



THE REPUBLIC OF UGANDA  
MINISTRY OF HEALTH

# Uganda Clinical Guidelines 2023

National Guidelines for Management  
of Common Health Conditions

## **Foreword**

The overall goal of Uganda's health system is to provide accessible, equitable and quality services to the population, in order to promote a healthy and productive life, which is a necessary factor for achieving socio-economic growth and national development.

Currently, the health system is faced with multiple challenges that include a high burden of infectious diseases that remain major causes of morbidity and mortality, such as HIV, malaria, tuberculosis, lower respiratory tract infections, malnutrition and meningitis. In addition, new threats keep emerging, for example, epidemics of hepatitis B, yellow fever, haemorrhagic fevers, COVID-19 and nodding disease. The increase of non-communicable conditions including diabetes, hypertension, heart diseases, cancer and mental disorders complicates the scenario.

The push towards universal health coverage, including universal access to AntiRetroviral Therapy (ART) and particular attention to neonatal, child, adolescent and maternal health, is also placing more demands on a system with limited resources.

To respond appropriately, the health system has to ensure high standards of quality and efficiency in service delivery. The Uganda Clinical Guidelines manual helps to achieve these standards by presenting updated, practical, and useful information on the diagnosis and management of common health conditions in Uganda. It also provides a rational basis for an efficient procurement and supply system that ensures the availability of safe, efficacious, quality medicines and health supplies.

The guidelines are based on principles of scientific evidence, cost effectiveness and prioritization of conditions to maximize the health benefit with limited resources.

The regular update of clinical guidelines and essential medicines lists is one of the key interventions in the Health Sector Development Plan 2015-2020, to promote the appropriate use of health products and technologies.

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## Preface

The Uganda Clinical Guidelines (UCG) evolved from the National Standard Treatment Guidelines 1993, which were the first of the type published in Uganda. Before then, individual guidelines existed to manage a limited number of specific conditions.

The purpose of national standard treatment guidelines is to provide evidence-based, practical and implementable guidance to prescribers to provide the most cost-effective and affordable treatment of priority health conditions in a country.

Together with the Practical Guidelines for Dispensing at Lower/ Higher Health Facility Level, which provide information about medicine characteristics, administration, and side effects, the UCG is designed as a practical tool to support daily clinical practice by providing a reliable reference for health workers on appropriate management of Uganda's common health conditions. It also gives health managers a reference tool to assess and measure service quality.

The guidelines are also the basis for the formulation of the essential medicines and health supplies list of Uganda (EMHSLU), which is used to guide supply and procurement. This allows for more efficient use of limited resources to improve rational prescribing.

The treatments described in the UCG are the nationally recognised standard treatments, and in many cases, they are derived from those recommended in the Ministry of Health Vertical Programmes, World Health Organisation, and other international guidelines.

The guidelines have been reviewed and updated through a three-month process involving extensive consultations with public health programs staff, medical experts and health workers of all cadres and various health development partners.

As medicine is an ever-evolving field, this manual is to be used for guidance, but cannot replace clinical judgement in individual cases.

The Ministry of Health and all those involved in updating the UCG sincerely hope that the manual will make a significant contribution to ongoing improvements in national therapeutic services and medicines utilisation.



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## Abbreviations

<b>3TC</b>	Lamivudine
<b>ABC</b>	Abacavir
<b>Ab</b>	Antibody
<b>ACE</b>	Angiotensin Converting Enzyme
<b>ACP</b>	Aids Control Program
<b>ACT</b>	Artemisinin-Based Combination Therapy
<b>ACTH</b>	Adrenocorticotrophic Hormone
<b>ADHD</b>	Attention Deficit Hyperactivity Disorder
<b>ADR</b>	Adverse Drug Reaction
<b>AFASS</b>	Acceptable, Feasible, Affordable, Sustainable And Safe
<b>(A)AFB</b>	(Alcohol) Acid-Fast Bacillus
<b>AIDS</b>	Acquired Immunodeficiency Syndrome
<b>ALP</b>	Alkaline Phosphatase
<b>ALT</b>	Alanine Aminotransferase
<b>AMI</b>	Acute Myocardial Infarction
<b>ANC</b>	Antenatal Care
<b>APH</b>	Antepartum Haemorrhage
<b>APPE</b>	Appropriate Personal Protective Equipment
<b>APRI</b>	Aspartate Aminotransferase (Ast) To Platelets Ratio Index
<b>aPTT</b>	Activated Partial Thromboplastin Time
<b>AQ</b>	Amodiaquine
<b>ARB</b>	Aldosterone Receptor Blocker
<b>ART</b>	Antiretroviral Therapy
<b>ARV</b>	Antiretroviral
<b>AS</b>	Artesunate
<b>ASA</b>	Acetylsalicylic Acid
<b>ASOT</b>	Anti-Streptolysin O Titre
<b>AST</b>	Aspartate Aminotransferase

<b>ATV</b>	Atazanavir
<b>AZT</b>	Zidovudine
<b>BCG</b>	Bacillus Calmette-Guérin
<b>BMI</b>	Body Mass Index
<b>BNP</b>	Brain Natriuretic Peptide
<b>BP</b>	Blood Pressure
<b>BPH</b>	Benign Prostatic Hyperplasia
<b>bpm</b>	Beats Per Minute
<b>BSE</b>	Breast Self-Examination
<b>BUN</b>	Blood Urea Nitrogen
<b>C&amp;S</b>	Culture And Sensitivity
<b>Ca2+</b>	Calcium
<b>CBC</b>	Complete Blood Count
<b>CCB</b>	Calcium Channel Blocker
<b>CD4</b>	Cluster Of Differentiation 4
<b>CIN</b>	Cervical Intraepithelial Neoplasia
<b>CK</b>	Creatin Kinase
<b>CKD</b>	Chronic Kidney Disease
<b>CLL</b>	Chronic Lymphocytic Leukaemia
<b>CM</b>	Cryptococcal Meningitis
<b>CML</b>	Chronic Myeloid Leukaemia
<b>CMM</b>	Cervical Mucus Method
<b>CMV</b>	Cytomegalovirus
<b>CNS</b>	Central Nervous System
<b>COC</b>	Combined Oral Contraceptive
<b>COPD</b>	Chronic Obstructive Pulmonary Disease
<b>CPD</b>	Cephalopelvic Disproportion
<b>CPK</b>	Creatine Phosphokinase



<b>CrAg</b>	Cryptococcal Antigen
<b>CRP</b>	C-Reactive Protein
<b>CSF</b>	Cerebrospinal Fluid
<b>CT</b>	Computed Tomography
<b>CuIUD</b>	Copper Bearing Intra-Uterine Device
<b>CVD</b>	Cardiovascular Disease
<b>CXR</b>	Chest X-Ray
<b>DBP</b>	Diastolic Blood Pressure
<b>DBS</b>	Dried Blood Spots
<b>DHA</b>	Dihydroartemisinin
<b>DIC</b>	Disseminated Intravascular Coagulation
<b>DKA</b>	Diabetic Ketoacidosis
<b>DMPA</b>	Depot Medroxyprogesterone Acetate
<b>DNA</b>	Deoxyribonucleic Acid
<b>DOT</b>	Directly Observed Therapy
<b>DOTS</b>	Directly Observed Treatment, Short-Course
<b>DPT</b>	Diphtheria, Pertussis, And Tetanus
<b>DRE</b>	Digital Rectal Exam
<b>DRV</b>	Darunavir
<b>DST</b>	Drug Susceptibility Testing
<b>DT</b>	Dispersible Tablet
<b>DTG</b>	Dolutegravir
<b>DVT</b>	Deep Vein Thrombosis
<b>EBV</b>	Epstein-Barr Virus
<b>EC</b>	Enteric Coated
<b>ECG</b>	Electrocardiogram
<b>ECP</b>	Emergency Contraceptive Pill
<b>EDD</b>	Estimated Delivery Date
<b>EFV</b>	Efavirenz

<b>ELISA</b>	Enzyme-Linked Immunosorbent Assay
<b>eMTCT</b>	Elimination Of Mother-To-Child Transmission
<b>ENT</b>	Ear, Nose, And Throat
<b>ESR</b>	Erythrocyte Sedimentation Rate
<b>ETV</b>	Etravirine F-75/F-100 Therapeutic Milk Formula 75 Or 100Kcals/100ML
<b>FB</b>	Foreign Body
<b>FBC</b>	Full Blood Count
<b>FDC</b>	Fixed Dose Combination
<b>FEV</b>	Forced Expiratory Volume
<b>FNAC</b>	Fine Needle Aspiration Cytology
<b>FP</b>	Family Planning
<b>FSH</b>	Follicle Stimulating Hormone
<b>G6PD</b>	Glucose 6 Phosphate Dehydrogenase
<b>GBV</b>	Gender-Based Violence
<b>GDM</b>	Gestational Diabetes Mellitus
<b>GERD</b>	Gastroesophageal Reflux Disease
<b>GFR</b>	Glomerular Filtration Rate
<b>GGT</b>	Gamma-Glutamyl Transferase
<b>GIT</b>	Gastrointestinal Tract
<b>H</b>	Hospital
<b>HAART</b>	Highly Active Antiretroviral Therapy
<b>Hb</b>	Haemoglobin
<b>HB</b>	Hepatitis B
<b>HbA1c</b>	Glycated Haemoglobin, Haemoglobin A1c
<b>HBeAg</b>	Hepatitis B Envelope Antigen
<b>HbF</b>	Foetal Haemoglobin F
<b>HbS</b>	Abnormal Haemoglobin
<b>HBsAg</b>	Hepatitis B Surface Antigen



<b>HBV</b>	Hepatitis B Virus
<b>HC</b>	Health Centre
<b>Hct/Ht</b>	Haematocrit
<b>HCW</b>	Health Care Worker
<b>HDU</b>	High Dependency Unit
<b>HE</b>	Hepatic Encephalopathy
<b>HepB</b>	Hepatitis B
<b>HHS</b>	Hyperosmolar Hyperglycaemic State
<b>Hib</b>	Haemophilus Influenzae Type B
<b>HIV</b>	Human Immunodeficiency Virus
<b>HPV</b>	Human Papilloma Virus
<b>HR</b>	Heart Rate
<b>HRP</b>	High-Risk Pregnancy
<b>HRS</b>	Hepatorenal Syndrome
<b>HSV</b>	Herpes Simplex Virus
<b>HVS</b>	High Vaginal Swab
<b>ICCM</b>	Integrated Community Case Management
<b>ICU</b>	Intensive Care Unit
<b>Ig</b>	Immunoglobulin
<b>IM</b>	Intramuscular
<b>IMNCI</b>	Integrated Management Of Neonatal And Childhood Illness
<b>IMPAC</b>	Integrated Management Of Pregnancy And Childbirth
<b>INH</b>	Isoniazid
<b>INR</b>	International Normalised Ratio
<b>IOP</b>	Intraocular Pressure
<b>IPT</b>	Intermittent Preventive Treatment
<b>IPT</b>	Isoniazid Preventive Therapy
<b>IPTp</b>	Intermittent Preventive Treatment Of Malaria In Pregnancy

<b>IPV</b>	Injectable Polio Vaccine
<b>IRIS</b>	Immune Reconstitution Inflammatory Syndrome
<b>ITN</b>	Insecticide -Treated Nets
<b>IU</b>	International Units
<b>IUD</b>	Intrauterine Device
<b>IUGR</b>	Intrauterine Growth Restriction Iv
<b>IYCF</b>	Infant And Young Child Feeding
<b>IVU</b>	Intravenous Urogram
<b>JMS</b>	Joint Medical Store
<b>JVP</b>	Jugular Vein Pressure
<b>KOH</b>	Potassium Hydroxide
<b>LAM</b>	Lactational Amenorrhoea
<b>LBW</b>	Low Birth Weight
<b>LDH</b>	Lactate Dehydrogenase
<b>LFT</b>	Liver Function Test
<b>LGV</b>	Lymphogranuloma Venerum
<b>LH</b>	Luteinizing Hormone
<b>LLINs</b>	Long-LastingInsecticideTreated Nets
<b>LMP</b>	Last Menstrual Period
<b>LMWH</b>	Low Molecular Weight Heparin
<b>LNG</b>	Levonorgestrel
<b>LOC</b>	Level Of Care
<b>LP</b>	Lumbar Puncture
<b>LPV</b>	Lopinavir
<b>LTBI</b>	Latent Tuberculosis Infection
<b>Max</b>	Maximum Dose
<b>MB</b>	Multibacillary
<b>mcg</b>	Microgram
<b>MCH</b>	Maternal And Child Health



<b>MCH</b>	Mean Corpuscular (Cell) Haemoglobin
<b>MCV</b>	Mean Corpuscular Volume
<b>MDR-TB</b>	Multi-Drug Resistant Tuberculosis
<b>MDT</b>	Multi-Drug Therapy
<b>MDVP</b>	Multi-Dose Vial Policy
<b>mhGAP</b>	Mental Health GapActionProgram
<b>MOH</b>	Ministry Of Health
<b>MRI</b>	Magnetic Resonance Imaging
<b>MRSA</b>	Multi-Resistant Staphylococcus Aureus
<b>MTB</b>	Mycobacterium Tuberculosis
<b>MU</b>	Mega Unit
<b>MUAC</b>	Mid-Upper Arm Circumference
<b>NaCl</b>	Sodium Chloride
<b>NBTS</b>	National Blood Transfusion Services
<b>NCD</b>	Noncommunicable Disease
<b>NDA</b>	National Drug Authority
<b>NET-EN</b>	Norethisterone Enanthate
<b>NG</b>	Nasogastric
<b>NGT</b>	Nasogastric Tube
<b>NMS</b>	National Medical Store
<b>NMCP</b>	National Malaria Control Program
<b>NNRTI</b>	Non-Nucleoside Reverse Transcriptase Inhibitors
<b>NPH</b>	Neutral Protamine Hagedorn (IsophaneInsulin)
<b>NPO</b>	Nil Per Os (Nothing By Mouth)
<b>NR</b>	National Referral (Hospital)
<b>NS</b>	Normal Saline
<b>NSAID</b>	Nonsteroidal Anti-Inflammatory Drugs
<b>NTLP</b>	National Tuberculosis And Leprosy Programme
<b>NTRL</b>	National TB Reference Laboratory
<b>NtRTI</b>	Nucleoside Reverse Transcriptase Inhibitors

<b>NVP</b>	Nevirapine
<b>OI</b>	Opportunistic Infection
<b>OPD</b>	Outpatient Department
<b>OPV</b>	Oral Polio Vaccine
<b>ORS</b>	Oral Rehydration Solution
<b>OTC</b>	Over The Counter
<b>PAP</b>	Papanicolaou Smear/Test
<b>PB</b>	Paucibacillary
<b>PBC</b>	Primary Biliary Cirrhosis
<b>PCP</b>	Pneumocystis Jirovecii Pneumonia
<b>PCR</b>	Polymerase Chain Reaction
<b>PCV</b>	Pneumococcal Conjugate Vaccine
<b>PE</b>	Pulmonary Embolism
<b>PEFR</b>	Peak Expiratory Flow Rate
<b>PEM</b>	Protein Energy Malnutrition
<b>PEP</b>	Post-Exposure Prophylaxis
<b>PGD</b>	Practical Guidelines For Dispensing At Lower/ Higher Level Health Facilities
<b>PI</b>	Protease Inhibitor
<b>PID</b>	Pelvic Inflammatory Disease
<b>PIH</b>	Pregnancy Induced Hypertension
<b>PMTCT</b>	Prevention of Maternal-To-Child Transmission
<b>PNFP</b>	Private Not-For-Profit
<b>POC</b>	Products Of Conception
<b>POI</b>	Progesterogen Only Injection
<b>POIM</b>	Progesterogen Only Implant
<b>POP</b>	Progesterogen Only Pill
<b>PPD</b>	Purified Protein Derivative
<b>PPE</b>	Personal Protective Equipment
<b>PPH</b>	Postpartum Haemorrhage



<b>PPQ</b>	Piperaquine
<b>PrEP</b>	Pre-Exposure Prophylaxis Prn As Needed
<b>PROM</b>	Premature Rupture Of Membrane
<b>PSA</b>	Prostate Specific Antigen
<b>PT</b>	Prothrombin Time
<b>PTT</b>	Partial Thromboplastin Time
<b>PUD</b>	Peptic Ulcer Disease
<b>PV</b>	Per Vagina
<b>QA</b>	Quality Assurance
<b>RAL</b>	Raltegravir
<b>RBC</b>	Red Blood Cell
<b>RDT</b>	Rapid Diagnostic Test Rhd
<b>RIA</b>	Radio Immune Assay
<b>RF</b>	Rheumatoid Factor
<b>RFT</b>	Renal Function Test
<b>RH</b>	Rifampicin + Isoniazid
<b>RHZE</b>	Rifampicin + Isoniazid + Pyrazinamide + Ethambutol
<b>RIF</b>	Rifampicin
<b>RL</b>	Ringer's Lactate
<b>RNA</b>	Ribonucleic Acid
<b>RPR</b>	Rapid Plasma Reagins [Assay]
<b>RR</b>	Regional Referral
<b>RR-TB</b>	Rifampicin-Resistant Tuberculosis
<b>RTV</b>	Ritonavir
<b>RUTF</b>	Ready-To-Use Therapeutic Food
<b>SAM</b>	Severe Acute Malnutrition
<b>SARS</b>	Severe Acute Respiratory Syndrome
<b>SBP</b>	Systolic Blood Pressure
<b>SC</b>	Subcutaneous

<b>SCA</b>	Sickle Cell Anaemia
<b>SCC</b>	Squamous Cell Carcinoma
<b>SCD</b>	Sickle Cell Disease
<b>sdNVP</b>	Single Dose Nevirapine
<b>SFH</b>	Symphysis-Fundal Height
<b>SJS</b>	Stevens-Johnson Syndrome
<b>SP</b>	Sulphadoxine + Pyrimethamine
<b>SpO<sub>2</sub></b>	Arterial Oxygen Saturation
<b>SSRI</b>	Selective Serotonin Reuptake Inhibitor
<b>STI</b>	Sexually Transmitted Infections
<b>T3 or T4</b>	Thyroxine 3 Or 4
<b>TB</b>	Tuberculosis
<b>TDF</b>	Tenofovir Disoproxil Fumarate
<b>TEN</b>	Toxic Epidermal Necrolysis
<b>TIG</b>	Tetanus Immunoglobulin Human
<b>TSH</b>	Thyroid Stimulating Hormone
<b>TST</b>	Tuberculin Skin Test
<b>TT</b>	Tetanus Toxoid
<b>U/S or US</b>	Ultrasound Sonography
<b>UBTS</b>	Uganda Blood Transfusion Service
<b>UCI</b>	Uganda Cancer Institute
<b>UCMB</b>	Uganda Catholic Medical Bureau
<b>UE</b>	Urea Electrolytes
<b>UHI</b>	Uganda Heart Institute
<b>UHSC</b>	Uganda Health Supply Chain
<b>ULN</b>	Upper Limit Of Normal
<b>UNEPI</b>	Uganda National Expanded Program On Immunisation
<b>UNHLS</b>	Uganda National Health Laboratory Services



<b>USAID</b>	United States Agency For International Development
<b>UTI</b>	Urinary Tract Infection
<b>UV</b>	Ultraviolet
<b>UVF</b>	Ureterovaginal Fistula
<b>UVRI</b>	Uganda Virus Research Institute
<b>VCT</b>	Voluntary Counselling And Testing
<b>[HIV]</b>	Venereal Disease Research Laboratory [Test]
<b>VDRL</b>	
<b>VEN</b>	Vital Essential Necessary
<b>VHT</b>	Village Health Team
<b>VIA</b>	Visual Inspection With Acetic Acid
<b>VILI</b>	Visual Inspection With Lugol's Iodine
<b>VL</b>	Viral Load
<b>VSC</b>	Voluntary Surgical Contraception
<b>VTE</b>	Venous Thromboembolism
<b>VVF</b>	Vulvovaginal Fistula
<b>VVM</b>	Vaccine Vial Monitor
<b>VZV</b>	Varicella Zoster Virus
<b>WB</b>	Whole Blood
<b>WBC</b>	White Blood Cell
<b>WFA</b>	Weight For Age
<b>WFH/L</b>	Weight For Height/ Length
<b>WHO</b>	World Health Organisation
<b>WOA</b>	Weeks of Amenorrhea
<b>XDR-TB</b>	Extensively Drug Resistant Tuberculosis
<b>ZN</b>	Ziehl - Neelsen[Stain]
<b>Zn</b>	Zinc

# Introduction to Uganda Clinical Guidelines 2023

This fully updated publication replaces the UCG 2023 and is being circulated to all public and private sector prescribers, pharmacists, Training Institutions and regulatory authorities in the country.

For effective use of the UCG, it is recommended that carefully designed dissemination sessions be organized countrywide to ensure that users appreciate the new features, changes, structural arrangement and content to improve its usability .

The following sections will present the structure and main features of the guideline to highlight the changes in this latest edition and help the user become familiar with the book and use it effectively.

## What is the aim of the UCG?

The UCG aims to provide summarized easy-to-use, practical, complete and useful information on how to quickly and correctly diagnose and manage common conditions you are likely to encounter. This will ensure that patients receive the best possible clinical services and obtain prompt and effective relief from or cure of their complaint, thereby making the most appropriate use of scarce diagnostic and clinical resources, including medicines. It should, however, be emphasised that the UCG does not replace or substitute available textbooks on the subject.

## Why is the UCG necessary?

Medicine is an ever-evolving and expanding field in terms of needs and knowledge. The UCG helps the country to prioritize and effectively use limited resources by guiding the procurement system to ensure the availability of the most needed medicines and supplies.

## Being a health worker today...



NEW TREATMENTS...  
NEW GUIDELINES...  
NEW PRIORITIES...  
NEW POLICIES...  
NEW DISEASES...  
NEW DIAGNOSTICS...

In the context of new knowledge and changing priorities, as a tool, the UCG assists health workers in their daily practice by providing information in an easy-to-follow and practical format.

### How do I use the UCG?

**First of all, familiarize yourself with it.** Check the table of contents and see how the chapters are arranged and organized.

#### New Feature

The order of chapters has been maintained as in the previous versions. However, new chapters have been introduced, namely, self-care, management of hypoxia and COVID-19. The Palliative Care section has been expounded with more clarity. For the first time a purely herbal preparation with selenium has been included for management of stress. The snake bite section has been enriched with photographs of the common virulent snakes found in Uganda, to ease identification and thus more accurate intervention and management.

Most chapters are organised by disease monographs, arranged either in alphabetical order or another logical order (e.g., according to occurrence of disease progression). However, some chapters are organised according to syndrome or symptoms (e.g., child health, palliative care, oncology, sexually transmitted infections, emergencies and trauma), while TB and HIV are presented as individual sub-chapters.

### New Feature

The chapters Covid -19, Self-care and Hypoxia management have been added with focus on primary care (prevention and early recognition of symptoms).

Disease monographs are organized in the order of: definition, cause/risk factors, clinical features and complications, differential diagnosis, investigations, management, and prevention.

### New Feature

Palliative care ladder has been introduced to make it easier for pain assessment. Treatments are presented in logical order from non-pharmacological to

pharmacological, from the lower to the higher level of care. Where possible, alternatives and second-line options have been presented, as well as referral criteria.

Medicines are presented by their generic name, in **bold**. Unless otherwise specified, dosages are for adults and via oral route. Children's dosages are added whenever indicated, as well as duration and other instructions.

The level of care (LOC) is an important feature; it provides information about the level at which the condition can be appropriately managed. Often, treatment can be initiated at lower level, but the patient needs to be referred for further management, or for second-line treatment, or for complications. For antibiotics, it is recommended that treatment can be initiated in some cases awaiting laboratory results. HC1-4 refers to health centres of different levels (with HC1 being the community level), H to general hospital, RR to regional referral hospital, and NR to national referral hospital.

**After familiarizing yourself with it, try using it!** Practice finding conditions and looking them up to see how they are managed, using either the table of contents at the beginning or the index at the end.

**Read all the introductory sections.** They will give you useful advice for your daily practice. There is always something new to learn or to be reminded of.

**Use it in your daily practice.** The UCG is designed as a simple reference manual to keep at your work station, where you can consult it any time. Using it in front of patients and colleagues will show that you care deeply about the quality of your work, and it will provide good examples to other health workers.

The UCG cannot replace healthworkers' knowledge and skills; like your thermometer and stethoscope, it is a tool to help improve clinical practice by providing a quick and easily available summary of the recommended management of common health conditions.



#### **What is the difference between the UCG and a textbook?**

The UCG gives a summary of recommendations for managing priority conditions in Uganda. It does not provide extensive or in-depth information about all diseases and all treatments available in the world.

Conditions have been selected based on their prevalence in the country and their impact on the population's health status. Treatments have been selected based on the following criteria:

**Scientific evidence:** recommendations are evidence-based, from international literature and local experts. For example, the situation analysis on antimicrobial resistance in Uganda conducted by the National Academy of Sciences was used to guide the choice of antibiotic treatments.

**Cost-effectiveness:** treatments have been selected based on their effectiveness, but also their affordability, to get the best “value for money”, meaning the maximum benefit with the limited resources available. For example, a liver transplant is a very effective way to treat terminal cirrhosis, but it is definitely not affordable—money is better invested in treating patients with chronic hepatitis B!

### What has changed compared to the previous edition?

- ⦿ There are more chapters as explained before.
- ⦿ The management sections have been re-edited to be more user-friendly, using the suggestions collected during a user survey.
- ⦿ Information on new diseases has been added, following new epidemics and public health priorities (e.g., viral haemorrhagic fevers, Covid-19, yellow fever, nodding disease, sickle cell disease, newborn illnesses).
- ⦿ More attention has been paid to non-communicable chronic diseases; for example, stroke and chronic obstructive pulmonary disease (COPD), and sections on diabetes, hypertension, asthma and mental conditions including diseases of elderly and dementia have been expanded.
- ⦿ Recommendations have been aligned with the most recent national and international guidelines related to ART, TB, malaria, IMNCI, IMPAC, mhGAP (see the list of references in Appendix 4).
- ⦿ Medications have been added or deleted and level of care has changed according to recent evidence and national policies.

- ② Skin management of Albinos using a sunscreen protection product has been included under the dermatological section.
- ③ The essential medicines list has been removed from this edition to make the book pocket friendly.

### What about the Essential Medicines and Health Supply List (EMHSLU)?

The essential medicines list has been removed from this edition to make the book pocket friendly. Always refer to the separate EMHSLU.

To implement the recommendations in the UCG, the medicines listed in the EMHSLU have to be procured and distributed in adequate quantity. This is why the procurement and supply system plays a fundamental role in the provision of quality healthcare.



The EMHSLU has all the medicines recommended in the UCG, with specification of the level of care (LOC) at which they can start being used, but it also has additional “specialty” medicines, which are items used at referral level (regional or national) or in the context of specialized services. They may not be included in the UCG, which focus more on primary care, but are still part of the list because they need to be procured to ensure the provision of a wider range of services at secondary and tertiary levels. In the context of limited resources, it is very important to learn to prioritize medicines for procurement: this is reflected by the vital, essential, necessary (VEN) classification in the EMHSLU, introduced in 2012.

Medicines are classified into three categories according to health impact:

**V:** vital medicines are potentially life-saving, and lack of availability would cause serious harm and side effects. These must ALWAYS be available—for example insulin, metformin, most antibiotics, first-line antimalarials, some anti-epileptics, and parenteral diuretics.

**E:** essential medicines are important; they are used to treat common illnesses that are maybe less severe but still significant. They are not absolutely needed for the provision of basic health care (e.g., anti-helminthics, pain killers).

**N:** necessary (or sometimes called non-essential) medicines are used for minor or self-limiting illnesses, or may have a limited efficacy, or a higher cost compared to the benefit.

Every effort has to be made to ensure health facilities do not suffer stock-outs of VITAL MEDICINES.

#### AWaRe classification

The WHO AWaRe classification was used to describe overall antibiotic use as assessed by the variation between use of Access, Watch, and Reserve antibiotics.

#### Why is a laboratory test menu in the appendix?

Laboratory is an important tool in supporting the diagnosis and management of various conditions. Tests are listed according to the level at which they can be performed, in order to inform health workers about the available diagnostics at each level for the suspected condition and guide on management or referral decisions.



# Primary Health Care

## Definition

Primary healthcare is **essential healthcare** based on practical, scientifically sound and socially acceptable methods and technologies. Primary healthcare should be universally **accessible** to individuals and families **in the community** through their full **participation** and at a cost that the community and country can afford in the spirit of **self-reliance** and **self-determination**.

Primary healthcare forms an integral part of both the country's health system, of which it is the main focus, and of the community's overall social and economic development.

Primary healthcare brings healthcare as close as possible to where people live and work and is the community's **first level of contact** with the national health system.

"Primary health care is the key to the attainment of the goal of Health for All."

—Declaration of Alma-Ata International Conference on Primary Health Care, Alma-Ata, USSR, 6–12 September 1978



## How to diagnose and treat in primary care

The principles of healthcare are the same wherever it takes place.

**“Listen to the patient; he is telling you the diagnosis”**

—Sir William Osler, MD, 1849–1919.

### Communication skills in the consultation room

Good communication skills are essential for making a correct diagnosis and for explaining or counselling on the illness, its treatment, and prevention of future illness.



At the beginning of the consultation, use open questions, which allow the patient to express him or herself freely, listen without interrupting, and give him or her the chance to share their interpretations, fears and worries.



#### The Golden Minute

The golden 60 seconds at the start of the consultation is eliciting ideas, concerns and expectations without interrupting.

Move to more specific questions later, to ask for further details and clarifications.

## The Seven Steps in a Primary Care Consultation

### 01. Greet

- Greet and welcome the patient. Ensure adequate space and privacy!

### Look

### 02.

- Observe the patient as he/she walks into your room for degree or state of illness. Look for danger signs and act immediately if necessary

### Listen

### 03.

- Ask about the main complaint or complaints, establish duration, and explore each symptom asking relevant questions
- Briefly ask about previous medical history, other past or present illnesses and current or recent medications

### Examine

### 04.

- Perform a complete medical examination, focused on but not limited to the complaints

### Suspect diagnosis

### 05.

- Write your findings, and think about possible diagnosis and differentials

### Test

### 06.

- Request tests to confirm or exclude possible diagnosis

### Treat

### 07.

- Conclude on a diagnosis and decide on the treatment, if needed
- Explain diagnosis, treatment, and follow-up to the patient
- Give counselling and advice as appropriate

## NEW FEATURE

Introduced a section on self-care interventions for sexual and reproductive health (SRH), in the categories of self-awareness, self-testing and self-management, across the various health areas of Antenatal Care, Family Planning, HIV and STIs and post abortion care.

WHO defines self-care as the ability of individuals, families and communities to promote health, prevent disease, maintain health, and cope with illness and disability with or without the support of a healthcare provider.

The Ministry of Health developed the National Guideline on Self-Care Interventions for SRH. For details refer to the current guidelines

## Chronic Care

- Health workers are faced with an increasing number of chronic diseases and conditions that require additional attention, such as hypertension, chronic heart problems, diabetes, cancers, mental conditions, HIV/AIDS, and TB.
- Communication is even more important to:
- Find out the duration of the symptoms, previous diagnosis, previous or current treatments and impact on daily life
- Explain the nature and management of the condition to the patient and counsel on lifestyle and adjustment
- Chronic diseases require long-term (sometimes lifelong) follow-up and treatment:
- Counsel and advise the patient on the importance of follow-up and treatment adherence
- Set up a system for scheduling appointments (on the model of HIV care!)
- At each monitoring visit, determine whether the patient's

condition is improving, stable, or deteriorating and assess whether patients are taking prescribed treatments properly (the right medicines, in the right doses, at the right time). Try to be consistent in prescribing and change the regimen only if it is not working or has side effects. If a treatment is working and well tolerated, maintain it!

- Ⓐ Counsel and motivate the patient to follow lifestyle recommendations, including selfcare.
- Ⓐ Assess the need for further support (e.g., pain management, counselling, etc.)
- Ⓐ A chronic care system requires collaboration among and integration of all levels of healthcare
- Ⓐ Higher levels of care may be responsible for initial diagnosis and prescription of treatment and periodic reviews and re-assessment in case of problems or complications
- Ⓐ Lower levels of care (including the community) may be responsible for routine follow-up, counselling and education, medication refills and prompt and early referral in case of problems.

### Appropriate Medicines Use

According to WHO, “Rational [appropriate] use of medicines requires that patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements, for an adequate period of time, and at the lowest cost to them and their community”.

Inappropriate medicine use can not only harm the patient, but by wasting resources, may limit the possibility of other people accessing healthcare! Both health workers and patients have an important role to play in ensuring appropriate use by:

- Ⓐ Prescribing (and taking) medicines ONLY when they are needed
- Ⓐ Avoiding giving unnecessary multiple medications to satisfy patients’ demands or for financial gain

- ⑤ Avoiding expensive alternative or second-line medications when an effective and inexpensive first-line is available
- ⑤ Avoiding injections when oral treatment is perfectly adequate
- ⑤ Ensuring that the correct dose and duration of treatment is prescribed, especially for antibiotics, to avoid resistance
- ⑤ Providing adequate information and counselling to the patient to ensure adherence with instructions.

### **Antimicrobial Resistance (AMR)**

According to the WHO definition

“Antimicrobial resistance occurs when microorganisms such as bacteria, viruses, fungi and parasites change in ways that render the medications used to cure the infections they cause ineffective. Antimicrobial resistance is facilitated by the inappropriate use of medicines, for example, when taking substandard doses or not finishing a prescribed course of treatment. Low-quality medicines, wrong prescriptions and poor infection prevention and control also encourage the development and spread of drug resistance”.

The problem of AMR is a serious threat for the modern world:

- ⑤ The resistance of malaria parasites has caused several changes in antimalarial regimens in the last 15 years
- ⑤ MDR-TB (multi-drug resistant tuberculosis) is spreading and requires long and complex treatments
- ⑤ HIV resistance is a serious concern, especially after long-term treatment
- ⑤ AMR is spreading and, in some cases, commonly used antimicrobials are not as effective as before
- ⑤ Antimicrobial resistance among bacteria other than TB and fungi (moulds and yeasts) that affect the immune-compromised is evolving, spreading and responsible for death from sepsis in general and high dependency units.

Inappropriate use of antibiotics (in human medicine but also in animal agriculture), poor quality products and ineffective infection control measures are all contributing factors. We are seriously at risk of finding ourselves in a situation with no affordable antimicrobial available to cure common and dangerous infections.

It is URGENT that both health workers and patients become aware of the problem and start acting by:

- ⦿ Using antimicrobials only when it is really necessary and according to recommendations (e.g. not for simple viral infections!)
- ⦿ Avoiding self-prescription of antibiotics
- ⦿ Avoiding using last generation and broad spectrum antibiotics as first-line treatment
- ⦿ Prescribing correct dosages for the correct duration and ensuring adherence to the prescription
- ⦿ Practising strict measures of infection control in health facilities
- ⦿ Improving hygiene and sanitation in the community, thereby reducing the circulation of germs.

### **AWaRE**

- ⦿ WHO has further introduced the AWaRE classification to guide prescribers during prescribing of antibiotics. The major focus of AWaRe approach is to reduce on the increasing antimicrobial resistance.
- ⦿ The principle of AWaRe prescribing is based on **Access, Watch, Reserve**.
- ⦿ Prescribers are encouraged to adhere to the above.

## Prescribing Guidelines

The current PGD (Practical Guidelines for Dispensing at Lower/ Higher Level Health Facilities), provide comprehensive information about how to prescribe and dispense the medicines listed in the EMHSLU and UCG 2023. Carefully consider the following key questions before writing any prescription:

QUESTION	COMMENTS
Does the diagnosed condition require drug treatment?	<ul style="list-style-type: none"> <li>⦿ Not all patients or conditions need a prescription for medicines (condition is self-limiting): non-medicine treatments or simple advice may be more suitable in certain situations</li> </ul>
Is the prescribed treatment likely to have optimum therapeutic effect and to benefit the patient?	<ul style="list-style-type: none"> <li>⦿ Good therapeutics depends on:</li> <li>⦿ Accurate diagnosis of the condition</li> <li>⦿ Knowledge of the relevant available medicines</li> <li>⦿ Ask patient about previous drug history (eg. drug reaction /allergy)</li> <li>⦿ Selection of the most appropriate medicine, dose, route, and duration</li> <li>⦿ In all cases, carefully consider the expected benefit of a prescribed medication against its potential risks</li> </ul>
Is the selected dosage-form the most appropriate?	<ul style="list-style-type: none"> <li>⦿ For systemic medications, ALWAYS USE THE ORAL ROUTE if possible, as it is the cheapest and least hazardous route</li> <li>⦿ Always resist patient demands for you to prescribe injections or other expensive dose forms when they are not clearly indicated or appropriate</li> </ul>

QUESTION	COMMENTS
	<ul style="list-style-type: none"><li>⦿ LIMIT INJECTIONS to situations where they are absolutely necessary (they carry risks and are more expensive)</li><li>⦿ Always explain to the patient the reasons for choosing a certain route</li></ul>
Can I justify using a combination of medicines?  Do I really need to prescribe more than one medicine?	<ul style="list-style-type: none"><li>⦿ Do not prescribe a combination of medicines unless they have a proven and significant therapeutic advantage over corresponding single ingredient preparations</li><li>⦿ Do not practise multiple medicine prescribing (polypharmacy), especially when the diagnosis is uncertain. It is a tremendous waste of resources and puts the patient at increased risk without clear benefit</li></ul>
Have I taken into account all relevant patient criteria?	<p>Consider the following:</p> <ul style="list-style-type: none"><li>⦿ Age, gender, weight—especially of children and elderly</li><li>⦿ Likelihood of side effects (including allergies)</li><li>⦿ Presence of renal or hepatic disease (many medicines may have to be used in reduced doses or avoided completely)</li><li>⦿ Any other medicines the patient may be taking (risk of unwanted medicine interactions or adverse effects)</li></ul>

QUESTION	COMMENTS
	<ul style="list-style-type: none"> <li>Ⓐ Pregnancy and breastfeeding: only use medicines in pregnancy if the expected benefit to the mother is greater than any risk to the foetus/ baby and avoid all medicines if possible during the first trimester (the first three months of pregnancy)</li> <li>Ⓑ Likely degree of adherence to treatment (simpler, shorter dosage regimes increase the chance of</li> <li>Ⓒ the patient correctly following prescribed therapy)</li> </ul>

## Prescribing placebos

Avoid placebos whenever possible. Instead, spend some time reassuring and educating the patient. Use home remedies when possible (e.g., honey for cough in adults and children above 1 year).



### Prescription writing

A wrong prescription is very risky for you and your patient.

Unclear, incomplete, or inaccurate prescriptions are very dangerous for the patient. To avoid problems, follow the guidance below in writing your prescriptions:

PRESCRIPTION WRITING RULES
<ul style="list-style-type: none"> <li>Ⓐ Write all prescriptions legibly in ink</li> </ul>
<ul style="list-style-type: none"> <li>Ⓑ Poor writing may lead to errors in interpretation by the dispenser, which may have harmful and possibly life-threatening consequences for the patient</li> </ul>

## PREScription WRITING RULES

- Write the full name, age, gender and address of the patient, then sign and date the prescription form
- All prescriptions should clearly indicate the name and address of the prescriber and of the facility
- **A PRESCRIPTION IS A LEGAL DOCUMENT**
- Write the name of the medicine or preparation using its full generic name.
- Unofficial abbreviations, trade names, and obsolete names should not be used.
- State the strength of the medicine prescribed where relevant:
- Quantities of one gram or more should be written as 1g, 2.5g, 10g, and so on
- Quantities <1g but >1mg should be expressed in milligrams rather than grams, for example, 500mg and not 0.5g
- Quantities <1mg should be expressed in micrograms and not in mg, for example, 100 micrograms rather than 0.1 mg or 100 mcg
- If decimal figures are used, always write a zero in front of the decimal point where there is no other figure, for example 0.5 ml and not .5 ml
- Always state dose regimen in full:
  - Dose size, Dose frequency, Duration of treatment
  - The quantity to be dispensed is calculated from the regimen.
  - For example, doxycycline 100 mg every 12 hours for 7 days = to be dispensed: 14 tablets of 100 mg.
  - For in-patients, clearly state the route of administration and specify time of administration, if relevant

## PREScription WRITING RULES

- Avoid use of instructions like “prn” or “to be used/taken as required”. Indicate a suitable dose frequency instead
- In the few cases where “as required” is appropriate, always state the actual quantity of the medicine to be supplied, when to take it and maximum amount
- Where relevant, always remember to include on the prescription any special instructions necessary for the correct use of a medicine or preparation, for example “before food” or “apply sparingly”.

### Controlled medicine prescriptions

These medicines are covered by the provisions of the National Drug Policy and Authority Act 1993, which should be consulted for details of the appropriate legal requirements as stipulated. Medicines covered by the Act and appear in the UCG 2023 or EMHSLU 2023 include:

- Morphine injection
- Morphine oral solution
- Papaveretum + hyoscine injection
- Pethidine injection
- Codeine
- Tramadol
- Diazepam injection

These are all medicines of potential abuse that may result in dependence. All procedures involving them should be carefully recorded in the appropriate record books. They may only be prescribed by authorised prescribers who must observe the following legal requirements:

- Prescriptions must be in the prescriber’s own handwriting, with a signature, date and the prescriber’s address



- Prescriptions must state the name and address of the patient
- Prescriptions must state the total amount of the product to be supplied in words and figures
- It is an offence for a prescriber to issue and for a pharmacy to dispense prescriptions for controlled medicines unless they are in full compliance with the requirements of the law.



### Notes

- Specialised palliative care nurses and clinical officers are authorised to prescribe oral morphine and other medicines used in palliative care.
- Morphine rarely causes psychological dependence when prescribed for severe pain.
- In certain exceptional circumstances, senior nurses in charge of departments, wards or theatres and midwives may also obtain and administer certain specified controlled medicines. Consult the relevant sections of the Act for details of the appropriate legal requirements in each case.
- Hospital in-patient prescriptions written on treatment cards or case sheets and signed/dated by the person administering the medicine are considered as compliant under the Act.

### Prescribing in children and the elderly

In these guidelines, paediatric medicine doses are usually given according to body weight and not age, and are therefore expressed as mg/kg.

The main reason for this is that children of the same age may vary significantly in weight. Thus, it is safer and more accurate to prescribe medicines according to body weight. Moreover, this should encourage the good practice of weighing children whenever possible.

However, as a guide to prescribing by weight when a weighing scale is not available, the weight-for-age charts at the end of Chapter 17 can be used as an estimate for children from 1-24 months and 2-15 years, respectively. Always use lean/ideal body weight for children who are overweight/obese to avoid giving them overdoses.

**Note: Paediatric doses calculated using mg/kg should not exceed the normal adult dose.**

In the case of some medicines that have a wide therapeutic range and a good safety profile, dosages are given for age ranges for easy reference.

Prescriptions in the elderly also need additional attention because the elderly are more prone to side effects; they are more likely to take several medications(polypharmacy)with possible interactions, and they often have co-morbidities that can affect their response to medicines. Reduced doses and careful monitoring are always advised, and specific warnings have been added for some medicines.

### **Medicine interactions**

Before prescribing any medicine, take care to avoid problems of interactions with other medicines by obtaining details of any other medication that the patient is taking, whether the medication is:

- Ⓐ Also prescribed at the same time
- Ⓑ Previously prescribed by another prescriber for the same or another condition and currently being taken by the patient
- Ⓒ Purchased or otherwise obtained by the patient for purposes of self-medication at home.



**Note on interactions with alcohol.** If a prescribed medicine interacts with alcohol (for example, metronidazole, diazepam, anti-diabetic medicines, and tricyclic antidepressants), caution the patient to avoid taking alcoholic drinks during the course of treatment and for 48 hours afterwards.

### Patient counselling

This vital part of patient management is often neglected with potentially serious consequences. Although counselling the patient may take time, if done systematically, it should only take a few minutes and could make the difference between treatment success and failure.

Include the following key components when counselling the patient:

- ⦿ Explain the diagnosis and the likely cause of the disease or condition and discuss the proposed approach to treatment
- ⦿ Describe the prescribed medicine therapy in detail including:
  - Medicine name
  - Function of the medicine
  - Dose regimen (size, frequency, duration)
  - Any additional instructions on correct use or storage of the medicine

- Any likely side effects and what to do if they occur
  - Advise on important medicine interactions (including with alcohol)
  - Give advice on how to contribute to the success of the treatment (for example, rest, diet, fluids and other lifestyle changes) and how to avoid the same problem in future
  - Ensure the patient or caretaker fully understands the information and advice provided—ask him or her to repeat key points
  - For health conditions that require self-care, proper advice should be given to the patient on self-awareness, self-testing and self-management.
- Ensure the patient is satisfied with the proposed treatment and has an opportunity to raise any problems or queries with you.

# 1 Emergencies and Trauma

## 1.1 COMMON EMERGENCIES

### 1.1.1 Anaphylactic Shock

ICD10 CODE: T78.2

Severe allergic reaction that occurs rapidly (seconds or minutes) after administration, or exposure, and may be life threatening. It generally affects the whole body.

#### Causes

- ⦿ Allergy to pollens, some medicines (e.g., penicillins, vaccines, acetylsalicylic acid), or certain foods (e.g. eggs, fish, cow's milk, nuts, some food additives)
- ⦿ Reaction to insect bites, e.g., wasps and bees

#### Clinical features

- ⦿ Body itching, hives (urticarial rash), swelling of lips, eyes, tongue
- ⦿ Difficulty in breathing (stridor, wheezing)
- ⦿ Hypotension and sudden collapse, excessive sweating, thin pulse
- ⦿ Abdominal cramps, vomiting and diarrhoea.

#### Differential diagnosis

- ⦿ Other causes of shock, e.g., haemorrhagic (due to bleeding), hypovolemic (severe dehydration), septic
- ⦿ Asthma, foreign body in airways.

## Management

TREATMENT	LOC
<p><b>General measures</b></p> <p>Determine and remove the cause Secure the airways Restore BP: lay the patient flat and raise feet Keep patient warm</p>	HC2
<p>Sodium chloride 0.9% infusion 20 ml/kg by IV infusion over 60 minutes</p> <ul style="list-style-type: none"> <li>– Start rapidly then adjust rate according to BP</li> </ul> <p>Administer oxygen</p>	HC3 HC4
<p>Adrenaline (epinephrine) injection 1 in 1000 (1 mg/ml) 0.5 mg (0.5 ml) IM immediately, into anterolateral thigh</p> <ul style="list-style-type: none"> <li>– Repeat every 5-10 minutes according to BP, pulse rate, and respiratory function until better</li> </ul> <p>Child &lt;6 years: 150 micrograms (0.15 ml) Child 6-12 years: 300 micrograms (0.3 ml)</p>	HC2
<p><b>In severely affected patients</b></p> <p>Hydrocortisone 200 mg IM or slow IV stat</p> <p>Child &lt;1 year: 25 mg Child 1-5 years: 50 mg Child 6-12 years: 100 mg</p>	HC3
<p><b>If urticaria/itching</b></p> <p>Give an antihistamine as useful adjunctive treatment e.g., chlorpheniramine 4 mg every six hours</p> <p>Child 1-2 years: 1mg every 12 hours Child 2-5 years: 1 mg every 6 hours Child 5-12 years: 2 mg every 6 hours -Or Cetirizine 5mg once daily for adults Child 6 and above years: 5mg daily Child 1-6 years: 2.5mg once daily.</p>	HC2V

TREATMENT	LOC
<p>or promethazine 25-50 mg by deep IM or very slow IV (or oral)  Child 1-5 years: 5 mg by deep IM  Child 5-10 years: 6.25-12.5 mg by deep IM  Repeat dose every 8 hours for 24-48 hours to prevent relapse  Repeat adrenaline and hydrocortisone every  2-6 hours prn depending on the patient's progress</p>	HC4

### Notes

- Adrenaline: IM is the route of choice: absorption is rapid and more reliable than SC
- Monitor the patient for several hours (reaction may recur after several hours)
- If drug reaction, compile adverse drug reaction reporting form (see appendix 2)

### Prevention

- ⦿ Always ask about allergies before giving patients new medicine
- ⦿ Keep emergency drugs at hand at health facilities and in situations where risk of anaphylaxis is high, e.g. visiting bee hives or places that usually harbour snakes
- ⦿ Counsel allergic patients to wear alert bracelet or tag.

### 1.1.2 Hypovolaemic Shock ICD10 CODE: R57.1

Condition caused by severe acute loss of intravascular fluids leading to inadequate circulating volume and inadequate perfusion.

### Causes

- ⦿ Loss of blood due to internal or external haemorrhage (e.g., post partum haemorrhage, splenic rupture etc.)

- Acute loss of fluids, e.g. in gastroenteritis, or extensive burns

### Clinical features

- High heart rate, fast breathing rate
- Thin or absent pulse, cold extremities, slow capillary refill
- Low blood pressure
- Mental agitation, confusion

### Classification of hypovolaemia in adults

Indicator	Class 1 Mild	Class 2 ProGressing	Class 3 Severe	Class 4 End Stage
Blood loss (Litres)	<0.75	0.75 – 1.5	1.5 – 2	>2
% of total blood volume loss	<15	15- 30	30 – 40	>40
Pulse rate	Normal	>100	>120	>140
Pulse pressure	Normal	â	ââ	ââ/A
Systolic BP	Normal	N	â	ââ
Capillary refill	Normal	â	ââ	Absent
Respiratory rate	Normal	20 – 30	30 – 40	>45 or gasping
Mental state	Alert	Anxious	Confused	Confused/ unconscious
Urine output (ml/h)	>30	20 - 30	5 – 20	<5

### Differential diagnosis

- Other types of shock



## Management in adults

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Control obvious bleeding with pressure</li> <li><input type="checkbox"/> Keep patient lying down with raised legs.</li> </ul>	HC3
<b>If established hypovolaemia class 2 and above</b>	
<ul style="list-style-type: none"> <li>▪ Set 2 large bore IV lines</li> <li>▪ IV fluids <b>Normal Saline 0.9%</b> (or <b>Ringer's lactate</b>) 20-30ml/kg over 60 minutes according to response</li> <li>- If possible, warm the fluid</li> <li>- Start rapidly, monitor BP</li> <li>- Assess response to fluid resuscitation: BP, HR, RR, capillary refill, consciousness and urinary output</li> </ul> <p><input type="checkbox"/> If internal or external haemorrhage, consider blood transfusion</p>	
<b>If rapid improvement and stable (blood loss &lt;20% and not progressing)</b>	HC4
<ul style="list-style-type: none"> <li><input type="checkbox"/> Slow IV fluids to maintenance levels</li> <li><input type="checkbox"/> No immediate transfusion but do cross-matching</li> <li><input type="checkbox"/> Regular reassessment</li> <li><input type="checkbox"/> Detailed examination and definitive treatment according to the cause</li> </ul>	
<b>If transient improvement (blood loss 20-40% or ongoing bleeding)</b>	
<ul style="list-style-type: none"> <li><input type="checkbox"/> Rapid administration of fluids</li> <li><input type="checkbox"/> Initiate blood transfusion (see section 11.2)</li> <li><input type="checkbox"/> Regular reassessment</li> <li><input type="checkbox"/> Detailed examination and early surgery</li> </ul>	
<b>If no improvement</b>	
<ul style="list-style-type: none"> <li><input type="checkbox"/> Vigorous fluid administration</li> <li><input type="checkbox"/> Urgent blood transfusion</li> <li><input type="checkbox"/> Immediate surgery</li> </ul>	

TREATMENT	LOC
<p><b>Caution</b></p> <p>Do not use glucose solution or plain water as replacement fluids</p>	

### 1.1.2.1 Hypovolaemic Shock In Children

Principles of management are similar to the ones in adults BUT:

- Recognising this may be more difficult than in adults
- Vital signs may change little, even when up to 25% of blood volume is lost (class 1 and 2 hypovolaemia)
  
- Tachycardia is often the first response to hypovolaemia but may also be caused by fear or pain

#### Classification of hypovolaemia in children

Indicator	Class 1 Mild	Class 2 Progressing	Class 3 Severe	Class 4 End Stage
% of total blood volume loss <15		15-25	25-40	>40
Pulse rate	Normal	>150	>150	>150
Pulse pressure	Normal	N	↓	Absent
Systolic BP	Normal	N	↓	Absent
Capillary refill	Normal	↑	↑↑	Absent
Respiratory rate	Normal	N/↑	↑↑	↑↑ Slow sighing
Mental state	Normal	Irritable	Lethargic	Comatose
Urine output (ml/kg/hour)	<1	<1	<1	<1

## Normal ranges for vital signs in children

Age (Years)	Pulse (Rate/Min)	Systolic Bp (Mmhg)	Respiration (Rate/Min)	Blood Vol (Ml/Kg)
<1	120–160	70–90	30–40	85–90
1–5	100–120	80–90	25–30	80
6–12	80–100	90–110	20–25	80
>12	60–100	100–120	15–20	70

## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Initial fluid challenge should represent 25% of blood volume as signs of hypovolaemia may only show after this amount is lost</li> <li><input type="checkbox"/> If there are signs of class 2 hypovolaemia or greater, give 20-30 ml/kg of Normal Saline 0.9% (or Ringer's lactate) over 60 minutes <ul style="list-style-type: none"> <li>- Start rapidly</li> <li>- Monitor BP</li> <li>- Reduce rate depending on BP response</li> </ul> </li> <li><input type="checkbox"/> Depending on response, repeat up to 3 times if necessary i.e. up to max 60 ml/kg</li> <li><input type="checkbox"/> If no response:</li> <li><input type="checkbox"/> Give further IV fluids and blood transfusion</li> <li><input type="checkbox"/> Initially transfuse 20 ml/kg of whole blood or 10 ml/kg of packed cells (only in severe anaemia)</li> </ul>	HC3
	HC4

## 1.1.3 Dehydration

ICD10CODE: E86.0

A condition brought about by the loss of significant quantities of fluids and salts from the body.

### Causes

- Ⓐ Vomiting and/or diarrhoea
- Ⓑ Decreased fluid intake
- Ⓒ Excessive loss of fluids, e.g. due to polyuria in diabetes, excessive sweating as in high fever, burns

### Clinical features

- Ⓐ Apathy, sunken eyes/fontanel, loss of skin turgor (especially in children)
- Ⓑ Hypotension, tachycardia, deep (acidotic) breathing, dry mucosae, poor or no urine output.

#### 1.1.3.1 Dehydration in Children under 5 years

Assess degree of dehydration following the table below:

#### Clinical features of dehydration in children

Signs	Degree of Dehydration		
	None	Some	Severe
General condition	Well, alert	Restless, irritable	Lethargic, drowsy or unconscious
Eyes	Not sunken	Sunken	Sunken
Fontanel	Not sunken	Sunken	Sunken
Ability to drink	Drinks normally	Drinks eagerly, thirsty	Drinks poorly or not able to drink
Skin pinch	Goes back immediately	Goes back slowly; <2 seconds	Goes back very slowly; >2 seconds
Treatment	Plan A	Plan B	Plan C



## Management

### Plan A (No dehydration and for prevention)

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Counsel the mother on the 4 rules of home treatment: extra fluids (ORS), continue feeding, zinc supplementation, when to return</li> <li><input type="checkbox"/> Give extra fluids: as much as the child will take             <ul style="list-style-type: none"> <li>- If child exclusively breastfed, give ORS or safe clean water in addition to breast milk</li> <li>- If child not exclusively breastfed, give one or more of: <b>ORS</b>, soup, rice-water, yoghurt, clean water</li> <li>- In addition to the usual fluid intake, give <b>ORS</b> after each loose stool or episode of vomiting Child &lt;2 years: 50-100 ml</li> </ul> </li> </ul> <p>Child 2-5 years: 100-200 ml</p> <ul style="list-style-type: none"> <li>- Give the mother 2 packets to use at home</li> <li>- Giving ORS is especially important if the child has been treated with Plan B or Plan C during current visit</li> <li>- Give frequent small sips from a cup</li> </ul> <ul style="list-style-type: none"> <li><input type="checkbox"/> Advice the mother to continue or increase breastfeeding. If child vomits, wait 10 minutes, then give more slowly</li> <li>- In a child with high fever or respiratory distress, give plenty of fluids to counter the increased fluid losses in these conditions</li> <li>- Continue giving extra fluid as well as ORS until the diarrhoea or other cause of dehydration stops</li> <li><input type="checkbox"/> If diarrhoea, give Zinc supplementation Child &lt;6 months: 10 mg once a day for 10 days Child &gt;6 months: 20 mg once a day for 10 days</li> </ul>	HC2

## Plan B (Some dehydration)

TREATMENT	LOC															
<p><input type="checkbox"/> Give ORS in the following approximate amounts during the first 4 hours</p> <table border="1"> <thead> <tr> <th>Age (Months)</th><th>&lt;4</th><th>4–12</th><th>13–24</th><th>25–60</th></tr> </thead> <tbody> <tr> <td>Weight (Kg)</td><td>&lt;6</td><td>6–9.9</td><td>10–11.9</td><td>12–19</td></tr> <tr> <td>Ors (Ml)</td><td>200–400</td><td>400–700</td><td>700–900</td><td>900–1400</td></tr> </tbody> </table> <ul style="list-style-type: none"> <li>- Only use child's age if weight is not known</li> <li>- You can also calculate the approximate amount of ORS to give a child in the first 4 hours as weight (kg) x 75 ml</li> </ul> <p><input type="checkbox"/> Show the mother how to give the ORS</p> <ul style="list-style-type: none"> <li>- Give frequent small sips from a cup</li> <li>- If the child wants more than is shown in the table, give more as required</li> <li>- If the child vomits, wait 10 minutes, then continue more slowly</li> </ul> <p><input type="checkbox"/> For infants &lt;6 months who are not breastfed, also give 100–200 ml of clean water during the first 4 hours</p> <p><input type="checkbox"/> Reassess patient frequently (every 30–60 minutes) for classification of dehydration and selection of Treatment Plan</p> <p>After 4 hours</p> <p><input type="checkbox"/> Reassess the patient</p> <p><input type="checkbox"/> Reclassify the degree of dehydration</p> <p><input type="checkbox"/> Select the appropriate Treatment Plan A, B or C</p> <p><input type="checkbox"/> Begin feeding the child in the clinic</p>	Age (Months)	<4	4–12	13–24	25–60	Weight (Kg)	<6	6–9.9	10–11.9	12–19	Ors (Ml)	200–400	400–700	700–900	900–1400	HC2
Age (Months)	<4	4–12	13–24	25–60												
Weight (Kg)	<6	6–9.9	10–11.9	12–19												
Ors (Ml)	200–400	400–700	700–900	900–1400												



TREATMENT	LOC
<p>If mother must leave before completing the child's treatment</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Show her how to prepare ORS at home and how much ORS to give to finish the 4-hour treatment</li> <li>- Give her enough packets to complete this and 2 more to complete Plan A at home</li> <li><input type="checkbox"/> Counsel mother on the 4 rules of home treatment: extra fluids, continue feeding, zinc, when to return</li> </ul>	

### Plan C (Severe dehydration)

TREATMENT	LOC
<p>If you are unable to give IV fluids and this therapy is not available nearby (within 30 minutes) but a nasogastric tube (NGT) is available or the child can drink</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Start rehydration with ORS by NGT or by mouth: Give 20 ml/kg/hour for 6 hours (total = 120 ml/ kg)</li> <li><input type="checkbox"/> Reassess the child every 1-2 hours           <ul style="list-style-type: none"> <li>- If there is repeated vomiting or increasing abdominal distension, give more slowly</li> <li>- If hydration status is not improving within 3 hours, refer the child urgently for IV therapy</li> </ul> </li> <li><input type="checkbox"/> After 6 hours, reassess the child</li> <li><input type="checkbox"/> Classify the degree of dehydration</li> <li><input type="checkbox"/> Select appropriate Plan A, B, or C to continue treatment</li> </ul>	HC2

TREATMENT	LOC
If you are unable to give IV fluids but IV treatment is available nearby (i.e. within 30 minutes) <ul style="list-style-type: none"> <li><input type="checkbox"/> Refer urgently for IV treatment</li> </ul> If the child can drink: <ul style="list-style-type: none"> <li><input type="checkbox"/> Provide mother with ORS and show her how to give frequent sips during the trip to the referral facility</li> </ul>	HC2
If you are able to give IV fluids <ul style="list-style-type: none"> <li><input type="checkbox"/> Set up an IV line immediately <ul style="list-style-type: none"> <li>- If child can drink, give ORS while the drip is set up</li> </ul> </li> <li><input type="checkbox"/> Give 100 ml/kg of Ringer's Lactate <ul style="list-style-type: none"> <li>- Or half-strength Darrow's solution in glucose 2.5% or sodium chloride 0.9%</li> <li>- Divide the IV fluid as follows:</li> </ul> </li> <li><input type="checkbox"/> Reassess patient frequently (every 30-60 minutes) to re-classify dehydration and treatment plan</li> </ul> If the patient is not improving <ul style="list-style-type: none"> <li><input type="checkbox"/> Give the IV fluids more rapidly</li> </ul>	HC3
As soon as patient can drink, usually after 3-4 hours in infants or 1-2 hours in children <ul style="list-style-type: none"> <li><input type="checkbox"/> Also give ORS 5 ml/kg/hour</li> <li><input type="checkbox"/> Continue to reassess patient frequently; classify degree of dehydration; and select appropriate Plan A, B, or C to continue treatment.</li> </ul>	
<p><b>Note</b></p> <p>If possible, observe child for at least 6 hours after rehydration to ensure that the mother can correctly use ORS to maintain hydration.</p>	

### 1.1.3.2 Dehydration in Older Children and Adults

Assess degree of dehydration following the table below.

CLINICAL FEATURE	DEGREE OF DEHYDRATION		
	MILD	MODERATE	SEVERE
General appearance	Thirsty, alert	Thirsty, alert	Generally conscious, anxious, clammy, cold extremities, cyanosis, wrinkly skin of fingers, muscle cramps, dizzy if standing
Pulse	Normal	Rapid	Rapid, thready, sometimes absent
Respiration	Normal	Deep, may be rapid	Deep and rapid
Systolic BP	Normal	Normal	Low, may be immeasurable
Skin pinch	Returns rapidly	Returns slowly	Returns very slowly (>2 seconds)
Eyes	Normal	Sunken	Very sunken
Tears	Present	Absent	Absent
Mucous membranes	Moist	Dry	Very dry
Urine output	Normal	Reduced, dark urine	Anuria, empty bladder
<b>Note</b>			
At least 2 of these signs must be present			

## Management

TREATMENT	LOC
<p><b>Mild dehydration</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Give oral ORS 25 ml/kg in the first 4 hours           <ul style="list-style-type: none"> <li>- Increase or maintain until clinical improvement</li> </ul> </li> </ul> <p><b>Moderate dehydration</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Give oral ORS 50 mg/kg in the first 4 hours</li> </ul> <p><b>Severe dehydration</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Ringer's lactate (or Normal Saline 0.9%) IV, 50 ml/kg in the first 4 hours           <ul style="list-style-type: none"> <li>- Give IV fluids rapidly until radial pulse can be felt,</li> <li>- then adjust rate</li> <li>- Re-evaluate vitals after 4 hours</li> </ul> </li> </ul> <p>Volumes that are given over the first 24 hours in adults are shown in the table below</p>	HC2
	HC3

Time period	Volume of iv fluid
First hour	1 L
Next 3 hours	2 L
Next 20 hours	3 L

- After 4 hours, evaluate rehydration in terms of clinical signs (NOT in terms of volumes of fluid given)
- As soon as signs of dehydration have disappeared (but not before), start fluid maintenance therapy, alternating ORS and water (to avoid hypernatraemia) as much as the patient wants

Continue for as long as the cause of the original dehydration persists.

## Notes

- Volumes shown are guidelines only. If necessary, volumes can be increased or initial high rate of administration maintained until clinical improvement occurs
- In addition to ORS, other fluids such as soup, fruit juice and safe clean water may be given
- Initially, adults can take up to 750 ml ORS/hour.
- If sodium lactate compound IV infusion (Ringer's Lactate) is not available, use half-strength Darrow's solution in glucose 2.5% or sodium chloride infusion 0.9%. However, both of these are less effective
- Continued nutrition is important, and food should be continued during treatment for dehydration.

## Caution

- Avoid artificially sweetened juices.

## Prevention (for all age groups)

- ⌚ Encourage prompt use of ORS at home if the person is vomiting and/or having diarrhoea.

### 1.1.4 Fluids and Electrolytes Imbalances ICD10 CODE: E87.8

A condition where losses of bodily fluids from whatever cause has led to significant disturbance in the normal fluid and electrolyte levels needed to maintain physiological functions.

#### Causes

Disorders may occur in the fluid volume, concentration (sodium composition), and distribution of fluid and other electrolytes and ph. The main cause is problems in intake, loss and/or distribution and balance between water and electrolytes, as shown in the table below:

MECHANISM	EXAMPLES
Gastrointestinal loss	<ul style="list-style-type: none"> <li>○ Excessive vomiting and diarrhoea</li> <li>○ Nasogastric drainage</li> <li>○ Fistula drainage</li> </ul>
Haemorrhage	<ul style="list-style-type: none"> <li>○ Internal or external</li> </ul>
Fluid sequestration	<ul style="list-style-type: none"> <li>○ Paralytic ileus, intestinal obstruction</li> <li>○ Peritonitis</li> </ul>
Loss through skin/wounds	<ul style="list-style-type: none"> <li>○ Sweating</li> <li>○ Extensive burns</li> </ul>
Urinary loss	<ul style="list-style-type: none"> <li>○ Decompensated diabetes</li> </ul>
Fluid retention and electrolytes or water imbalances	<ul style="list-style-type: none"> <li>○ Renal, hepatic and heart failure (see specific section for management)</li> </ul>
Reduced intake	<ul style="list-style-type: none"> <li>○ Post operative patients</li> </ul>
Excessive intake	<ul style="list-style-type: none"> <li>○ Water intoxication, IV fluids overload</li> </ul>

### Clinical features

- Dehydration in mild/moderate fluid (water and electrolytes) deficiency
- Hypovolaemic shock in severe fluid deficiency
- Oedema (including pulmonary oedema) in fluid excess
- Specific effects due to electrolytes imbalances

### Management

IV fluids and electrolytes therapy has three main objectives:

- Replace lost body fluids and continuing losses
- Correct eventual imbalances
- Maintain daily fluid requirements.

Always use an IV drip for patients who are seriously ill (except patients with congestive heart failure; for these, use only an indwelling needle) and may need IV drugs or surgery. If the fluid is not needed urgently, run it slowly to keep the IV line open.

### Maintenance fluid therapy

TREATMENT	LOC
<p>Administer daily fluid and electrolyte requirements to any patient not able to feed</p> <ul style="list-style-type: none"><li>□ The basic 24-hour maintenance requirement for an adult is 2.5-3 litres<ul style="list-style-type: none"><li>- One third of these daily fluids should be (isotonic) sodium chloride 0.9% infusion (or Ringer's Lactate), the other two thirds Glucose 5% infusion</li></ul></li><li>□ As well as the daily requirements, replace fluid lost due to the particular condition according to the assessed degree of dehydration.</li></ul>	HC3

### Notes

- Closely monitor all IV drips to ensure that the rate is adjusted as required
- Check the drip site daily for any signs of infection; change drip site every 2-3 days or when the drip goes into tissues (extravasation).

## Repletion therapy in specific conditions

TREATMENT	LOC
<b>Dehydration</b>	HC3
<input type="checkbox"/> see section 1.1.3	
<b>Diarrhoea and vomiting with severe dehydration, paralytic ileus, intestinal obstruction</b>	
<input type="checkbox"/> Replace fluid losses with isotonic (sodium) solutions containing potassium e.g. compound sodium lactate infusion (Ringer's Lactate solution) <input type="checkbox"/> Or half-strength Darrow's solution in 2.5% glucose infusion	
<b>Haemorrhage</b>	
<b>If there is blood loss and the patient is not in shock</b>	
<input type="checkbox"/> Use sodium chloride 0.9% infusion for blood volume replacement giving 0.5-1 L in the 1st hour and not more than 2-3 L in 4 hours	
<b>If there is blood loss &gt;1 litre</b>	
<input type="checkbox"/> Give 1-2 units of blood to replace volume and concentration	
<b>Shock</b>	
<input type="checkbox"/> Give Ringer's Lactate or sodium chloride 0.9% infusion 20 ml/kg IV over 60 minutes for initial volume resuscitation <ul style="list-style-type: none"> <li>- Start rapidly, closely monitor BP</li> <li>- Reduce the rate according to BP response</li> </ul> <input type="checkbox"/> In patients with severe shock and significant haemorrhage, give a blood transfusion	
<b>Notes</b>	
<ul style="list-style-type: none"> <li>▪ Closely monitor all IV drips to ensure that the rate is adjusted as required</li> <li>▪ Check the drip site daily for any signs of infection; change drip site every 2-3 days or when the drip goes into tissues (extravasation).</li> </ul>	

**1.1.4.1 IV Fluid management in children**

ICD10 CODE: E87.8

TREATMENT	LOC
<ul style="list-style-type: none"><li><input type="checkbox"/> Total daily maintenance fluid requirement is 100 ml/kg for the first 10 kg plus<ul style="list-style-type: none"><li>- 50 ml/kg for the next 10 kg plus 25 ml/kg for each subsequent kg</li></ul></li><li><input type="checkbox"/> Give more than above if child is dehydrated or in fluid loss or fever (10% more for each 1 C of fever)</li></ul>	HC4

**Fluid management in neonates**

TREATMENT	LOC
<ul style="list-style-type: none"><li><input type="checkbox"/> Encourage mother to breastfeed or if child unable, give expressed breast milk via NGT</li><li><input type="checkbox"/> Withhold oral feeding in case of bowel obstruction, necrotizing enterocolitis, or if feeding is not tolerated (abdominal distension, vomiting everything)</li><li><input type="checkbox"/> Withhold oral feeding in acute phase of severe sickness, in infants who are lethargic, unconscious or having frequent convulsions</li></ul>	HC4

**Total amount of fluids (oral and/or IV)**

Day 1: 60 ml/kg/day of Dextrose 10%

Day 2: 90 ml/kg/day of Dextrose 10%

Day 3: 120 ml/kg/day of half normal saline and dextrose 5%

Day 4 onwards: 150 ml/kg/day

- If only IV fluids are given, do not exceed 100 ml/ kg/ day unless child is dehydrated, under a radiant heater or phototherapy
- If facial swelling develops, reduce rate of infusion
- When oral feeding is well established, raise the total amount to 180 ml/kg/day.

## Shock in non-malnourished child

TREATMENT	LOC
<input type="checkbox"/> Use Ringer's lactate or normal saline <input type="checkbox"/> Infuse 20 ml/kg as rapidly as possible	HC3
<b>If no improvement</b>	HC4
<input type="checkbox"/> Repeat 10-20 ml/kg of IV fluids <input type="checkbox"/> If bleeding, give blood at 20 ml/kg	
<b>If still no improvement</b>	
<input type="checkbox"/> Give another 20 ml/kg of IV fluids	
<b>If no improvement further still</b>	
<input type="checkbox"/> Suspect septic shock <input type="checkbox"/> Repeat 20 ml/kg IV fluids and consider adrenaline or dopamine	
<b>If improvement noted at any stage (reducing heart rate, increase in blood pressure and pulse volume, capillary refill &lt;2 seconds)</b>	
<input type="checkbox"/> Give 70 ml/kg of Ringer's lactate (or Normal saline if Ringer's not available) over 5 hours (if infant <12 months) or 2.5 hours (if child >12 months)	
<b>Note</b>	
<ul style="list-style-type: none"> <li>▪ In children with suspected malaria or anaemia with shock, IV fluids should be administered cautiously and blood should be used in severe anaemia</li> </ul>	

## Shock in malnourished child

TREATMENT	LOC
<input type="checkbox"/> In malnourished children, give 15 ml/kg over 1 hour, use one of the following: <ul style="list-style-type: none"> <li>- Ringer's lactate with 5% glucose</li> <li>- Half strength darrow's solution with 5% glucose</li> <li>- 0.45% Sodium chloride plus 5% glucose</li> </ul>	HC3



## Shock in malnourished child

TREATMENT	LOC
<input type="checkbox"/> Repeat once <b>If signs of improvement</b> <input type="checkbox"/> Switch to oral or NGT ReSoMal at 10 ml/kg/hour for up to 10 hours	HC3
<b>If no improvement</b> <input type="checkbox"/> Give maintenance IV fluids 4 ml/kg/hour f Transfuse 10 ml/kg slowly (over 3 hours) f Start refeeding <input type="checkbox"/> Start IV antibiotics.	

## Commonly used IV fluids and indication

NAME	COMPOSITION	INDICATIONS
Sodium Chloride 0.9% (normal saline)	Na 154 mmol/L Cl 154 mmol/L	Shock, dehydration in adults (and children) Maintenance fluid in adults
Dextrose (Glucose) 5%	Glucose 25 g in 500 ml	Maintenance fluid in adults
Dextrose (Glucose) 10% (to be prepared)	Glucose 50 g in 500 ml	Hypoglycaemia in children and adults Maintenance fluids in newborns day 1 and 2
Dextrose 50%	Glucose 50 g in 100 ml	Hypoglycaemia in adults
Ringer's lactate (Sodium lactate compound, Harmann's solution)	Na 130 mmol/L K 5.4 mmol/L Ca 1.8 mmol/L	Shock, dehydration in children (and adults) Maintenance fluid in adults
½ strength Darrow's solution in 5% glucose	Na 61 mmol/L K 17 mmol/L Glucose 25 g in 500 ml	Shock and dehydration in malnourished children

NAME	COMPOSITION	INDICATIONS
Half normal saline (NaCl 0.45%) dextrose 5% (to be prepared)	Na 77 mmol/L Cl 77 mmol/L Glucose 25 g in 500 ml	Maintenance fluid in children Shock and dehydration in malnourished children
Normal saline or Ringer's lactate with 5% dextrose3 (to be prepared)	Na 154/130 K 0/5.4 Glucose 25 g in 500 ml	Maintenance fluid in children

### Note

1 Prepare from Dextrose 5% and 50%:

- Remove 50 ml from Dextrose 5% 500 ml bottle and discard
- Replace with 50 ml of Dextrose 50%. Shake
- Follow normal aseptic techniques
- Use immediately, DO NOT STORE

2 Prepare from Normal saline 500 ml bottle and dextrose 5% and 50%

- Replace 250 ml of Normal saline with 225 ml of Dextrose 5% and 25 ml of Dextrose 50%

3 Prepare by replacing 50 ml of normal saline or Ringer's 500 ml bottle with 50 ml of Dextrose 50%

### 1.1.5 Febrile Convulsions

ICD10 CODE: R56

A generalized tonic-clonic seizure associated with a rapid rise in temperature due to an extracranial illness. It is a diagnosis of exclusion: specific conditions (cerebral malaria, meningitis, epilepsy) should be excluded. It commonly affects children from age 3 months to 6 years.

#### Causes

- Ⓐ Malaria
- Ⓐ Respiratory tract infections
- Ⓐ Urinary tract infections



- Other febrile conditions

### Clinical features

- Elevated temperature ( $>38\text{ C}$ )
- Convulsions usually brief and self-limiting (usually  $<5$  minutes, always  $<15$  minutes) but may recur if temperature remains high
- No neurological abnormality in the period between convulsions
- Generally benign and with good prognosis

### Differential diagnosis

- Epilepsy, brain lesions, meningitis, encephalitis
- Trauma (head injury)
- Hypoglycaemia
- If intracranial pathology cannot be clinically excluded (especially in children  $<2$  years) consider lumbar puncture or treat children empirically for meningitis

### Investigations

- Blood: Slide/RDT for malaria parasites
  - Random blood glucose
  - Full blood count
  - LP and CSF examination
- ¾ Urinalysis, culture and sensitivity  
¾ Chest X-ray

### Management

TREATMENT	LOC
<ul style="list-style-type: none"><li>❑ Use tepid sponging to help lower temperature</li></ul>	HC2
<ul style="list-style-type: none"><li>❑ Give an antipyretic: paracetamol 15 mg/kg every 6 hours until fever subsides</li></ul>	

TREATMENT	LOC
<b>If convulsing</b> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Give diazepam 500 micrograms/kg rectally (using suppositories/rectal tube or diluted parenteral solution)</li> </ul> <p>Maximum dose is 10 mg Repeat prn after 10 minutes</p>	HC2
<b>If unconscious</b> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Position the patient on the side (recovery position) and ensure airways, breathing and circulation (ABC)</li> </ul>	
<b>If persistent convulsions</b> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> see section 9.1.1</li> </ul>	HC4

## Prevention

Educate caregivers on how to control fever (tepid sponging and paracetamol)

### 1.1.6 Hypoglycaemia

ICD10 CODE: E16.2

A clinical condition due to reduced levels of blood sugar (glucose). Symptoms generally occur with a blood glucose <3.0 mmol/L (55 mg/dl).

#### Cause

- Overdose of insulin or anti-diabetic medicines
- Excessive alcohol intake
- Sepsis, critical illnesses
- Hepatic disease
- Prematurity
- Starvation
- Operations to reduce the size of the stomach (gastrectomy)
- Tumours of the pancreas (insulinomas)
- Certain drugs e.g. quinine
- Hormone deficiencies (cortisol, growth hormone)

#### Clinical features

- Early symptoms: hunger, dizziness, tremors, sweating, nervousness and confusion



- Ⓐ Profuse sweating, palpitations, weakness
- Ⓑ Convulsions
- Ⓒ Loss of consciousness

### Differential diagnosis

- Ⓐ Other causes of loss of consciousness (poisoning, head injury etc.)

### Investigations

- Blood sugar (generally <3.0 mmol/L)
- Specific investigations: to exclude other causes of hypoglycaemia

### Management

TREATMENT	LOC
<b>If patient is able to swallow</b> <ul style="list-style-type: none"> <li>□ Oral glucose or sugar 10-20 g in 100-200 ml water (2-4 teaspoons) is usually taken initially and repeated after 15 minutes if necessary</li> </ul>	HC2
<b>If patient is unconscious</b> <ul style="list-style-type: none"> <li>□ Adults: glucose 50% 20-50 ml IV slowly (3 ml/ minute) or diluted with normal saline, followed by 10 % glucose solution by drip at 5-10 mg /kg/ minute until patient regains consciousness, then encourage oral snacks</li> <li>Child: Dextrose 10% IV 2-5 ml/kg</li> <li>□ If patient does not regain consciousness after 30 minutes, consider other causes of coma</li> <li>□ Monitor blood sugar for several hours (at least 12 if hypoglycaemia caused by oral antidiabetics) and investigate the cause – manage accordingly.</li> </ul>	HC3

**Note**

- After dextrose 50%, flush the IV line to avoid sclerosis of the vein (dextrose is very irritant)
- Preparation of Dextrose 10% from Dextrose 5% and Dextrose 50%:
  - Remove 50 ml from Dextrose 5% bottle and discard
  - Replace with 50 ml of Dextrose 50%. Shake
  - Follow normal aseptic techniques
  - Use immediately, DO NOT STORE.

**Prevention**

- ⌚ Educate patients at risk of hypoglycaemia on recognition of early symptoms e.g. diabetics, patients who have had a gastrectomy
- ⌚ Advise patients at risk to have regular meals and to always have glucose or sugar with them for emergency treatment of hypoglycaemia
- ⌚ Advise diabetic patients to carry an identification tag

**1.2 TRAUMA AND INJURIES****1.2.1 Bites and Stings**

Wounds caused by teeth, fangs or stings.

**Causes**

- ⌚ Animals (e.g. dogs, snakes), humans or insects

**Clinical features**

- ⌚ Depend on the cause

## General management

TREATMENT	LOC
<b>First aid</b>	HC2
<ul style="list-style-type: none"> <li><input type="checkbox"/> Immediately clean the wound thoroughly with plenty of clean water and soap to remove any dirt or foreign bodies</li> <li><input type="checkbox"/> Stop excessive bleeding by applying pressure where necessary</li> <li><input type="checkbox"/> Rinse the wound and allow to dry</li> <li><input type="checkbox"/> Apply an antiseptic: Chlorhexidine solution 0.05% or Povidone iodine solution 10%</li> </ul>	
<b>Supportive therapy</b>	HC3
<ul style="list-style-type: none"> <li><input type="checkbox"/> Treat anaphylactic shock (see section 1.1.1)</li> <li><input type="checkbox"/> Treat swelling if significant as necessary, using ice packs or cold compresses</li> <li><input type="checkbox"/> Give analgesics prn</li> <li><input type="checkbox"/> Reassure and immobilise the patient</li> </ul>	
<b>Antibiotics</b>	
<ul style="list-style-type: none"> <li><input type="checkbox"/> Give only for infected or high-risk wounds including:           <ul style="list-style-type: none"> <li>- Moderate to severe wounds with extensive tissue damage</li> <li>- Very contaminated wounds</li> <li>- Deep puncture wounds (especially by cats)</li> </ul> </li> <li>- Wounds on hands, feet, genitalia or face</li> <li>- Wounds with underlying structures involved</li> <li>- Wounds in immunocompromised patients</li> </ul> <p><input type="checkbox"/> See next sections on wound management, human and animal bites for more details</p>	
<b>Tetanus prophylaxis</b>	
<ul style="list-style-type: none"> <li><input type="checkbox"/> Give TT immunisation (tetanus toxoid, TT 0.5 ml) if not previously immunised within the last 10 years</li> </ul>	

TREATMENT	LOC
<b>Caution</b> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Do not suture bite wounds</li> </ul>	

### 1.2.1.1 Snakebites

Snakebites can cause both local and systemic effects. Non-venomous snakes cause local effects (swelling, redness, laceration) and venomous snakes cause both local and systemic effects due to envenomation. Over 70% of snakes in Uganda are non-venomous and most bites are from non-venomous snakes. Of the venomous snakes, more than 50% of bites are “dry” i.e. no envenomation occurs. In the event that venom is injected, the effect of the venom depends on the type of venom, quantity, location of the bite and size and general condition of the victim.

#### Cause

- ⦿ Common venomous snakes in Uganda: Puff adder, Gaboon viper, black mambas, Brown Forest cobra, Egyptian cobra and Boomslang (see below images of some of the common snakes in Uganda)

#### Clinical features

Local symptoms and signs	Generalized (systemic) symptoms and signs
<ul style="list-style-type: none"> <li>▪ Fang marks</li> <li>▪ Malaise</li> <li>▪ Swelling</li> <li>▪ Local bleeding</li> <li>▪ Pain</li> <li>▪ Blistering</li> <li>▪ Redness</li> <li>▪ Skin discolouration (necrosis)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Vomiting</li> <li>▪ Difficulty in breathing</li> <li>▪ Abdominal pain</li> <li>▪ Weakness</li> <li>▪ Loss of consciousness</li> <li>▪ Confusion</li> <li>▪ Shock</li> </ul>

#### If cytotoxic venom (Puff adder, Gaboon viper)

- ⦿ Extensive local swelling, pain, lymphadenopathy – starting 10-30 minutes after the bite.



## If neurotoxic venom (Jameson's mamba, Egyptian Cobra, Forest Cobra, Black mamba)

- Weakness, paralysis, difficulty in breathing, drooping eyelids, difficulty in swallowing, double vision, slurred speech – starting 15-30 minutes after the bite
- Excessive sweating and salivation

## If hemotoxic venom (Boomslang, Vine/Twig snake)

- Excessive swelling and oozing from the site
- Skin discolouration
- Excessive bleeding, bloody blisters
- Haematuria, haematemesis – even after some days
- Shock

## If combined venom toxicity

- Late appearance of signs and symptoms

### Investigations

- Whole blood clotting test at arrival and every 4-6 hours after the first day:
- Put 2-5ml of blood in a dry tube and observe after 30 minutes
- If incomplete or no clotting, it indicates coagulation abnormalities
- Other useful tests depending on severity, level of care and availability:
  - Oxygen Saturation/PR/BP/RR
  - Haemoglobin/PCV/Platelet count/PT/APTT/D-Dimer
  - Biochemistry for Serum Creatinine/Urea/Potassium
  - Urine Tests for Proteinuria/Haemoglobinuria/ Myoglobinuria
  - Imaging ECG/X-Ray/Ultrasound

## Management

What to do	What not to do
<ul style="list-style-type: none"> <li>▪ Reassure the patient to stay calm</li> <li>▪ Lay the patient on the side to avoid movement of affected areas</li> <li>▪ Remove all tight items around the affected area</li> <li>▪ Leave the wound/bite area alone</li> <li>▪ Immobilize the patient</li> </ul>	<ul style="list-style-type: none"> <li>▪ Do not panic</li> <li>▪ Do not lay the patient on their back as it may block airways</li> <li>▪ Do not apply a tourniquet</li> <li>▪ Do not squeeze or incise the wound</li> <li>▪ Do not attempt to suck the venom out</li> <li>▪ Do not try to kill or attack the snake</li> <li>▪ DON'T use traditional methods/herbs</li> </ul>

### Venom in eyes

- Irrigate eyes with plenty of water
- Cover with eye pads

TREATMENT	LOC
<p>○ Assess skin for fang penetration</p> <p><b>If signs of fang penetration</b></p> <ul style="list-style-type: none"> <li>○ Immobilise limb with a splint</li> <li>○ Analgesic e.g. paracetamol (avoid NSAIDS like aspirin, diclofenac, ibuprofen)</li> </ul>	HC2
<p><b>If no signs and symptoms for 6-8 hours: most likely bite without envenomation</b></p> <ul style="list-style-type: none"> <li>○ Observation for 12-24 hours recommended</li> <li>○ Tetanus toxoid (TT) IM 0.5 ml if not previously immunised in the last 10 years</li> </ul> <p><b>If local necrosis develops</b></p> <ul style="list-style-type: none"> <li>○ Remove blisters, clean and dress daily, debride after lesions stabilise (minimum 15 days)</li> </ul>	

TREATMENT	LOC
<p><b>Criteria for referral for administration of antivenom</b></p> <ul style="list-style-type: none"> <li><input checked="" type="radio"/> Signs of systemic envenoming (paralysis, respiratory difficulty, bleeding)</li> <li><input checked="" type="radio"/> Spreading local damage:           <ul style="list-style-type: none"> <li>- Swelling of hand or foot (site of most bites) within 1 hour of bite</li> <li>- Swelling of elbow or knee within 3 hours of bite</li> <li>- Swelling of groin or chest at any time</li> <li>- Significant swelling of head or neck</li> </ul> </li> <li><input type="checkbox"/> Antivenom sera polyvalent (Africa)           <ul style="list-style-type: none"> <li>- Check package insert for IV dosage details. Ensure the solution is clear and check that patient has no history of allergy</li> </ul> </li> </ul> <p><b>Antibiotics</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Indicated only if wound is infected</li> </ul>	

### Images of some common snakes in Uganda



Puff Adder (*Bitis arietans*)



Black Mamba (*Dendroaspis polylepis*)



Egyptian cobra (*Naja haje*)



Black-necked spitting cobra (*Naja nigricollis*)



Jameson's mamba (*Dendroaspis jamesoni*) Boomslang (*Dispholidus typus*)



Vine, bird, twig or tree snakes (*Thelotornisspp.*) Rhino-horned Viper (*Bitis nasicornis*)



Egyptian Cobra (*Naja haje*)

Eastern Forest Cobra (*Naja subfulva*)



Rock Python (*Python sebae*)

Gaboon Adder (*Bitis gabonica*)



Battersby's green snake (*Philothamnus battersbyi*) Olive House Snake (*Lycodonomorphis inornatus*)

### 1.2.1.2 Insect Bites & Stings

ICD10 CODE: T63.4

#### Causes

- ⦿ Bees, wasps, hornets and ants: venom is usually mild and causes only local reaction but may cause anaphylactic shock in previously sensitized persons
- ⦿ Spiders and scorpions: Most are non-venomous or only mildly venomous

#### Other stinging insectsClinical features

- ⦿ Swelling, discolouration, burning sensation, pain at the site of the sting
- ⦿ There may be signs of anaphylactic shock.

#### Differential diagnosis

- ⦿ Allergic reaction

MANAGEMENT	LOC
<input type="checkbox"/> If the sting remains implanted in the skin, carefully remove with a needle or knife blade <input type="checkbox"/> Apply cold water/ice	HC2
<b>If severe local reaction</b>	

MANAGEMENT	LOC
<p><input type="checkbox"/> Give chlorpheniramine 4 mg every 6 hours (max: 24 mg daily) until swelling subsides Child 1-2 years: 1 mg every 12 hours  Child 2-5 years: 1 mg every 6 hours (max: 6 mg daily)  Child 6-12 years: 2 mg every 6 hours (max: 12 mg daily)</p> <p><input type="checkbox"/> Apply calamine lotion prn every 6 hours</p> <p><b>If very painful scorpion sting</b></p> <p><input type="checkbox"/> Infiltrate 2 ml of lignocaine 2% around the area of the bite</p> <p><b>If signs of systemic envenomation</b></p> <p><input type="checkbox"/> Refer</p>	HC2

### Prevention

- Ⓐ Clear overgrown vegetation/bushes around the home
- Ⓐ Prevent children from playing in the bush
- Ⓐ Cover exposed skin while moving in the bush
- Ⓐ Use pest control methods to clear insect colonies.

### 1.2.1.3 Animal and Human Bites

ICD10 CODE: W50.3, W54.0

#### Clinical features

- Ⓐ Teeth marks or scratches, lacerations
- Ⓐ Puncture wounds (especially cats)
- Ⓐ Complications: bleeding, lesions of deep structures, wound infection (by mixed flora, anaerobes), tissue necrosis, transmission of diseases (tetanus, rabies, others)

MANAGEMENT	LOC
<p><b>First aid</b></p> <p><input type="checkbox"/> Immediately clean the wound thoroughly with plenty of clean water and soap to remove any dirt or foreign bodies</p>	HC2

MANAGEMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Stop excessive bleeding where necessary by applying pressure</li> <li><input type="checkbox"/> Rinse the wound and allow to dry</li> <li><input type="checkbox"/> Apply an antiseptic: Chlorhexidine solution 0.05% or povidone iodine solution 10%</li> <li><input type="checkbox"/> Soak puncture wounds in antiseptic for 15 minutes</li> <li><input type="checkbox"/> Thorough cleaning, exploration and debridement (under local anesthesia if possible)</li> </ul> <p><b>As a general rule</b></p> <p><b>DO NOT SUTURE BITE WOUNDS</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Refer wounds on hands and face, deep wounds, wounds with tissue defects to hospital for surgical management</li> </ul>	HC2
<p><b>Tetanus prophylaxis</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Give TT immunisation (tetanus toxoid, TT 0.5 ml) if not previously immunised within the last 10 years</li> </ul>	HC4
<p><b>Prophylactic antibiotics</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Indicated in the following situations:           <ul style="list-style-type: none"> <li>- Deep puncture wounds (especially Cats)</li> <li>- Human bites</li> <li>- Severe (deep, extensive) wounds</li> <li>- Wounds on face, genitalia, hands</li> <li>- Wounds in immunocompromised hosts</li> </ul> </li> <li><input type="checkbox"/> Amoxicillin 500 mg every 8 hours for 5-7 days Child: 15 mg/kg per dose</li> <li><input type="checkbox"/> Plus Metronidazole 400 mg every 12 hours Child: 10-12.5 mg/kg per dose</li> </ul>	HC2
<p><b>Note</b></p> <ul style="list-style-type: none"> <li>▪ Do not use routine antibiotics for small uncomplicated dog bites/wounds</li> </ul>	

## 1.2.1.4 Rabies Post Exposure Prophylaxis

Z20.3, Z23

ICD10 CODE:

Post exposure prophylaxis effectively prevents the development of rabies after the contact with saliva of infected animals, through bites, scratches, licks on broken skin or mucous membranes. For further details refer to **Rabies Post-Exposure Treatment Guidelines, Veterinary Public Health Unit, Community Health Dept, Ministry of Health, September 2001**

### General management

#### Dealing with the animal

TREATMENT	LOC
If the animal can be identified and caught <ul style="list-style-type: none"> <li><input type="checkbox"/> If domestic, confirm rabies vaccination</li> <li><input type="checkbox"/> If no information on rabies vaccination or</li> </ul>	HC2
If the animal can be identified and caught <ul style="list-style-type: none"> <li><input type="checkbox"/> If domestic, confirm rabies vaccination</li> <li><input type="checkbox"/> If no information on rabies vaccination or</li> </ul> <b>wild:</b> quarantine for 10 days (only dogs, cats or endangered species) or kill humanely and send the head to the veterinary Department for analysis <ul style="list-style-type: none"> <li>▪ If no signs of rabies infection shown within 10 days: release the animal, stop immunisation</li> <li>▪ If it shows signs of rabies infection: kill the animal, remove its head, and send to the Veterinary Department for verification of the infection</li> </ul>	HC2
If animal cannot be identified <ul style="list-style-type: none"> <li><input type="checkbox"/> Presume animal infected and patient at risk</li> </ul>	
<b>Notes</b> <ul style="list-style-type: none"> <li>▪ Consumption of properly cooked rabid meat is not harmful</li> <li>▪ Animals at risk: dogs, cats, bats, other wild carnivores</li> <li>▪ Non-mammals cannot harbour rabies</li> </ul>	

## Dealing with the patient

- ⦿ The combination of local wound treatment plus passive immunisation with rabies immunoglobulin (RIG) plus vaccination with rabies vaccine (RV) is recommended for all suspected exposures to rabies
- ⦿ if the RI is not available, the patient should still be vaccinated with the Rabies Vaccine alone
- ⦿ Since prolonged rabies incubation periods are possible, persons who present for evaluation and treatment even months after having been bitten should be treated in the same way as if the contact occurred recently
- ⦿ Administration of Rabies IG and vaccine depends on the type of exposure and the animal's condition

TREATMENT	LOC
<input type="checkbox"/> LOCAL WOUND TREATMENT: Prompt and thorough local treatment is an effective method to reduce risk of infection <input type="checkbox"/> For mucous membranes contact, rinse thoroughly with water or normal saline ⦿ if the wound is deep Tetanus Toxoid (TT) should be given as well to prevent tetanus	HC2
<input type="checkbox"/> Local cleansing is indicated even if the patient presents late <input type="checkbox"/> DO NOT SUTURE THE WOUND	H
If Veterinary Department confirms rabies infection or if animal cannot be identified/tested <input type="checkbox"/> Give rabies vaccine+/- rabies immunoglobulin human as per the recommendations in the next table.	

## Recommendations for Rabies Vaccination/Serum

	Condition Of Animal		
Nature Of Exposure	At Time Of Exposure	10 Days Later	Recommended Action
Saliva in contact with skin but no skin lesion	Healthy	Healthy	Do not vaccinate
		Rabid	Vaccinate
	Suspect/ Unknown	Healthy	Do not vaccinate
		Rabid	Vaccinate
		Unknown	Vaccinate
Saliva in contact with skin that has lesions, minor bites on trunk or proximal limbs	Healthy	Healthy	Do not vaccinate
		Rabid	Vaccinate
	Suspect/ unknown	Healthy	Vaccinate; but stop course if animal healthy after 10 days
		Rabid	Vaccinate
		Unknown	Vaccinate
Saliva in contact with mucosae, serious bites (face, head, fingers or multiple bites)	Domestic or wild rabid animal or suspect	Suspect	Vaccinate and give antirabies immunoglobulin
	Domestic or wild rabid animal or Suspect		Vaccinate but stop course if animal healthy after 10 days

## Prevention

- ① Vaccinate all domestic animals against rabies e.g. dogs, cats and others

## Administration of Rabies Vaccine (RV)

The following schedules use Purified VERO Cell Culture Rabies Vaccine (PVRV), which contains one intramuscular immunising dose (at least 2.5 IU) in 0.5 ml of reconstituted vaccine.

RV and RIG are both very expensive and should only be used when there is an absolute indication

### Post-Exposure Vaccination in Non-Previously Vaccinated Patients

Give RV to all patients unvaccinated against rabies together with local wound treatment. In severe cases, also give rabies immunoglobulin

#### The 2-1-1 intramuscular regimen

This induces an early antibody response and may be particularly effective when post-exposure treatment does not include administration of rabies immunoglobulins

- Day 0: One dose (0.5 ml) in right arm + one dose in left arm
- Day 7: One dose
- Day 21: One dose

#### Notes on IM doses

- Doses are given into the deltoid muscle of the arm. In young children, the anterolateral thigh may also be used
- Never use the gluteal area (buttock) as fat deposits may interfere with vaccine uptake making it less effective.

#### Alternative: 2-site intradermal (ID) regimen

- This uses PVRV intradermal (ID) doses of 0.1 ml (i.e. one fifth of the 0.5 ml IM dose of PVRV)
- Day 0: one dose of 0.1 ml in each arm (deltoid)
- Day 3: one dose of 0.1 ml in each arm

- Day 3: one dose of 0.1 ml in each arm
- Day 7: one dose of 0.1 ml in each arm
- Day 28: one dose of 0.1 ml in each arm

#### Notes on ID regime

- Much cheaper as it requires less vaccine
- Requires special staff training in ID technique using 1 ml syringes and short needles
- Compliance with the Day 28 is vital but may be difficult to achieve
- Patients must be followed up for at least 6-18 months to confirm the outcome of treatment
- If on malaria chemoprophylaxis, do NOT use.

### Post-exposure immunisation in previously vaccinated patients

In persons known to have previously received full pre- or post-exposure rabies vaccination within the last 3 years

#### Intramuscular regimen

- Day 0: One booster dose IM
- Day 3: One booster dose IM

#### Intradermal regimen

- Day 0: One booster dose ID
- Day 3: One booster dose ID

#### Note

- If incompletely vaccinated or immunosuppressed: give full post exposure regimen.

**Passive immunisation with rabies immunoglobulin (RIG) Give in all high-risk rabies cases irrespective of the time between exposure and start of treatment BUT within 7 days of first vaccine.DO NOT USE in patient previously immunised.**

## Human rabies immunoglobulin (HRIG)

### HRIG 20 IU/kg (do not exceed)

- Infiltrate as much as possible of this dose around the wound/s (if multiple wounds and insufficient quantity, dilute it 2 to 3 fold with normal saline)
- Give the remainder IM into gluteal muscle
- Follow this with a complete course of rabies vaccine
- The first dose of vaccine should be given at the same time as the immunoglobulin, but at a site as far away as possible from the site where the vaccine was injected. If the bite is at or near the upper arm, do not infiltrate the wound with the immunoglobulin unless the vaccine won't be injected in the deltoid muscle of that arm. If the wound near the deltoid is infiltrated with the immunoglobulin, use the deltoid muscle of the opposite arm for the vaccine".

### Notes

- If RIG not available at first visit, its administration can be delayed up to 7 days after the first dose of vaccine.

## Pre-exposure immunisation

Offer rabies vaccine to persons at high risk of exposure such as:

- Laboratory staff working with rabies virus
- Veterinarians
- Animal handlers
- Zoologists/wildlife officers
- Any other persons considered to be at high risk

### Day 0: One dose IM or ID

### Day 7: One dose IM or ID

### Day 28: One dose IM or ID

### 1.2.1.5 Rabies Vaccine Schedules

DAY	Vaccine Dose	No. of Doses	Comments
<b>Intramuscular Regimen</b>			
0	0.5ml	2 (one in each deltoid)	Into the deltoid muscle NEVER IN THE GLUTEAL MUSCLE (buttocks)
7	0.5ml	1	
21	0.5ml	1	Children with less muscle mass: Anterolateral aspect of the thigh Note: Day 14 is skipped The 2:1:1 regimen uses 4doses in 3weeks It has fewer patient appointments and it is easy to comply with If the patient is on anti-malarial prophylaxis with Chloroquine, it should be withheld and an alternative malaria prophylaxis should be started if needed.
<b>2-site Intradermal (ID) Regimen</b>			
0	0.1ml	2 (one in each deltoid)	It is cheaper since it uses less drug It requires special staff training in ID technique using 1ml syringes with shorter needles Note: Days 14 and 21 are skipped
3	0.1ml	2 (one in each deltoid)	
7	0.1ml	2 (one in each deltoid)	
28	0.1ml	2 (one in each deltoid)	
<b>Rabies Immunoglobulin</b>			

DAY	Vaccine Dose	No. of Doses	Comments
DAY	Immunoglobulin dose	Number of doses	Comments
0	20IU/kg	Infiltrate in the area around and in the wound at the same depth as the wound	The Immunoglobulin should be administered as far as possible from the vaccine to avoid antibody-antigen reaction

## 1.2.2 Fractures

ICD10 CODE: S00-T88

A fracture is a complete or incomplete break in a bone.

### Causes

- ⌚ Trauma e.g. road traffic accident, assault, falls, sports
- ⌚ Bone weakening by disease, e.g., cancer, TB, osteomyelitis, osteoporosis

### Clinical features

- ⌚ Pain, tenderness, swelling, deformity
- ⌚ Inability to use/move the affected part
- ⌚ May be open (with a wound) or closed

### Differential diagnosis

- ⌚ Sprain, dislocations
- ⌚ Infection (bone, joints and muscles)
- ⌚ Bone cancer

## Investigations

- X-ray: 2 views (AP and lateral) including the joints above and below

## Management

Suspected fractures should be referred to HC4 or Hospital after initial care.

TREATMENT	LOC
<b>If polytrauma</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Assess and manage airways</li> <li><input type="checkbox"/> Assess and treat shock (see section 1.1.2)</li> </ul>	
<b>Closed fractures</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Assess nerve and blood supply distal to the injury: if no sensation/pulse, refer as an emergency</li> <li><input type="checkbox"/> Immobilise the affected part with a splint</li> <li><input type="checkbox"/> Apply ice or cold compresses</li> <li><input type="checkbox"/> Elevate any involved limb</li> </ul>	HC2
<ul style="list-style-type: none"> <li><input type="checkbox"/> Give Tetanus Toxoid if not fully vaccinated</li> <li><input type="checkbox"/> Start antibiotic           <ul style="list-style-type: none"> <li>- Amoxicillin 500 mg every 8 hours</li> <li>- Child: 25 mg/kg every 8 hours (or 40 mg/kg every 12 hours)</li> </ul> </li> </ul>	
<b>If severe soft tissue damage</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Add gentamicin 2.5 mg/kg every 8 hours</li> <li><input type="checkbox"/> Refer URGENTLY to hospital for further management</li> </ul>	HC3
<b>Note</b> <ul style="list-style-type: none"> <li>▪ Treat sprains, strains and dislocations as above</li> </ul> <b>Note</b> <ul style="list-style-type: none"> <li>▪ Treat sprains, strains and dislocations as above</li> </ul>	
<b>Caution</b> <ul style="list-style-type: none"> <li>▪ Do not give pethidine and morphine for rib fractures and head injuries as they cause respiratory depression</li> </ul>	



## 1.2.3 Burns

ICD10CODE:T20-T25

Tissue injury caused by thermal, chemical, electrical, or radiation energy.

### Causes

- Ⓐ Thermal, e.g., hot fluids, flame, steam, hot solids, sun
- Ⓐ Chemical, e.g., acids, alkalis, and other caustic chemicals
- Ⓐ Electrical, e.g., domestic (low voltage) transmission lines (high voltage), lightening
- Ⓐ Radiation, e.g., exposure to excess radiotherapy or radioactive materials

### Clinical features

- Ⓐ Pain, swelling
- Ⓐ Skin changes (hyperaemia, blisters, singed hairs)
- Ⓐ Skin loss (eschar formation, charring)
- Ⓐ Reduced ability to use the affected part
- Ⓐ Systemic effects in severe/extensive burns include shock, low urine output, generalised swelling, respiratory insufficiency, deteriorated mental state
- Ⓐ Breathing difficulty, hoarse voice and cough in smoke inhalation injury – medical emergency

### Criteria for classification of the severity of burns

The following criteria are used to classify burns:

CRITERIA	LEVEL
Depth of the burn (a factor of temperature, of agent, and of duration of contact with the skin)	<b>1st Degree burns</b> Superficial epidermal injury with no blisters. Main sign is redness of the skin, tenderness, or hyper sensitivity with intact two-point discrimination. Healing in 7 days

CRITERIA	LEVEL
	<p><b>2nd Degree burns or Partial thickness burns</b>            It is a dermal injury that is sub-classified as superficial and deep 2nd degree burns. In superficial 2nd degree burns, blisters result, the pink moist wound is painful. A thin eschar is formed. Heals in 10-14 days.            In deep 2nd degree burns, blisters are lacking, the wound is pale, moderately painful, a thick eschar is formed. Heals in &gt;1 month, requiring surgical debridement</p>
	<p><b>3rd Degree burns</b>            Full thickness skin destruction, leather-like rigid eschar. Painless on palpation or pinprick. Requires skin graft.</p> <p><b>4th Degree burns</b>            Full thickness skin and fascia, muscles, or bone destruction. Lifeless body part</p>
Percentage of total body surface area (TBSA)	Small areas are estimated using the open palm of the patient to represent 1% TBSA. Large areas estimated using the “rules of nines” or a Lund-Browder chart. Count all areas except the ones with erythema only
The body parts injured	Face, neck, hands, feet, perineum and major joints burns are considered severe
Age/general condition	In general, children and the elderly fare worse than young adults and need more care. A person who is sick or debilitated at the time of the burn will be more affected than one who is healthy

## Categorisation of severity of burns

Using the above criteria, a burn patient may be categorised as follows:

SEVERITY	CRITERIA
Minor/mild burn	<ul style="list-style-type: none"> <li>- Adult with &lt;15% TBSA affected or</li> <li>- Child/elderly with &lt;10% TBSA affected or</li> <li>- Full thickness burn with &lt;2% TBSA affected and no serious threat to function</li> </ul>
Minor/mild burn	<ul style="list-style-type: none"> <li>- Adult with &lt;15% TBSA affected or</li> <li>- Child/elderly with &lt;10% TBSA affected or</li> <li>- Full thickness burn with &lt;2% TBSA affected and no serious threat to function</li> </ul>
Moderate (intermediate) burn	<p>Adult with partial thickness burn 15- 25% TBSA or Child/elderly with partial thickness burn 10-20% TBSA</p> <p>All above with no serious threat to function and no cosmetic impairment of eyes, ears, hands, feet or perineum</p>
Major (severe) burn	<p><b>Adult with</b></p> <ul style="list-style-type: none"> <li>- Partial thickness burn &gt;25% TBSA or</li> <li>- Full thickness burn &gt;10% TBSA</li> </ul> <p><b>Child/elderly with</b></p> <ul style="list-style-type: none"> <li>- Partial thickness burn &gt;20% TBSA or full thickness burn of &gt;5% TBSA affected</li> </ul> <p><b>Irrespective of age</b></p> <ul style="list-style-type: none"> <li>- Any burns of the face and eyes, neck, ears, hand, feet, perineum and major joints with cosmetic or functional impairment risks, circumferential burns</li> <li>- Chemical, high voltage, inhalation burns</li> <li>- Any burn with associated major trauma</li> </ul>

## Chart for Estimating Percentage of Total Body Surface Area (TBSA) Burnt

### LUND AND BROWDER CHARTS

Ignore simple erythema

#### Superficial Deep

Region	%
Head	
Neck	
Region	%
Ant. Trunk	
Post. Trunk	
Right Arm	
Left Arm	
Buttocks	
Genitalia	
Right Leg	
Left Leg	
Total Burn	

#### Relative percentage of body surface area affected by growth

Area	Age 0	1	5	10	15	Adult
A = $\frac{1}{2}$ of head	9 $\frac{1}{2}$	8 $\frac{1}{2}$	6 $\frac{1}{2}$	5 $\frac{1}{2}$	4 $\frac{1}{2}$	3 $\frac{1}{2}$
B = $\frac{1}{2}$ of one thigh	2	3	4	4 $\frac{1}{2}$	4 $\frac{1}{2}$	4
C = $\frac{1}{2}$ of one lower leg	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2	3	3	3 $\frac{1}{2}$

#### Management

TREATMENT	LOC
Mild/moderate burns – First aid <ul style="list-style-type: none"> <li><input type="checkbox"/> Stop the burning process and move the patient to safety</li> <li><input type="checkbox"/> Roll on the ground if clothing is on fire</li> </ul>	HC1

## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Switch off electricity</li> <li><input type="checkbox"/> Cool the burn by pouring or showering or soaking the affected area with cold water for 30 minutes, especially in the first hour after the burn (this may reduce the depth of injury if started immediately)</li> <li><input type="checkbox"/> Remove soaked clothes, wash off chemicals, remove any constrictive clothing/rings</li> <li><input type="checkbox"/> Clean the wound with clean water</li> <li><input type="checkbox"/> Cover the wound with a clean dry cloth and keep the patient with warm</li> </ul>	HC1
<p><b>At health facility</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Give oral or IV analgesics as required</li> <li><input type="checkbox"/> If TBSA &lt;10% and patient able to drink, give oral fluids otherwise consider IV</li> <li><input type="checkbox"/> Give TT if not fully immunised</li> <li><input type="checkbox"/> Leave small blisters alone, drain large blisters and dress if closed dressing method is being used the urine output. The normal urine output is: Children (&lt;30 kg) 1-2 ml/kg/hour and adults 0.5 ml/kg/hour (30-50 ml /hour)</li> </ul>	HC2
<ul style="list-style-type: none"> <li><input type="checkbox"/> Dress with silver sulphadiazine cream 1%, add saline moistened gauze or paraffin gauze and dry gauze on top to prevent seepage</li> <li><input type="checkbox"/> Small superficial 2nd degree burns can be dressed directly with paraffin gauze dressing</li> <li><input type="checkbox"/> Change after 1-3 days then prn</li> <li><input type="checkbox"/> Patient may be exposed in a bed cradle if there are extensive burns</li> <li><input type="checkbox"/> Saline bath should be done before wound dressing</li> </ul>	HC3

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> If wound infected dress more frequently with silver sulphadiazine cream until infection is controlled.</li> </ul>	HC3
<b>Severe burns</b>	
<ul style="list-style-type: none"> <li><input type="checkbox"/> First aid and wound management as above PLUS</li> <li><input type="checkbox"/> Give IV fluid replacement in a total volume per 24 hours according to the calculation in the box below (use crystalloids, i.e., Ringer's lactate, or normal saline)</li> <li><input type="checkbox"/> If patient in shock, run the IV fluids fast until BP improves (see section 1.1.2)</li> <li><input type="checkbox"/> Manage pain as necessary</li> <li><input type="checkbox"/> Refer for admission</li> <li><input type="checkbox"/> Monitor vital signs and urine output</li> <li><input type="checkbox"/> Use antibiotics if there are systemic signs of infection: benzylpenicillin 3 MU every 6 hours</li> </ul> <p>+/- gentamicin 5-7 mg/kg IV or IM once a day</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Blood transfusion may be necessary</li> <li><input type="checkbox"/> If signs/symptoms of inhalation injury, give oxygen and refer for advanced life support (refer to regional level)</li> </ul>	HC4
<b>Surgery</b>	H
<ul style="list-style-type: none"> <li><input type="checkbox"/> Escharotomy and fasciotomy for circumferential finger, hand, limb or torso burns</li> <li><input type="checkbox"/> Escharectomy to excise dead skin</li> <li><input type="checkbox"/> Skin grafting to cover clean deep burn wounds</li> </ul>	
<b>Eye injury</b>	
<ul style="list-style-type: none"> <li><input type="checkbox"/> Irrigate with abundant sterile saline</li> <li><input type="checkbox"/> Place eye pad over eye ointment and refer</li> </ul>	

TREATMENT	LOC
<b>Additional care</b>	
<input type="checkbox"/> Nutritional support <input type="checkbox"/> Physiotherapy of affected limb <input type="checkbox"/> Counselling and psychosocial support <input type="checkbox"/> Health education on prevention (e.g. epilepsy control)	
<b>Caution</b>	
<input type="checkbox"/> Silver sulphadiazine contraindicated in pregnancy, breast-feeding and premature babies	

### Fluid replacement in burns

- Ⓐ The objective is to maintain normal physiology as shown by urine output, vital signs and mental status
- Ⓑ Fluid is lost from the circulation into the tissues surrounding the burns and some is lost through the wounds, especially in 18-30 hours after the burns
- Ⓒ Low intravascular volume results in tissue circulatory insufficiency (shock) with results such as kidney failure and deepening of the burns
- Ⓓ The fluid requirements are often very high and so should be given as necessary to ensure adequate urine output

TREATMENT	LOC
<input type="checkbox"/> Give oral fluids (ORS or others) and/or IV fluids e.g. normal saline or Ringer's Lactate depending on the degree of loss of intravascular fluid	HC2 HC3
V The total volume of IV solution required in the first 24 hours of the burns is:	
<b>4 ml x weight (kg) x % TBSA burned plus the normal daily fluid requirement</b>	
<input type="checkbox"/> Give 50% of fluid replacement in the first 8 hours and 50% in the next 16 hours. The fluid input is balanced against	

## Prevention

- Ⓐ Public awareness of burn risks and first aid water use in cooling burnt skin
- Ⓐ Construction of raised cooking fire places as safety measure
- Ⓐ Ensure safe handling of hot water and food, keep well out of the reach of children
- Ⓐ Particular care of high risk persons near fires e.g. children, epileptic patients, alcohol or drug abusers
- Ⓐ Encourage people to use closed flames e.g. hurricane lamps. Avoid candles.
- Ⓐ Beware of possible cases of child abuse

### 1.2.4 Wounds

ICD10 CODE: S00-T88

Any break in the continuity of the skin or mucosa or disruption in the integrity of tissue due to injury.

#### Causes

- Ⓐ Sharp objects, e.g. knife, causing cuts, punctures
- Ⓐ Blunt objects causing bruises, abrasions, lacerations
- Ⓐ Infections, e.g. abscess
- Ⓐ Bites, e.g. insect, animal, human
- Ⓐ Missile and blast injury, e.g. gunshot, mines, explosives, landmines
- Ⓐ Crush injury, e.g. RTA, building collapse

#### Clinical features

- Ⓐ Raw area of broken skin or mucous membrane
- Ⓐ Pain, swelling, bleeding, discharge

- Ⓐ Reduced use of affected part
- Ⓐ Cuts: sharp edges
- Ⓐ Lacerations: Irregular edges
- Ⓐ Abrasions: loss of surface skin
- Ⓐ Bruises: subcutaneous bleeding e.g. black eye

## Management

TREATMENT	LOC
<b>Minor cuts and bruises</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> First aid, tetanus prophylaxis, dressing and pain management</li> <li><input type="checkbox"/> Antibiotics are not usually required but if the wound is grossly contaminated, give           <ul style="list-style-type: none"> <li>- Cloxacillin or amoxicillin 500 mg every 6 hours</li> <li>- as empiric treatment</li> </ul> </li> </ul>	HC2
<b>Child: 125-250 mg every 6 hours</b>	
<b>Deep and/or extensive</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Identify the cause of the wound or injury if possible</li> <li><input type="checkbox"/> Wash affected part and wound with plenty of water or saline solution           <ul style="list-style-type: none"> <li>- (you can also clean with chlorhexidine 0.05%</li> <li>- or hydrogen peroxide 6% diluted with equal amount of saline to 3% if wound is contaminated)</li> </ul> </li> <li><input type="checkbox"/> Explore the wound under local anesthesia to ascertain the extent of the damage and remove foreign bodies</li> <li><input type="checkbox"/> Surgical toilet: carry out debridement to freshen the wound</li> <li><input type="checkbox"/> Tetanus prophylaxis, pain management, immobilization</li> </ul>	HC4

TREATMENT	LOC
<b>If wound is clean and fresh (&lt;8 hours)</b>	HC3
<input type="checkbox"/> Carry out primary closure by suturing under local anaesthetic <ul style="list-style-type: none"> <li>- Use lignocaine hydrochloride 2% (dilute to 1% with equal volume of water for injection)</li> </ul>	
<b>If wound is &gt;8 hours old or dirty</b>	
<input type="checkbox"/> Clean thoroughly and dress daily f Check the state of the wound for 2-3 days f Carry out delayed primary closure if clean <ul style="list-style-type: none"> <li>- Use this for wounds up to 2-4 days old</li> </ul>	
<b>If wound &gt;4 days old or deep puncture wound, contaminated wounds, bite/gunshot wounds, abscess cavity</b>	
<input type="checkbox"/> Let it heal by secondary closure (granulation tissue) <input type="checkbox"/> Dress daily if contaminated/dirty, every other day if clean <input type="checkbox"/> Pack cavities (e.g. abscesses) with saline-soaked gauzes	
<b>In case of extensive深深 wound</b>	
<input type="checkbox"/> Consider closure with skin graft/flap	
<b>Note</b>	
<ul style="list-style-type: none"> <li>● Use SOP for collection of wound discharge, or deep tissue, submit to lab</li> <li>● Start on treatment, change treatment when results return</li> <li>● If MDR, gramnegative or MRSA or VRE implement the respective transmission-based precautions.</li> <li>● Where can, use chlorine release for environmental decontamination or alternate fumigation (not formaldehyde)</li> </ul>	



## 1.2.5 Head Injuries

ICD10 CODE: S00-S09

Trauma to the head resulting in brain injuries due to:

- Direct damage to the brain (contusion, concussion, penetrating injury, diffuse axonal damage)
- Haemorrhage from rupture of blood vessels around and in the brain
- Severe swelling of the cerebral tissue (cerebral oedema)

### Causes

- ⌚ Road traffic accident
- ⌚ Assault, fall or a blow to the head

### Clinical features

- ⌚ May be closed (without a cut) or open (with a cut)
- ⌚ Swelling on the head (scalp hematoma)
- ⌚ Fracture of the skull, e.g., depressed area of the skull, open fracture (brain matter may be exposed)
- ⌚ Raccoon eyes (haematoma around the eyes), bleeding and/or leaking of CSF through nose, ears – signs of possible skull base fracture

### Severe head injury

- ⌚ Altered level of consciousness, agitation, coma (see GCS below)
- ⌚ Seizures, focal neurological deficits, pupil abnormalities

### Minor head injury (concussion)

- ⌚ Transient and short lived loss of mental function, e.g., loss of consciousness (<5 minutes), transient amnesia, headache, disorientation, dizziness, drowsiness, vomiting
  - symptoms should improve by 4 hours after the trauma

## Severity classification of head injuries

Head injuries are classified based on Glasgow Coma Scale (GCS) score as:

- Severe (GCS 3-8)
- Moderate ( GCS 9-13)
- Mild (GCS > 13)

### Glasgow Coma Scale (GCS)

Eye Opening	Verbal Response	Motor Response
1 = No response 1 = No response		1 = No response
2 = Open in response to pain	2 = Incomprehensible sounds (grunting in children)	2=Extension to painful stimuli (decerebrate)
3 = Open in response to voice	3 = Inappropriate words (cries and screams/ cries inappropriately in children)	3 = Abnormal flexion to painful stimuli (decorticate)
4 = Open spontaneously	4 = Disoriented able to converse (use words inappropriately / cries in children)	4 = Flexion/ withdrawal from painful stimuli
NA	5 = Oriented able to converse (use words appropriately/ cries appropriately in children)	5 = Localize pain
NA		6 = Obeys command (NA in children <1 yr)

For infants and children use AVPU

A	Alert	GCS >13
V	Responds to voice	GCS 13

P	Responds to pain	GCS 8
U	Unresponsive	GCS <8

### Note

Mild injuries can still be associated with significant brain damage and can be divided into low and high risk according to the following criteria:

Low Risk Mild Head Injury	High Risk Mild Head Injury
<ul style="list-style-type: none"> <li>● GCS 15 at 2 hours</li> <li>● No focal neurological deficits</li> <li>● No signs/symptoms of skull fracture</li> <li>● No recurrent vomiting</li> <li>● No risk factors (age &gt;65 years, bleeding disorders, dangerous mechanism)</li> <li>● Brief LOC (&lt;5 minutes) and post traumatic amnesia (&lt;30 minutes)</li> </ul>	<ul style="list-style-type: none"> <li>● GCS &lt;15 at 2 hours</li> <li>● Deterioration of GCS</li> <li>● Focal neurological deficits</li> <li>● Clinical suspicion of skull fracture</li> <li>● Recurrent vomiting</li> <li>● Known bleeding disorder</li> <li>● Age &gt;65 years</li> <li>● Post traumatic seizure</li> <li>● LOC &gt;5 minutes</li> <li>● Persistent amnesia</li> <li>● Persistent abnormal behaviour</li> <li>● Persistent severe headache</li> </ul>

### Investigations

- ¾ Skull X ray useful only to detect fracture
- ¾ CT scan is the gold standard for detection of head injury

### Differential diagnosis

- Alcoholic coma - may occur together with a head injury
- Hypoglycaemia

- Meningitis
- Poisoning
- Other cause of coma

### Management (general principles)

Management depends on:

- GCS and clinical features at first assessment
- Risk factors (mechanism of trauma, age, baseline conditions)
- GCS and clinical features at follow up

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Assess mechanism of injury to assess risks of severe injury (which may not be apparent at the beginning)</li> <li><input type="checkbox"/> Assess medical history to assess risk of complication (e.g., elderly, anticoagulant treatment etc.)</li> <li><input type="checkbox"/> Assess level of consciousness using GCS or AVPU</li> <li><input type="checkbox"/> Perform general (including ears) and neurological examination (pupils, motor and sensory examination, reflexes)           <ul style="list-style-type: none"> <li>- Assess other possible trauma especially if road traffic accident, e.g., abdominal or chest trauma</li> </ul> </li> <li><input type="checkbox"/> DO NOT SEDATE. Do NOT give opioids</li> <li><input type="checkbox"/> Do NOT give NSAIDs (risk of bleeding)</li> </ul>	HC3

Low Risk Mild Head Injury	High Risk Mild Head Injury
<ul style="list-style-type: none"> <li><input checked="" type="radio"/> No persistent headache</li> <li><input checked="" type="radio"/> No large haematoma/ laceration</li> <li><input checked="" type="radio"/> Isolated head injury</li> <li><input checked="" type="radio"/> No risk of wrong information</li> </ul>	<ul style="list-style-type: none"> <li><input checked="" type="radio"/> Large scalp haematoma</li> <li><input checked="" type="radio"/> Polytrauma</li> <li><input checked="" type="radio"/> Dangerous mechanism (fall from height, car crash etc.)</li> <li><input checked="" type="radio"/> Unclear information</li> </ul>

TREATMENT	LOC
<input type="checkbox"/> >90 mmHg	H
<input type="checkbox"/> Monitor GCS, pupils and neurological signs	
<input type="checkbox"/> Early CT if available, otherwise observe and refer immediately if not improving in the following hours	

### Management of severe traumatic head injury

TREATMENT	LOC
<input type="checkbox"/> Early CT if available, otherwise observe and refer immediately if not improving in the following hours Refer immediately for specialist management f Supportive care as per moderate head injury f If open head injury, give first dose of antibiotic prereferral - Ceftriaxone 2 g IV <b>Child: 100 mg/kg</b>	NR

### Prevention

- ⦿ Careful (defensive) driving to avoid accidents
- ⦿ Use of safety belts by motorists
- ⦿ Wearing of helmets by cyclists, motor-cyclists and people working in hazardous environments
- ⦿ Avoid dangerous activities (e.g., climbing trees)

#### 1.2.5.1 Traumatic Spinal Injury

Early recognition of spinal injury.

Immobilizations with a rigid cervical collar or thoracolumbar corset to prevent further nerve damage.

Decompression:

Non operative Skull traction, Skin traction of lower limbs

Operative e.g., discectomy, anterior or posterior spinal decompression surgery

**1.2.6 Sexual Assault/Rape**

ICD10 CODE Z04.4

Rape is typically defined as oral, anal or vaginal penetration that involves threats or force against an unwilling person.

Such penetration, whether wanted or not, is considered statutory rape if victims are younger than the age of consent (18 years).

Sexual assault or any other sexual contact that results from coercion is rape, including seduction of a child through offers of affection or bribes; it also includes being touched, grabbed, kissed or shown genitals.

### Clinical features

Rape may result in the following:

### Management of mild traumatic head injury

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> First aid if necessary</li> <li><input type="checkbox"/> Mild analgesia if necessary e.g. paracetamol</li> <li><input type="checkbox"/> Observe for at least 4-6 hours, monitor GCS and neurological symptoms</li> </ul> <p><b>If low risk (see above)</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Discharge on paracetamol</li> <li><input type="checkbox"/> Advise home observation and return to the facility in case of any change</li> </ul> <p><b>If high risk</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Monitor for 24 hours</li> <li><input type="checkbox"/> Refer immediately if GCS worsens or other clinical signs appear/persist</li> <li><input type="checkbox"/> If patient is fine at the end of observation period, send home with instructions to come back in case of any problem (severe headache, seizures, alteration of consciousness, lethargy, change in behaviour etc.)</li> </ul>	HC3

- ④ Exogenous injury
- ④ Genital injury (usually minor, but some vaginal lacerations can be severe)
- ④ Psychologic symptoms: often the most prominent
  - Short term: fear, nightmares, sleep problems, anger, embarrassment
  - Long term: Post traumatic Stress Disorder, an anxiety disorder; symptoms include re-experiencing (e.g., flashbacks, intrusive upsetting thoughts or images), avoidance (e.g., of trauma-related situations, thoughts, and feelings) and hyperarousal (e.g., sleep difficulties, irritability, concentration problems).
  - Symptoms last for >1 month and significantly impair social and occupational functioning.
  - Shame, guilt or a combination of both
  - Sexually transmitted infections (STIs, e.g., hepatitis, syphilis, gonorrhea, chlamydial infection, trichomoniasis, HIV infection)
- ④ Pregnancy (may occur)

**Note**

- Headaches and dizziness following mild traumatic brain injury may persist for weeks/months

**Management of moderate traumatic head injury**

TREATMENT	LOC
<ul style="list-style-type: none"><li><input type="checkbox"/> Refer to hospital for appropriate management</li><li><input type="checkbox"/> Careful positioning (head 30° up)</li><li><input type="checkbox"/> Use fluids with caution</li><li><input type="checkbox"/> Keep oxygen saturation &gt;90% and systolic BP</li></ul>	H

## Investigations

- Pregnancy test
- HIV, hepatitis B and RPR tests

## Management

Whenever possible, assessment of a rape case should be done by a specially trained provider. Victims are traumatized so should be approached with empathy and respect. Explain and ask consent for every step undertaken.

The goals are:

- Medical assessment and treatment of injuries
- Assessment, treatment and prevention of pregnancy and STIs

## Collection of forensic evidence

- Psychologic evaluation and support

TREATMENT	LOC
<ul style="list-style-type: none"><li><input type="checkbox"/> Advise not to throw out or change clothing, wash, shower, douche, brush their teeth or use mouthwash; doing so may destroy evidence</li></ul>	HC2
<ul style="list-style-type: none"><li><input type="checkbox"/> Initial assessment (history and examination) – use standard forms if available<ul style="list-style-type: none"><li>- Type of injuries sustained (particularly to the mouth, breasts, vagina and rectum)</li><li>- Any bleeding from or abrasions on the patient or assailant (to help assess the risk of transmission of HIV and hepatitis)</li><li>- Description of the attack (e.g., the orifices which were penetrated, whether ejaculation occurred, or whether a condom was used)</li></ul></li></ul>	HC4

TREATMENT	LOC
<ul style="list-style-type: none"> <li>- Assailant's use of aggression, threats, weapons and violent behavior</li> <li>- Description of the assailant</li> <li>- Use of contraceptives (to assess risk of pregnancy), previous coitus (to assess validity of sperm testing)</li> <li>- Clearly describe size, extent, nature of any injury.</li> <li>- If possible take photos of the lesions (with patient's consent)</li> </ul>	HC4
<p><input checked="" type="checkbox"/> Test for HIV, RPR, hepatitis B and pregnancy, to assess baseline status of the patient</p> <ul style="list-style-type: none"> <li>- If possible test for flunitrazepam and gamma hydroxybutyrate ("rape drugs")</li> </ul>	HC4
<p><input checked="" type="checkbox"/> Collect forensic evidence (with standard kits if available)</p> <ul style="list-style-type: none"> <li>- Condition of clothing (e.g., damaged, stained, adhering foreign material)</li> <li>- Small samples of clothing including an unstained sample, given to the police or laboratory</li> <li>- Hair samples, including loose hairs adhering to the patient or clothing, semen-encrusted pubic hair, and clipped scalp and pubic hairs of the patient (at least 10 of each for comparison)</li> <li>- Semen taken from the cervix, vagina, rectum, mouth and thighs</li> <li>- Blood taken from the patient</li> <li>- Dried samples of the assailant's blood taken from the patient's body and clothing</li> <li>- Urine, saliva</li> <li>- Smears of buccal mucosa</li> <li>- Fingernail clippings and scrapings</li> <li>- Other specimen as indicated by the history or physical examination</li> </ul>	

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Prophylaxis for STD including:           <ul style="list-style-type: none"> <li>- Ceftriaxone 1g IM or cefixime 400 mg orally stat</li> <li>- Azithromycin 1 g stat or doxycycline 100 mg</li> <li>- twice a day for 1 week</li> <li>- Metronidazole 2 g stat</li> <li>- HIV Post Exposure Prophylaxis if within 72 hours:</li> </ul> </li> </ul> <p><b>Adults : TDF+3TC+ATV/r for 28 days</b></p> <p><b>Children: ABC+3TC+LPV/r</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Hepatitis B vaccine if not already immunised</li> <li><input type="checkbox"/> Emergency contraception if within 72 hours (but may be useful up to 5 days after)           <ul style="list-style-type: none"> <li>- Levonorgestrel 1.5 mg (double the dose if patient is HIV positive on ARVs)</li> </ul> </li> </ul>	HC4
<ul style="list-style-type: none"> <li><input type="checkbox"/> Counselling: use common sense measures (e.g., reassurance, general support, non-judgmental attitude) to relieve strong emotions of guilt or anxiety</li> <li><input type="checkbox"/> Provide links and referral to:           <ul style="list-style-type: none"> <li>- Long-term psycho-social support</li> <li>- Legal counseling</li> <li>- Police investigations, restraining orders</li> <li>- Childprotection services</li> <li>- Economic empowerment, emergency shelters</li> <li>- Long-term case management</li> </ul> </li> </ul>	
<p><b>Notes</b></p> <ul style="list-style-type: none"> <li>■ Because the full psychologic effects cannot always be ascertained at the first examination, follow-up visits should be scheduled at 2 weeks intervals</li> <li>■ Reporting: Health facilities should use HMIS 105 to report Gender-Based Violence (GBV)</li> </ul>	

TREATMENT	LOC
<p><b>Harm classification for police reporting</b></p> <ul style="list-style-type: none"> <li>○ Harm: any body hurt, disease or disorders, whether permanent or temporary</li> <li>○ Grievous harm: any harm which amounts to a main or dangerous harm, or seriously or permanently injures health, or causes permanent disfigurement or any permanent injury to any internal or external organ, membrane or sense</li> <li>○ Dangerous harm: means harm endangering life</li> <li>○ "Main" means the destruction or permanent disabling of any external membrane or sense</li> </ul>	

## 1.3 POISONING

### 1.3.1 General Management of Poisoning ICD10 CODE: T36-T50

Bodily entry of toxic substances in amounts that cause dysfunction of body systems.

#### Causes

- Microorganisms (food poisoning)
- Fluids and gases (organic), e.g., agricultural chemicals, petrol, paraffin, carbon monoxide
- Metal poisoning (inorganic), e.g., lead, mercury, copper
- Alcohol, drugs of abuse, medicines (in excessive amounts)

Acute poisoning can occur by ingestion, inhalation, injection or cutaneous/mucosal absorption.

Exposure can be intentional (e.g., suicide or homicide attempt), unintentional (e.g., medication error) or environmental/ occupational.

## Principles of general management

- If possible, refer patients showing signs of poisoning to hospital for admission. Send a note of what is known about the poison and what treatment has been given
- Also refer/admit patients who have taken slow-acting poisons even if they appear well. These include: acetylsalicylic acid, iron, paracetamol, tricyclic antidepressants (e.g., amitriptyline, imipramine), paraquat, modified-release products
- Optimal management of the poisoned patient depends upon the specific poison(s) involved, the presenting and predicted severity of illness and time that has elapsed between exposure and presentation
- Treatment includes supportive care, decontamination, antidotal therapy and enhanced elimination techniques
- It may not always be possible to identify the poison and the amount taken. Anyway,
- Only a few poisons have specific antidotes
- Few patients need active removal of the poison
- Most patients must be treated symptomatically

However, knowledge of the poison will help you anticipate the likely effects on the patient.

## Supportive Treatment in Poisoning

TREATMENT	LOC
<ul style="list-style-type: none"><li><input type="checkbox"/> Ensure safety of the patient and minimize/stop exposure e.g., wash off/clean skin with water and soap</li><li><input type="checkbox"/> Monitor and stabilize all vitals (blood pressure, heart rate, respiratory rate, oxygen saturation AND temperature)</li></ul>	HC2

TREATMENT	LOC
Airway and breathing (often impaired in unconscious patient)	HC2 HC4
<ul style="list-style-type: none"> <li><input type="checkbox"/> Ensure the airway is cleared and maintained</li> <li><input type="checkbox"/> Insert an airway cannula if necessary</li> <li><input type="checkbox"/> Position patient semiprone to minimise risk of inhalation of vomit</li> <li><input type="checkbox"/> Assist ventilation if necessary</li> <li><input type="checkbox"/> Administer oxygen if necessary</li> </ul>	
Blood pressure	HC2
<ul style="list-style-type: none"> <li>- Hypotension is common in severe poisoning with CNS depressants. A systolic BP &lt;70 mmHg may cause irreversible brain or renal damage</li> <li><input type="checkbox"/> Carry the patient's head down on the stretcher and nurse in this position in the ambulance</li> </ul>	
<input type="checkbox"/> Set up an IV normal saline line <ul style="list-style-type: none"> <li>- Fluid depletion without hypotension is common after prolonged coma and after aspirin poisoning due to vomiting, sweating and hyperpnoea</li> <li><input type="checkbox"/> Hypertension is less common but may be associated with sympathomimetic poisoning e.g. amphetamines, cocaine, pseudoephedrine</li> </ul>	HC3
Heart	HC4
<ul style="list-style-type: none"> <li>- Cardiac conduction defects and arrhythmias may occur in acute poisoning especially with tricyclic antidepressants, but the defects usually respond to correction of any hypoxia or acidosis</li> </ul>	

TREATMENT	LOC
<b>Body temperature</b> <ul style="list-style-type: none"> <li>- Hypothermia may develop in patients with prolonged unconsciousness especially after overdose of barbiturates or phenothiazines e.g., chlorpromazine, trifluoperazine</li> <li>- Hypothermia may be missed unless temperature is monitored</li> <li>- Treat by covering the patient with a blanket</li> <li>- f Hyperthermia may occur with anticholinergics and sympathomimetics</li> <li>- Treat by tepid sponging and antipyretics if appropriate</li> </ul>	HC2
<b>Convulsions</b> <p><input type="checkbox"/> Diazepam 10 mg rectally repeated if necessary Child: 0.5 mg/kg per dose (1.5-2.5 mg if &lt;1 month, 5 mg if 1 month-2 years, 5-10 mg if 2-12 years) Or diazepam 5- 10 mg slow IV repeated if necessary max 30 mg Child: 200 micrograms (0.2 mg)/kg max 10 mg</p>	HC2 HC3
<b>Other considerations</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Counsel patient and families concerning poisoning</li> <li><input type="checkbox"/> A psychiatric evaluation is necessary if poisoning was intentional</li> <li><input type="checkbox"/> If environmental or occupational exposure, follow up to assess if other people have been affected and take appropriate measures</li> </ul>	HC4

### 1.3.1.2 Removal and Elimination of Ingested Poison

Removal and elimination of poison (decontamination) has to be implemented AFTER stabilization of vital signs.

## Removal from the stomach

- Ⓐ Balance the dangers of attempting to empty the stomach against the likely toxicity of any swallowed poison as determined by the type of poison and amount swallowed against the risk of inhalation
- Ⓐ Do not induce vomiting
- Ⓐ Gastric lavage
- ▢ Only useful if done within 2 hours of poisoning (except with salicylates or anticholinergics when it may be of use within 4 to 6 hours)
- ▢ Seldom practicable or necessary before the patient reaches hospital
- ▢ Contraindications: drowsy or comatose patients and if poisoning with corrosive or petroleum products

## Prevention of absorption and active elimination

- Ⓐ Oral activated charcoal can bind many poisons in the stomach and reduce their absorption
- Ⓐ It is more effective the sooner it is given but may still work up to 2 hours after poisoning (longer with modified-release products and anticholinergics)
- Ⓐ Contraindications
  - Depressed mental status
  - Late presentation
  - Ingestion of corrosives and petroleum products
  - Toxins poorly absorbed by charcoal (e.g. metals like iron, lithium, alcohol)
  - Intestinal obstruction
- Ⓐ It is generally safe and especially useful for poisons toxic in small amounts, e.g. antidepressants

TREATMENT	LOC
<p><b>Prevention of absorption</b></p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Dose: activated charcoal powder 50 g Child: 0.5-1 g/kg           <ul style="list-style-type: none"> <li>- Grind tablets into a fine powder before mixing with 100-200 ml of water (50 g = 200 tablets of 250 mg)</li> <li>- If patient unable to swallow the charcoal/water mixture (slurry), give by gastric lavage tube</li> </ul> </li> </ul>	HC2
<p><b>Active elimination</b></p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Repeated doses of activated charcoal may be beneficial in some cases, e.g., acetylsalicylic acid, carbamazepine, phenobarbital, phenytoin, quinine, theophylline</li> <li>- Give activated charcoal 50 g repeated every 4 hours</li> </ul> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Treat any vomiting as this may reduce the effectiveness of the charcoal</li> </ul>	
<p><b>In case of intolerance</b></p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Reduce dose and increase frequency, e.g., 25 g every 2 hours, or 12.5 g every hour</li> </ul>	

### 1.3.2 Acute Organophosphate Poisoning

ICD10 CODE: T60.0

Organophosphates are ingredients of some pesticides and insecticides intended for agricultural and household use. Poisoning occurs by ingestion, inhalation or absorption through the skin.

#### Causes

- Ⓐ May be accidental, e.g., contamination of food
- Ⓐ Intended poisoning, i.e., suicidal or homicidal

- ⦿ Occupational hazard, e.g., agricultural workers

### Clinical features

- ⦿ Patient may smell of the chemicals
- ⦿ Constricted pupils
- ⦿ Cold sweat, anxiety, restlessness
- ⦿ Abdominal pain, diarrhoea and vomiting
- ⦿ Twitching, convulsions
- ⦿ Bradycardia
- ⦿ Excessive salivation, difficulty in breathing, abundant respiratory secretions
- ⦿ Headache, hypotension, urine incontinence
- ⦿ Coma

### Differential diagnosis

- ⦿ Other causes of poisoning
- ⦿ Other causes of convulsions

### Management

TREATMENT	LOC
<input type="checkbox"/> Remove contaminated clothing (use gloves) <input type="checkbox"/> Wash contaminated skin with lots of water <input type="checkbox"/> Establish and maintain the airway <input type="checkbox"/> Assisted respiration with air or oxygen may be required during the first 24 hours after poisoning <input type="checkbox"/> Give IV fluids, e.g., normal saline prn for dehydration, hypovolaemia, and shock <input type="checkbox"/> Prevent and treat convulsions with diazepam 10 mg IV <b>Child: 0.2 mg/kg IV or 0.5 mg/kg rectal</b> <input type="checkbox"/> Salbutamol 5 mg (2.5 mg for children <5 years) nebulisation if bronchospasm:	HC4

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Perform gastric lavage if the poison was ingested (up to 6 hours after ingestion) but consider risk of aspiration</li> <li><input type="checkbox"/> Give standard dose of activated charcoal if patient presents within 2 (up to 4) hours</li> <li><input type="checkbox"/> Monitor patient for a few days (worsening can occur a few days after ingestion)</li> </ul> <p>In moderate to severe poisoning (only if not responding to adequate doses of atropine)</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Add pralidoxime mesylate 30 mg/kg IV over 30 minutes Child: 25-50 mg/kg IV <ul style="list-style-type: none"> <li>- Continue with infusion 8 mg/kg/hour</li> <li>- Child: 10-20 mg/kg/hour</li> </ul> </li> </ul>	

#### Note

- Pralidoxime: Only effective if given within 24 hours of poisoning

#### Prevention

- Label agricultural and domestic pesticides properly – do not use unlabelled bottles for pesticides
- Store such products away from children
- Wear protective clothing when using the products

### 1.3.3 Paraffin and Other Petroleum Products Poisoning ICD10

CODE: T53.7

Includes paraffin, petrol, paint thinners, organic solvents, and turpentine.

#### Clinical features

- Patient may smell of paraffin/other petroleum product
- Burning sensation in mouth and throat
- Patient looks pale (transient cyanosis)

- Ⓐ Vomiting, diarrhoea, bloody stools
- Ⓑ Cough, dyspnoea, wheezing, tachypnoea, nasal flaring (due to chemical pneumonitis)
- Ⓒ Lethargy, convulsions, difficulty in breathing

The main risk is damage to lung tissue due to aspiration. AVOID gastric lavage or use of emetics as this may lead to inhalation of gastric content and pneumonitis

### Differential diagnosis

- Ⓐ Other causes of poisoning
- Ⓑ Acute infections

### Management

TREATMENT	LOC
Treatment is supportive and symptomatic <ul style="list-style-type: none"> <li><input type="checkbox"/> Remove clothes and wash skin if contaminated</li> <li><input type="checkbox"/> Avoid gastric lavage or use of an emetic</li> <li><input type="checkbox"/> Charcoal is NOT useful</li> <li><input type="checkbox"/> Give oxygen if patient has hypoxia</li> </ul>	HC4

### Prevention

<ul style="list-style-type: none"> <li><input type="checkbox"/> Atropine 2-4 mg IM or IV (according to the severity of the poisoning)</li> </ul> <p><b>Child: 0.05 mg/kg per dose</b></p> <ul style="list-style-type: none"> <li>- Double dose every 3-5 minutes until signs of atropinisation occur (stopping of bronchial secretions and broncoconstrictions)</li> <li>- Continuous infusion of atropine 0.05 mg/kg/hour may be necessary</li> <li>- hour may be necessary</li> <li>- Reduce dose of atropine slowly over 24 hours but monitor for patient's status</li> </ul>	
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- Store paraffin and other petroleum products safely (e.g. in a locked cupboard, out of reach of children)
- Do not store paraffin and other petroleum products in common beverage bottles.

### **1.3.4 Acetylsalicylic Acid (Aspirin) Poisoning**

ICD10 CODE: T39.0

Overdose of ASA, due to consumption of >10 g of ASA in adults and 3 g in children.

#### **Clinical features**

- Mild to moderate toxicity (after 1-2 hours): hyperventilation, tinnitus, deafness, nausea, vomiting, dizziness, vasodilation
- Severe toxicity: hyperpyrexia, convulsions, altered mental status, non cardiac pulmonary oedema, coma
- Complex acid-base disturbances (acidosis)

#### **Management**

TREATMENT	LOC
<p><b>Stabilise vital signs</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Oxygen and IV fluids as necessary</li> <li><input type="checkbox"/> Gastric lavage: worthwhile up to 4 hours after poisoning as stomach emptying is delayed</li> <li><input type="checkbox"/> Activated charcoal 50 g repeated as needed every 4 hours or 25 g repeated prn every 2 hours           <ul style="list-style-type: none"> <li>- It delays absorption of any remaining salicylate</li> </ul> </li> <li><input type="checkbox"/> Treat/prevent hypoglycaemia with Dextrose 50% 50-100 ml (Dextrose 10% 2-5 ml/kg in children)</li> </ul>	H

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Tepid sponging for hyperpyrexia</li> <li><input type="checkbox"/> Treat convulsions with IV diazepam 10 mg prn</li> </ul> <p>Refer to higher level of care if coma, pulmonary oedema, renal insufficiency, clinical deterioration in spite of above measures</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Treat acidosis and enhance renal excretion in symptomatic patients with Sodium bicarbonate <ul style="list-style-type: none"> <li>- Bolus 1-2 mEq/kg (max 100 mEq) in 3-5 minutes</li> <li>- Followed by an infusion of 50-75 mEq in 500 ml of Dextrose 5 %; run at 250 ml/hour in adults (run at 1.5-2 times maintenance in children)</li> <li>- Maintain urine pH 7.5-8</li> </ul> </li> </ul>	RR

### 1.3.5 Paracetamol Poisoning

ICD10 CODE: T39.1

Accidental or intentional assumption of excessive amount of paracetamol.  
Toxic dose: >150 mg/kg or >7.5 g (200 mg/kg for children <6 years)

#### Clinical features

- ⌚ First 24 hours: asymptomatic or aspecific symptoms such as nausea and vomiting, malaise, anorexia, abdominal pain
- ⌚ In patients with mild poisoning, symptoms will resolve and patient will recover. In patients with severe poisoning, symptoms will progress to the next phase
- ⌚ In 24-72 hours: progressive signs of hepatic toxicity (e.g. right upper quadrant abdominal pain, enlarged tender liver, increased transaminases)
- ⌚ After 72 hours: signs and symptoms peak at 72-96 hours and this may be followed by full recovery in 5-7 days or progression into irreversible hepatic failure (less frequently renal failure) and death

## Investigations

- Monitor liver function, renal function, INR
- Rule out pregnancy (it crosses the placental barrier)

## Management

Treatment	LOC
<input type="checkbox"/> Give repeated doses of activated charcoal (25-50 g every 4 hours) <input type="checkbox"/> If ingestion was <2 hours, empty the stomach to remove any remaining medicine using gastric lavage <input type="checkbox"/> Give acetylcysteine IV preferably within 8 hours from ingestion; if patient presents later, give it anyway <ul style="list-style-type: none"> <li>- 150 mg/kg (max 15 g) in 200 ml of Dextrose 5% in 60 minutes followed by</li> <li>- 50mg/kg(max5g)inDextrose5%500mlin 4 hours followed by</li> <li>- 100 mg/kg (max 10 g) in Dextrose 5% 1000 ml in 16 hours</li> </ul> <input type="checkbox"/> Supportive treatment	HC2 H
<b>Note</b> <ul style="list-style-type: none"> <li>Acetylcysteine may cause histamine release, mimicking an allergic reaction. If patient is stable, slow the infusion. If bronchospasm, stop the infusion</li> </ul>	

### 1.3.6 Iron Poisoning ICD10 CODE: T45.4

Common in children, due to the candy-like aspect of iron tablets. Ingestion of a quantity <40 mg/kg of elemental iron is unlikely to cause problems. Doses >60 mg/kg can cause serious toxicity.

Note: the common tablet of 200 mg of an iron salt contains 60-65 mg of elemental iron.

## Clinical features

- Clinical symptoms vary according to the time from ingestion

TIME	SYMPTOMS
Phase 1 (30 minutes to 6 hours)	Initial symptoms (by corrosive action of iron in GIT): nausea, vomiting (may be blood stained), abdominal pain, shock, metabolic acidosis
Phase 2 (6–12 hours)	Symptoms improve or disappear
Phase 3 (12–48 hours)	Severe shock, vascular collapse, metabolic acidosis, hypoglycaemia, convulsions, coma
Phase 4 (2–4 days)	Liver and renal failure, pulmonary oedema
Phase 5 (>4 days)	Gastrointestinal scarring and obstruction in survivors

## Management

TREATMENT	LOC
<p><input checked="" type="checkbox"/> IV fluids to manage shock and hypovolaemia</p> <p><b>Indication for use of antidote:</b></p> <ul style="list-style-type: none"> <li>- Severe symptoms</li> <li>- Metabolic acidosis</li> </ul> <p><input checked="" type="checkbox"/> Desferrioxamine continuous infusion 15 mg/kg/ hour in normal saline or glucose 5%</p> <ul style="list-style-type: none"> <li>- Do not use for more than 24 hours</li> <li>- Increase IV fluids if BP drops</li> <li>- Continue until metabolic acidosis clears or clinical condition improves</li> <li>- Contraindication: renal failure/anuria</li> </ul>	NR

### 1.3.7 Carbon Monoxide Poisoning ICD10 CODE: T58

Usually due to inhalation in confined spaces of smoke, car exhaust or fumes caused by incomplete combustion of fuel gases e.g. use of charcoal stoves in unventilated rooms.



## Cause

- Ⓐ Carbon monoxide, a colourless and odourless non-irritating gas

## Clinical features

- Ⓐ Due to hypoxia
- Ⓐ Headache, nausea, vomiting, dizziness, confusion, weakness
- Ⓐ Collapse, seizures, coma, death

## Management

TREATMENT	LOC
<ul style="list-style-type: none"><li><input type="checkbox"/> Move person to fresh air</li><li><input type="checkbox"/> Clear the airway</li><li><input type="checkbox"/> Give oxygen 100% (use non-rebreather masks) as soon as possible</li><li><input type="checkbox"/> IV fluids for hypotension</li><li><input type="checkbox"/> Diazepam for seizures</li></ul>	HC4

### 1.3.8 Barbiturate Poisoning

ICD10 CODE: T42.3

Barbiturates are used in the treatment of epilepsy and convulsions (e.g. phenobarbital).

## Clinical features

- Ⓐ Confusion, irritability, combativeness
- Ⓐ Drowsiness, lethargy
- Ⓐ Hypotension, bradycardia or tachycardia, until shock
- Ⓐ Respiratory depression, until coma



## Management

TREATMENT	LOC
<p><b>Supportive care</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Oxygen therapy</li> <li><input type="checkbox"/> IV fluids for hypotension</li> <li><input type="checkbox"/> Charcoal may be useful but only if given within 1 hour from ingestion and if the patient is not drowsy (risk of inhalation)</li> <li><input type="checkbox"/> Refer for ventilatory support if necessary</li> <li><input type="checkbox"/> Alkalination to increase renal excretion           <ul style="list-style-type: none"> <li>- Sodium bicarbonate 1 mEq/kg bolus followed by infusion (specialist only)</li> </ul> </li> </ul>	H RR

### 1.3.9 Opioid Poisoning ICD10 CODE: T40

Voluntary or accidental overdose of opioid drugs like codeine, morphine, heroin used for therapeutic or recreational purposes.

#### Clinical features

- Respiratory depression
- Hypotension, hypothermia
- Pinpoint pupils
- Decreased mental status until coma

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Gastric lavage if ingestion within 1 hour from arrival or pills visible in the stomach at X-ray</li> <li><input type="checkbox"/> NB: charcoal is NOT EFFECTIVE</li> <li><input type="checkbox"/> Patients who are asymptomatic after 6 hours from ingestion most likely do not need specific treatment. Monitor for at least 12 hours</li> <li><input type="checkbox"/> IV fluids to manage shock and hypovolaemia</li> </ul>	H

## Management

TREATMENT	LOC
<p><b>Antidote:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Naloxone 0.4-2 mg IV or IM, repeat every 2-3 minutes if not improving until max 10 mg Child: 0.01 mg/kg, increase to 0.1 mg/kg if necessary</li> <li><input type="checkbox"/> Aim at restoring ventilation not consciousness f Repeated doses or infusion may be necessary f Manage complications accordingly</li> </ul>	H
<p><b>Note</b></p> <ul style="list-style-type: none"> <li>▪ Naloxone doses used in acute poisoning may not be suitable for treating opioid-induced respiratory depression and sedation in palliative care and in chronic opioid use</li> </ul>	

### 1.3.10 Warfarin Poisoning

ICD10 CODE: T45.5

Overdose may result from accidental ingestion of rat poison (containing a warfarin-like substance) or overdose of warfarin used for therapeutic purposes. Warfarin inhibits the production of coagulation factors in the liver.

#### Clinical features

- Bleeding (can be life threatening) internal or from mucosae
- Usually evident 24 hours after ingestion

#### Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Empty the stomach</li> <li><input type="checkbox"/> Give activated charcoal 50 g if presenting early</li> </ul> <p><b>Child: 25g (50g if severe)</b></p>	HC2
<ul style="list-style-type: none"> <li><input type="checkbox"/> Phytomenadione (vitamin K1) 5 mg IV slowly</li> </ul>	HC4
	RR

TREATMENT	LOC
<input type="checkbox"/> Supportive treatment (IV fluids, bloodtransfusion, fresh frozen plasma if active bleeding)	HC2

**Note**

- Intoxication with rat poison may require prolonged treatment with vitamin K

**1.3.11 Methyl Alcohol (Methanol) Poisoning**

ICD10 CODE: T51.1

Methanol is used as an industrial solvent and is an ingredient of methylated spirits. It is often ingested for self-harm or as a substitute for alcohol. It can form in home-distilled crude alcohol due to incomplete conversion to ethanol. A dose >1 g/kg is potentially lethal: it is transformed into toxic metabolites and causes profound acidosis.

**Clinical features**

- Ⓐ Initial inebriation (as in alcohol assumption)
- Ⓐ Latent asymptomatic period of 12-24 hours
- Ⓐ Headache, dizziness, nausea, vomiting, visual disturbances, CNS depression and respiratory failure
- Ⓐ Toxic metabolites may cause severe acidosis and retinal/ optic nerve damage

**Management**

TREATMENT	LOC
<input type="checkbox"/> Gastric aspiration and lavage <ul style="list-style-type: none"> <li>- Only use if done within 2 hours of ingestion (it has a very rapid absorption)</li> <input type="checkbox"/> Charcoal is NOT USEFUL           </ul>	H

TREATMENT	LOC
<ul style="list-style-type: none"> <li>□ Give 1.5-2 ml/kg of oral alcohol 40% (e.g. waragi, whisky, brandy) in 180 ml of water as loading dose, oral or via NGT           <ul style="list-style-type: none"> <li>- Maintenance dose: 0.3 ml/kg/hour</li> </ul> </li> <li>□ Sodium bicarbonate 50-100 ml IV over 30-45 minutes</li> <li>□ Check for and correct hypoglycaemia</li> </ul>	H

### 1.3.12 Alcohol (Ethanol) Poisoning ICD10 CODE: T51

Alcohol poisoning may be acute or chronic.

#### 1.3.12.1 Acute Alcohol Poisoning

Symptoms of alcoholic poisoning following ingestion of a large amount of alcohol over a short period.

##### Cause

- Deliberate consumption of excessive alcohol in a short period of time
- Accidental ingestion (may occur in children)

##### Clinical features

- Smell of alcohol in the breath
- Slurred speech, uninhibited behaviour,
- Altered cognition and perception
- Nausea and vomiting
- Excessive sweating, dilated pupils
- Hypoglycaemia and hypothermia
- In later stages, stupor and coma develop



## As coma deepens the following appear:

- Ⓐ Thready pulse and falling BP
- Ⓐ Fall in body temperature
- Ⓐ Noisy breathing

## Differential diagnosis

Other causes of coma:

- Ⓐ Malaria and other intracranial infections
- Ⓐ Diabetes mellitus
- Ⓐ Head injury
- Ⓐ Stroke (cerebrovascular accidents)

## Low blood sugar (hypoglycaemia) due to other causes

- Ⓐ Poisoning by other medicines e.g., narcotics
- Ⓐ Mental illness

## Investigations

- Ⓐ Blood: alcohol content, glucose level
- Ⓐ Urine: for glucose and protein
- Ⓐ Lumbar puncture

## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Manage airways (ventilation may be needed)</li> <li><input type="checkbox"/> Correct hypothermia and hypovolaemia if present f Check and correct hypoglycaemia with Dextrose 50% 20-50 ml IV           <ul style="list-style-type: none"> <li>- Give it via NGT or rectal if IV not available</li> <li>- Maintain infusion of Dextrose 5-10% until patient wakes up and can eat</li> </ul> </li> <li><input type="checkbox"/> Thiamine IV 100 mg in 1 L of Dextrose 5%</li> </ul>	H

## 1.3.12.2 Chronic Alcohol Poisoning

### Cause

- ⦿ Heavy habitual drinking combined with poor nutrition

### Clinical features

#### Features of malnutrition

- ⦿ Weight loss, dry scaly skin
- ⦿ Brittle discolored hair, pale mucous membranes

#### Cerebral damage

- ⦿ Memory loss, hallucinations, tremors

#### Liver disease

- ⦿ Poor appetite
- ⦿ Fluid in the abdomen (ascites) as a result of cirrhosis

#### Withdrawal

- ⦿ Mild: 12-48 hours after the last drink, with anxiety, agitation, insomnia, tremors, palpitation, sweating. If not progressing it may resolve over 24-48 hours
- ⦿ Severe: seizures, hallucinations (from 12 to 48 hours after the last drink)
- ⦿ Very severe: delirium tremens characterized by hallucinations, disorientation, tachycardia, hypertension, hyperthermia, agitation, and diaphoresis In the absence of complications, symptoms of delirium tremens typically persist for up to seven days

#### Wernicke encephalopathy

- ⦿ Due to thiamine deficiency. Common in chronic alcohol abuse
- ⦿ Characterized by acute mental confusion, ataxia (unstable gait) and nystagmus/ophthalmoplegia (abnormal eye movements)



## Management

TREATMENT	LOC
<p><b>Withdrawal syndrome</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Supportive care (IV fluids, nutrition)</li> <li><input type="checkbox"/> Check and correct hypoglycaemia with Dextrose 5% 20-50 ml IV           <ul style="list-style-type: none"> <li>- Give it via NGT or rectal if IV not available</li> <li>- Maintain infusion of Dextrose until patient wakes up and can eat</li> </ul> </li> <li><input type="checkbox"/> Diazepam 5-10 mg every 10 minutes until appropriate sedation is achieved           <ul style="list-style-type: none"> <li>- Very high doses may be required</li> <li>- Monitor respiration</li> </ul> </li> </ul>	HC3
<ul style="list-style-type: none"> <li><input type="checkbox"/> If not responding, consider phenobarbital 100- 200 mg slow IV but it has a risk of respiratory depression and hypotension</li> <li><input type="checkbox"/> Thiamine IV 100 mg in 1 L of Dextrose 5%</li> <li><input type="checkbox"/> If delirium or hallucinations persist in spite of treatment, consider haloperidol 2.5-5 mg up to 3 times a day</li> </ul> <p><b>If Wernicke encephalopathy</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Thiamine 100 mg IV or IM every 8 hours for 3-5 days</li> </ul>	HC4

### Note

- See section 9.1.1 for general management of alcohol use disorders

## 1.3.13 Food Poisoning ICD10 CODE: A05

Illness caused by consumption of food or water contaminated by certain pathogenic microorganisms. It usually affects large numbers of people after ingestion of communal food in homes, hospitals, hotels and parties.

## Causes

- Can be infective or toxic
- Infective: by bacteria e.g. *Salmonella typhimurium*, *Campylobacter jejuni*, *Bacillus cereus*
- Toxic: by toxins from *Staphylococcus aureus* and *Clostridium botulinum*

## Clinical features

- Nausea, vomiting
- Intermittent abdominal pain (colic) with associated diarrhoea
- Fever (especially if poisoning is the infective type)
- Often self-limiting

## Botulism

- Paralysis of skeletal, ocular, pharyngeal and respiratory muscles

## Differential diagnosis

- Cholera, dysentery
- Other causes of stomach and intestinal infections

## Investigations

- Good history and examination is important for diagnosis
- Stool microscopy, C&S

## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Establish the cause and treat accordingly</li> <li><input checked="" type="checkbox"/> Give oral (ORS) or IV fluids (Normal saline) for rehydration as required</li> <li><input checked="" type="checkbox"/> For pain, give paracetamol 1 g every 4-6 hours Child: 10 mg/kg per dose</li> </ul> <p>If diarrhoea severe and persisting or bloody, high fever</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Give an antibiotic for 3-7 days, depending on response:           <ul style="list-style-type: none"> <li>- Ciprofloxacin 500 mg every 12 hours</li> <li>- Child: 10 mg/kg per dose</li> <li>- Or erythromycin 500 mg every 6 hours</li> </ul> </li> </ul> <p>Child: 10 mg/kg per dose</p>	HC2
	HC2

## Prevention

- ⦿ Heat cooked foods thoroughly before eating and avoid eating cold left-over cooked foods
- ⦿ Ensure adequate personal and domestic hygiene

## 1.4 HYPOXEMIA MANAGEMENT AND OXYGEN THERAPY GUIDELINES

Hypoxaemia is the low concentration of Oxygen in blood or oxygen saturation ( $\text{SpO}_2$ ) less than 90% in peripheral arterial blood detected on pulse oximeter reading. Hypoxaemia is a life-threatening condition correlated with disease severity and an emergency stat. Left untreated and for prolonged periods of time, it results into low tissue oxygen concentration (Hypoxia), and this leads to death.

### Causes

- ⦿ Surgical causes.
  - Head Injury, Chest trauma
- ⦿ Medical Causes
  - Severe Asthma, Pneumonia, Sepsis, Shock, Malaria, Covid-19, Heart Failure, Cardiac arrest, Upper airway obstruction, Severe anaemia, Pertussis, Carbon Monoxide poisoning.
  - ⦿ Obstetric, gynaecological, and perioperative causes.
    - Obstructed labour, Ruptured uterus, Pre-eclampsia and eclampsia, Post caesarean section,
  - ⦿ Neonatal causes
    - Transient tachypnoea of the new-born, Hypoxic Ischaemic encephalopathy (Birth asphyxia), Respiratory distress Syndrome, Neonatal Septicaemia.

## Diagnosis

- Do a clinical assessment (history taking for symptoms and physical examination for signs)
- Pulse oximetry and blood gas analysis. The findings on clinical assessment (symptoms and signs) [It is non-invasive but associated with missed opportunities for diagnosis].

## Symptoms

- Fast/very slow breathing, Difficulty in breathing,
- Inability to talk, complete sentences
- Extreme weakness
- Inability to feed
- Confusion, sleepy, agitated
- Convulsions

## Clinical Features

Fast breathing rate for age (Tachypnoea)

Rate	Age	Implication
> 60 bpm	0 – 2months	Tachypnoea
> 50 bpm	2-12 months	Tachypnoea
> 40bpm	12- 59 months	Tachypnoea
> 40bpm	5-12years	Tachypnoea
> 20bpm	Adults	Tachypnoea

Note: bpm = Breaths per minute

- Nasal flaring
- Head nodding
- Chest in drawing (Intercostal, subcostal recession)
- Cyanosis (peripheral or central)
- Prostration
- Glasgow coma scale < 10/15
- Use of any accessory muscles of respiration



## Management

- Ⓐ Pulse oximetry use. Always refer to the manufacturer's insert or the steps outlined below for guidance on how to use the pulse oximetera.
- Ⓐ The steps involved in conducting pulse-oximetry
- ▢ Turn on the Pulse oximeter.
- ▢ Attach the Oximeter probe to the finger or toe.
- ▢ Wait until there is a consistent pulse -wave signal before you take the reading, this may take 20-30 seconds.
- ▢ Record the reading and act accordingly.
- Ⓐ Interpreting pulse-oximetry results
  - ▢ SpO<sub>2</sub> > 90% without danger signs = Normal
  - ▢ SpO<sub>2</sub> < 90% =Low oxygen concentration in blood (Hypoxaemia)
  - ▢ SpO<sub>2</sub> <92- 95% in Pregnancy = Low oxygen concentration in blood (Hypoxaemia)
  - ▢ SpO<sub>2</sub> < 94 % with danger signs = Low oxygen concentration in blood (Hypoxaemia)

Blood gas analysis-direct measurement of the partial pressure of oxygen (Pao<sub>2</sub>) and Carbon dioxide (PCO<sub>2</sub>) 2, the PH and electrolytes concentration in blood. It is the most accurate, but it is highly skill dependant, expensive and invasive.

## Treatment

### Oxygen therapy

The treatment of hypoxaemia includes the use of Medical Oxygen (Oxygen therapy) and specifically treating the underlying cause.

## Indications

- Ⓐ All patients with documented Hypoxaemia-arterial Oxygen tension (Paco<sub>2</sub>) of < 60 mmHg or peripheral arterial oxygen saturation (SpO<sub>2</sub>) OF < 90%.

- ⦿ Patients with the following danger/emergency signs irrespective of the documented SpO<sub>2</sub>, PaCO<sub>2</sub>.
- ⦿ Absent or obstructed breathing, Features of severe respiratory distress, Central cyanosis, Convulsions, Signs of shock, Coma
- ⦿ All acute conditions in which Coma is suspected like:
- ⦿ Acute Asthma, Severe Trauma, Acute myocardial Infarction, Carbon monoxide poisoning
- ⦿ Post anaesthesia recovery.
- ⦿ Increased metabolic demand
- ⦿ Severe burns, Poisoning, Multiple injuries, Severe infections

### **Medical Oxygen dosing and appropriate use of delivery device.**

- ⦿ The dosing of oxygen is dependent on the age of the patient and severity of disease while the choice of appropriate delivery devices depends on the amount or dose of oxygen to be delivered to a patient.

### **Titrate oxygen based on oxygen saturation and delivery device.**

De-livery device	Neonates	Infants (1month -1yr)	Pre-school age (1-3 yrs.)	School age (4 yrs. above)	Adults	Comments
Nasal Canulae	0.5–1.0 L/min	1–2 L/min	1–4 L/min	1–6 L/min		
Face Mask	NA	NA		6–10L/min	6–10L/min	At 5–7L/min to avoid CO <sub>2</sub> rebreathing

De-livery device	Neonates	Infants (1month -1yr)	Pre-school age (1-3 yrs.)	School age (4 yrs. above)	Adults	Comments
Face mask with reservoir	NA	NA	NA	NA	10-15L / min	Reservoir must be filled correctly before administration
CPAP	When nasal canulae failed to raise SpO2 above 90%	When nasal canulae failed to raise SpO2 above 90%	When nasal canulae failed to raise SpO2 above 90%	When nasal canulae failed to raise SpO2 above 90%	NA	-Bubble CPAP with modified nasal prongs can be run with an oxygen concentrator/cylinder -CPAP decreases atelectasis and respiratory fatigue and improves oxygenation
High Flow Nasal Canula	NA	NA	NA	NA		

Illness/disease categorization		FiO2	O2 flow rate		Delivery devices
			Range	Average	Name
1	Mild	25-40%	1-5l/min	3L/min	Nasal Cannula
2	Moderate	40-60%	6-10l/min	8L/min	Face Mask
3	Severe	60-90%	10-15l/min	13L/min	Face mask with reservoir bag

Illness/disease categorization		FiO2	O2 flow rate		Delivery devices
4	Critical	100%	20-60l/min	40l/min	High flow nasal cannula
5	?/	?	16-20l/min	18l/min	Mechanical ventilation

NB: Mild –Moderate illness start with 5l/min by nasal cannula

- For older children and adults with severe disease, give 10-15l/min via face mask with a reservoir bag.
- Older children and severe disease with mild –moderate disease give 6-10l/min via a simple face mask
- Children below 5years of age that require >5l/min of oxygen, the preferred delivery device is CPAP.
- Titration and weaning patients off Oxygen
- How to Escalate or increase oxygen in non-Responsive Adult patients with consistent Spo2 below 90%.

Start oxygen therapy at a rate of 1-5litres/min

Use Nasal prongs

Assess response



Worsening respiratory distress with  
SpO2<90%

Use a simple face mask, give 5-10litres/minute

Assess response



Worsening respiratory distress with  
SpO2<90%

Use a mask with a reservoir bag, ensure the bag is well inflated.

Give 10-15litres/minute. Assess for response.



Worsening respiratory distress with  
SpO2<90%

Continue to try to find a higher level of care and consider one of the following if available and adequate O2 supply:

HFNO: 30-60 LPM (may also adjust FiO2) | CPAP: 10-15 cmH2O

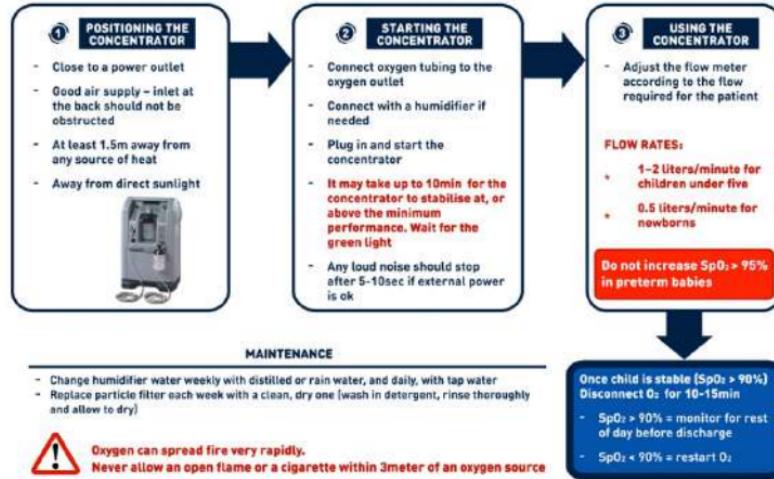
BIPAP: PS (P) 5-15/PEEP (EPAP) 5-15

- ② Weaning patient off oxygen
- The oxygen flowrate/ dose should be decreased if patient stabilizes or improves with SpO<sub>2</sub> above 90%.
- Decrease oxygen flow by 1-2Litre/min once patient is stable with Oxygen saturation above 92%.
- Observe the patient for 2-3 minutes, reassess after 15 mins to ensure SpO<sub>2</sub> is still above 90% (by recording clinical exam and SpO<sub>2</sub>)
- If a patient does not tolerate less oxygen, then maintain the flow rate that the patient has been on prior to reducing until the patient is stable (SpO<sub>2</sub> >92%)
- If a patient is in increased respiratory distress or SpO<sub>2</sub> less than 90%, then increased the oxygen flow rate to the previous rate until the patient is stable.
- If a patient remains stable after 15 mins of reassessment and SpO<sub>2</sub> >92%, continue to titrate oxygen down as tolerated.

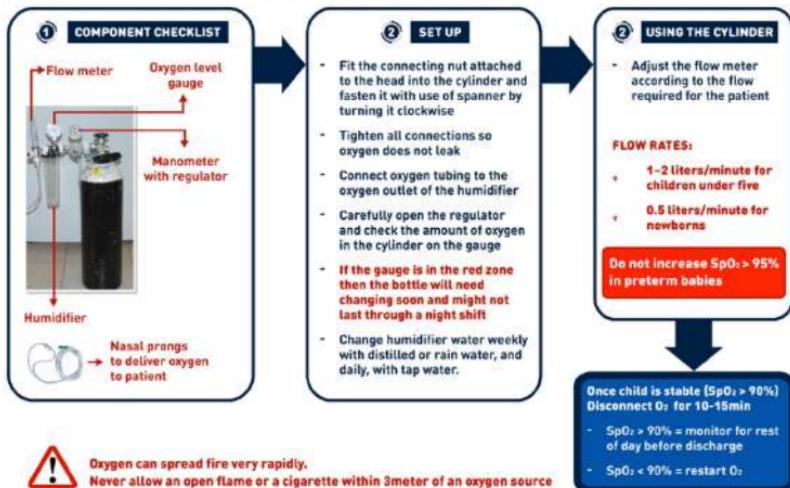
**Recheck clinical status and SpO<sub>2</sub> on the patient after 1 hour for delayed hypoxemia or respiratory distress.**

## Basic use and Maintenance of Oxygen sources

### OXYGEN CONCENTRATORS



### OXYGEN CYLINDERS



# 2 Infectious Diseases

## 2.1 BACTERIAL INFECTIONS

### 2.1.1 Anthrax

ICD10 CODE: A22.10-A22.9

Anthrax is an acute zoonotic infectious disease caused by the bacterium *Bacillus anthracis*. It most commonly occurs in wild and domestic animals, such as cattle, sheep, goats, camels, antelopes, and other herbivores. *B. anthracis* spores can live in the soil for many years.

It occurs in humans when they are exposed to infected animals or tissue from infected animals. The incubation period is usually 1-3 days. Anthrax is a notifiable disease.

#### Cause

- ⦿ Exposure to *B. anthracis* spores by handling products from infected animals or by inhaling anthrax spores from contaminated animal products
- ⦿ Anthrax can also be spread by eating undercooked meat from infected animals

#### Clinical features

Symptoms vary depending on how the disease was contracted, and usually occur within 7 days

TYPE	FEATURES
Cutaneous	<ul style="list-style-type: none"> <li>○ 95% of anthrax infections occur through skin cut or abrasion</li> <li>○ Starts as raised itchy bump that resembles an insect bite</li> <li>○ Within 1-2 days, it develops into a vesicle and then a painless ulcer, usually 1-3 cm in diameter, with a characteristic black necrotic (dying) area in the centre (eschar)</li> <li>○ Lymph glands in adjacent area may swell</li> <li>○ About 20% of untreated cutaneous anthrax results in death</li> </ul>
Inhalation	<ul style="list-style-type: none"> <li>○ Initial symptoms resemble a cold</li> <li>○ After several days, symptoms may progress to severe breathing problems and shock</li> <li>○ Inhalation anthrax is usually fatal</li> </ul>
Gastro- intestinal	<ul style="list-style-type: none"> <li>○ Acute inflammation of the intestinal tract</li> <li>○ Initial signs of nausea, loss of appetite, vomiting and fever</li> <li>○ Then abdominal pain, vomiting blood, and severe diarrhoea</li> <li>○ Intestinal anthrax results in death in 25% to 60% of the cases</li> </ul>

### Investigations

¾ Isolation of *Bacillus anthracis* from blood, skin lesions, or respiratory secretions- Smear-many bacilli

¾ Or measure specific antibodies in the blood of persons with suspected infection

## Management

TREATMENT	LOC
<b>Cutaneous anthrax</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Treat for 7–10 days</li> <li><input type="checkbox"/> First line is ciprofloxacin 500 mg every 12 hours</li> <li><input type="checkbox"/> Alternatives: doxycycline 100 mg every 12 hours</li> <li><input type="checkbox"/> Or amoxicillin 1 g every 8 hours</li> </ul>	HC2

## Prevention

The following public measures are key for quick prevention and control of anthrax infection:

- Ⓐ Health education and information
- Ⓐ Proper disposal by burying of carcasses, hides and skins; (no burning as it can spread spores)
- Ⓐ No skinning of dead animals; this allows spore formation, which can stay in soil for decades
- Ⓐ No eating of meat from dead animals
- Ⓐ Restrict movement of animals and animal by-products from infected to non-infected areas
- Ⓐ Mass vaccination of animals in endemic areas
- Ⓐ Vaccination using human anthrax vaccine for:
  - Persons who work directly with the organism in the laboratory
  - Persons who handle potentially infected animal products
  - in high-incidence areas

### 2.1.2 Brucellosis

ICD11CODE: A23.9

(Undulant fever, malta fever, abortus fever)

A zoonotic bacterial infection of acute onset. Common as an occupational

disease among people working with infected livestock or associated fresh animal products, for example butchers, farmers, abattoir workers, and vendors of contaminated roasted meat (muchomo). Incubation is 2-4 weeks on average, but it can be from 1 to 8 weeks.

## Causes

- Brucella abortus (cattle)
- Brucella canis (dog)
- Brucella melitensis (goats and sheep)
- Brucella suis (pigs)

## Clinical features

- Intermittent (fluctuating) fever
- Aches and pains
- Orchitis (inflammation of the testes)
- Vertebrae osteomyelitis (uncommon but characteristic)

## Differential diagnosis

- Typhoid fever, malaria, tuberculosis
- Trypanosomiasis (sleeping sickness)
- Other causes of prolonged fever

## Investigations

- ¾** Blood: complement fixation test or agglutination test (where possible)

The interpretation of serological tests can be difficult, particularly in endemic areas where a high proportion of the population has antibodies against brucellosis. Positive serological test results can persist long after recovery in treated individuals so results have to be interpreted on the basis of the clinical picture.



Isolation of the infectious agent from blood, bone marrow, or other tissues by culture

## Management

TREATMENT	LOC
<b>Adult and child &gt; 8 years:</b> <input checked="" type="checkbox"/> Doxycycline 100 mg every 12 hours for 6 weeks	HC4
<b>Child &gt; 8 years: 2 mg/kg per dose</b> <input checked="" type="checkbox"/> Plus gentamicin 5-7 mg/kg IV daily for 2 weeks	
<b>Child &lt; 8 years: 7.5 mg/kg daily in 1-3 divided doses</b> - Or ciprofloxacin 500 mg twice daily for 2 weeks <b>Child &lt; 12 years: do not use</b> <b>Children below 8 years</b> <input checked="" type="checkbox"/> Cotrimoxazole 24 mg/kg every 12 hours for 6 weeks <input checked="" type="checkbox"/> Plus gentamicin 5-7 mg/kg IV in single or divided doses for 2 weeks	
<b>Caution</b> <ul style="list-style-type: none"> <li>▪ Treatment duration must be adhered to at all times</li> <li>▪ Ciprofloxacin is contraindicated in children &lt;12 years</li> <li>▪ Doxycycline, gentamicin: Contraindicated in pregnancy</li> </ul>	

## Prevention

- ⌚ Provide public health education on
  - Drinking only pasteurised or boiled milk
  - Careful handling of pigs, goats, dogs, and cattle if a person has wounds or cuts
  - Provide veterinary services for domestic animals

**2.1.3 Diphtheria**

ICD10 CODE: A36.9

An acute bacterial infection caused by *Corynebacterium diphtheriae*, which is spread through droplet infection and mainly occurs in the nasopharynx. The bacteria produce a toxin which is responsible for the systemic effects. Incubation period is 2-7 days.

**Cause**

- Ⓐ Toxin of *Corynebacterium diphtheriae*

**Clinical features**

- Ⓐ Pseudomembranous tonsillitis (grey, tough and very sticky membranes) with dysphagia, cervical adenitis, at times progressing to massive swelling of the neck
- Ⓐ Airway obstruction and possible suffocation when infection extends to the nasal passages, larynx, trachea and bronchi
- Ⓐ Low grade fever
- Ⓐ Effects of the toxin: cardiac dysfunction (myocarditis with heart failure), neuropathies 1-3 months after the onset affecting swallowing, vision, breathing and ambulation
- Ⓐ Renal failure

**Investigation**

**¾** Culture from throat swab

**Management**

TREATMENT	LOC
<input type="checkbox"/> Refer urgently to hospital <input type="checkbox"/> Isolate (contact and droplet precautions) until 3 throat swabs (nose, throat, or skin) are negative <input type="checkbox"/> Give procaine benzylpenicillin 1.2 MIU daily IM until patients can switch to oral	H

## Management

TREATMENT	LOC
<p>Child: procaine benzylpenicillin 50,000 IU/kg per day IM once daily until patient can swallow  <b>When patient is able to swallow</b></p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Give Penicillin V 250 mg every 6 hours per day to complete 14 days.</li> </ul> <p><b>Child 1-6 years: 125 mg 6 hourly</b>  <b>Child &lt; 1 years: 12.5 mg/kg every 6 hours</b>  <b>In case of penicillin allergy</b></p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Erythromycin 500 mg every 6 hours for 14 days</li> </ul> <p><b>Child: 50 mg/kg every 6 hours</b></p>	H

### Prevention

- Ⓐ Isolation of patient and proper management of close contacts
  - Monitor close contacts for 7 days and give prophylactic antibiotics: single dose benzathine penicillin IM (child <10 years: 600,000 IU, child >10 yrs and adults: 1.2 MIU)
  - Verify immunisation status, complete if needed, give a booster if the last dose was more than a year before
- Ⓑ Immunise all children during routine childhood immunisation

### 2.1.4 Leprosy/Hansens disease ICD10 CODE: A30.0

A chronic infectious disease caused by *Mycobacterium leprae*/Hansens bacillus - an acid-fast bacillus. It mainly affects the skin, peripheral nerves and mucous membranes. It is transmitted from one person to another via the respiratory tract (possibly, very rarely, through broken skin). It is classified into paucibacillary (PB) or Multibacillary (MB) Leprosy.

## Clinical features

- Ⓐ Pale or reddish patches on the skin (The most common sign of leprosy)
- Ⓐ Loss or decrease in feeling in the skin patch
- Ⓐ Numbness or tingling of the hands or feet.
- Ⓐ Weakness of the hands, feet or eyelids
- Ⓐ Painful or tender nerves
- Ⓐ Swelling or lumps in the face or earlobes
- Ⓐ Painless wounds or burns on the hands or feet

## Case definition

A case of leprosy is a person with clinical signs of leprosy who requires chemotherapy.

## Diagnosis of leprosy

Diagnosis of Leprosy must be based on careful clinical examination of the patient and when necessary, backed by bacteriological examination

Leprosy is diagnosed by finding at least one of the three cardinal signs:

- Hypopigmented patches with definite loss of sensation in them
- Thickened or enlarged peripheral nerves, with loss of sensation and/or weakness of the muscles supplied by those nerves
- The presence of acid-fast bacilli in a slit skin smear

## Classification of leprosy

**Paucibacillary (PB) leprosy - 1-5 patches**

**Multibacillary (MB) Leprosy - More than 5 patches**

## Differential diagnosis

- Ⓐ Hypopigmentation e.g. birthmark, early vitiligo
- Ⓐ Fungal infections of the skin
- Ⓐ Molluscum contagiosum
- Ⓐ Other nodular conditions, e.g. Kaposi's sarcoma, neurofibromatosis, secondary syphilis
- Ⓐ Other causes of peripheral nerve damage, e.g. diabetes mellitus
- Ⓐ Psoriasis, molluscum contagiosum

## Investigations

- ¾** In most cases, a definite diagnosis of leprosy can be made using clinical signs alone
- ¾** At referral centre: stain slit skin smears for Acid Fast Bacilli (AFB)
- ¾** Skin biopsies NOT recommended as a routine procedure

## Management

Multi-drug therapy (MDT) for leprosy is presented in the form of various monthly dose blister packs. The same three drugs are used for both PB leprosy and MB leprosy, with special packs for children

## Summary of Treatment of leprosy

PB Leprosy	MB Leprosy
Rifampicin	Rifampicin
Dapsone	Dapsone
Clofazimine	Clofazimine
All for 6 months	All for 12 months

## Recommended treatment (drugs and their doses)

	Drug	Dosage and frequency	Duration		
			PB	MB	
Adult	Rifampicin	600 mg once a month	6 months	12 months	
	Clofazimine	300 mg once a month and 50 mg daily			
	Dapsone	100 mg daily			
Children (10 – 14 years)	Rifampicin	450 mg once a month	6 months	12 months	
	Clofazimine	150 mg once a month, 50 mg daily			
	Dapsone	50 mg daily			
Children <10 years old or <40 kg	Rifampicin	10 mg/kg once month	6 months	12 months	
	Clofazimine	6 mg/kg once a month and 1 mg/kg daily			
	Dapsone	2 mg/kg daily			
<b>Steroids for treatment of severe leproae reactions</b>				RR	
<input type="checkbox"/> Prednisolone 40 mg once daily in morning <ul style="list-style-type: none"> <li>- Treat for 12 weeks in PB and 24 weeks in MB</li> <li>- Reduce dose gradually by 10–5 mg once every 2 weeks (PB) or 3 weeks (MB)</li> </ul>					

### Note

- In patients co-infected with HIV and on cotrimoxazole, do not use dapsone.
- Health worker should directly observe that the medicines taken once a month are actually swallowed
- Treatment durations longer than 12 months and steroids for leproae reactions should only be prescribed by specialists at referral centres
- Lepra reactions: sudden inflammation (pain, redness, swelling, new lesions, loss of nerve function) in skin lesions or nerves of a person with leprosy. They can occur before, during or after MDT completion.

- Severe leprae reaction (Type 2) are also known as Erythema Nodosum Leprosum (ENL or Type 2 reactions)
- All patients should undergo rehabilitation and physiotherapy  
Counsel patient on: need to complete treatment, presence of residual signs after completion of treatment
- Presence of residual signs or post-treatment reactions is NOT an indication to re-start the treatment
- Refer to the National Tuberculosis and Leprosy Programme (NTLP) manual 2016 for more details

## Prevention

- Ⓐ Early diagnosis of cases and effective treatment
- Ⓐ Screening of contacts of known patients
- Ⓐ Administration of Single dose rifampicine in contacts of leprosy patients to prevent contacts of leprosy patients from developing leprosy disease
- Ⓐ Rifampicine dose used in contacts of leprosy patients

Age/weight	Rifampicin single dose
15 years and above	600mg
10-14years	450mg
Children 6-9years (weight 20kg)	300mg
Children 20kg ( 2years)	10-15mg/kg

- Ⓐ BCG vaccination may be help

## Disability due to Leprosy

Leprosy commonly causes physical disabilities which generate social stigma. Disability refers to an impairment (primary or secondary) that makes it difficult or impossible for the affected person to carry out certain activities, e.g. affecting manual dexterity, personal care, mobility and communication behavior

### Definitions of disability:

#### In the hands and feet:

**Grade 0** = No anesthesia, no visible deformity or damage

**Grade 1** = Anaesthesia, but no visible deformity or damage

**Grade 2** = Visible deformity or damage present

### In the eyes

**Grade 0** = no eye problem due to leprosy, no evidence of visual loss

**Grade 1** = eye problem due to presence of leprosy, but vision not severely affected as a result (6/60 or better, can count fingers at six meters)

**Grade 2** = severe visual impairment (vision worse than 6/60; inability to count fingers at six meters), lagophthalmos, iridocyclitis, corneal opacities

### Management of Disability in the hand and feet

Resting of the affected limb in the acute phase can be aided by splinting, especially at night

- ① Soaking and oiling for about 30 minutes every day of dry skin helps to prevent cracking and preserves the integrity of the epidermis.
- ② Use of a clean dry cloth to cover the wounds and walking as little as possible and walk slowly, taking frequent rest. Passive exercise and stretching to avoid contractures and strengthen muscle weakness
- ③ Use of a rough stone to smoothen the skin on the feet or palms,
- ④ Protective foot wear (MCR Sandals) all the time. For insensitive feet and protective appliances like gloves for insensitive hands

### Eye complications due to Leprosy

These include

1. Lagophthalmos: whole spectrum
2. Corneal hypoesthesia: with/without corneal ulcers
3. Acute iritis and scleritis
4. Chronic iritis and iris atrophy

## Treatment & Management of eye complications

Medical therapy for eye complications due to Leprosy- use of the topical antibiotics and topical steroids. It is strongly recommended that an ophthalmologist and a trained leprologist, if available, be included in the treatment of Hansen disease with ocular manifestations.

### 2.1.5 Meningitis

ICD10 CODES: A39.0 (MENINGOCOCCAL), G00, G01, G02

Meningitis is acute inflammation of the meninges (the membranes covering the brain). Bacterial meningitis is a notifiable disease.

#### Causative organisms

Most commonly bacterial: Streptococcus pneumoniae, Haemophilus influenzae type b (mainly in young children), Neisseria meningitidis, Enteric bacilli

- ⦿ Viral (HSV, enteroviruses, HIV, VZV etc)
- ⦿ Cryptococcus neoformans (in the immune-suppressed)
- ⦿ Mycobacterium tuberculosis

#### Clinical features

- ⦿ Rapid onset of fever
- ⦿ Severe headache and neck stiffness or pain
- ⦿ Photophobia/Haemorrhagic rash (N.meningitidis infection)
- ⦿ Convulsions, altered mental state, confusion, coma
- ⦿ In mycobacterial and cryptococcal meningitis, the clinical presentation can be sub-acute , over a period of several days or 1-2 weeks

## Differential diagnosis

- Brain abscess
- Space-occupying lesions in the brain
- Drug reactions or intoxications

## Investigations

- CSF: usually cloudy if bacterial, clear if viral. Analyse for white cell count and type, protein, sugar, Indian-ink staining (for Cryptococcus), gram stain, culture and sensitivity
- Blood: For serological studies and full blood count
- Blood: for culture and sensitivity
- Chest X-ray and ultrasound to look for possible primary site

## Management

Because of the potential severity of the disease, refer all patients to hospital after pre-referral dose of antibiotic. Carry out lumbar puncture promptly and initiate empirical antibiotic regimen

Treatment depends on whether the causative organisms are already identified or not.

TREATMENT	LOC
<b>General measures</b> <input checked="" type="checkbox"/> IV fluids <input checked="" type="checkbox"/> Control of temperature <input checked="" type="checkbox"/> Nutrition support (NGT if necessary)	HC4
<b>Causative organisms not yet identified</b> <input checked="" type="checkbox"/> Start initial appropriate empirical broad spectrum therapy <ul style="list-style-type: none"><li>- Ceftriaxone 2 g IV or IM every 12 hours for 10-14 days</li></ul>	

TREATMENT	LOC
<ul style="list-style-type: none"> <li>- Child: 100 mg/kg daily dose given as above</li> <li>- Change to cheaper effective antibiotic if and when C&amp;S results become available</li> </ul> <p><b>If ceftriaxone not available/not improving</b></p> <p><input checked="" type="checkbox"/> Use chloramphenicol 1 g IV every 6 hours for up to 14 days (use IM if IV not possible)</p> <p><b>Child: 25 mg/kg per dose</b></p> <p><b>Once clinical improvement occurs</b></p> <ul style="list-style-type: none"> <li>- Change to 500-750 mg orally every 6 hours to complete the course;</li> </ul> <p><b>Child: 25 mg/kg per dose</b></p>	
<p><b>Causative organisms identified</b></p> <p><b>Streptococcus pneumoniae (10-14 day course; up to 21 days in severe case)</b></p> <p><input checked="" type="checkbox"/> Benzylpenicillin 3-4 MU IV or IM every 4 hours</p> <p><b>Child: 100,000 IU/kg per dose</b></p> <p><input checked="" type="checkbox"/> Or ceftriaxone 2 g IV or IM every 12 hours</p> <p><b>Child: 100 mg/kg daily dose</b></p>	H
<p><b>Haemophilus influenzae (10 day course)</b></p> <p><input checked="" type="checkbox"/> Ceftriaxone 2 g IV or IM every 12 hours</p> <p><b>Child: 100 mg/kg per dose</b></p> <p><input checked="" type="checkbox"/> Only if the isolate is reported to be susceptible to the particular drug</p> <p><input checked="" type="checkbox"/> Change to chloramphenicol 1 g IV every 6 hours</p> <p><b>Child: 25 mg/kg per dose</b></p> <p><input checked="" type="checkbox"/> Or ampicillin 2-3 g IV every 4-6 hours</p> <p><b>Child: 50 mg/kg per dose</b></p>	H

TREATMENT	LOC
<p><b>Neisseria meningitidis (up to 14 day course)</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Benzylpenicillin IV 5-6 MU every 6 hours</li> </ul> <p><b>Child: 100,000-150,000 IU/kg every 6 hours</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Or Ceftriaxone 2 g IV or IM every 12 hours</li> </ul> <p><b>Child: 100 mg/kg daily dose</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Or Chloramphenicol 1 g IV every 6 hours (IM if IV not possible)</li> </ul> <p><b>Child: 25 mg/kg IV per dose</b></p> <p><b>Once clinical improvement occurs</b></p> <ul style="list-style-type: none"> <li>- Change to chloramphenical 500-750 mg orally every 6 hours to complete the course</li> </ul> <p><b>Child: 25 mg/kg per dose</b></p> <p><b>Note:</b> Consider prophylaxis of close contacts (especially children &lt; 5 years):</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Adults and children &gt;12 years: Ciprofloxacin 500 mg single dose</li> </ul>	
<p><b>Child &lt;12 yrs: 10 mg/kg single dose</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Alternative (e.g. in pregnancy): ceftriaxone 250 mg IM single dose</li> </ul> <p><b>Child &lt; 12 yrs: 150 mg IM single dose</b></p> <p><b>Listeria monocytogenes (at least 3 weeks course)</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Common cause of meningitis in neonates and immunosuppressed adults</li> </ul> <p>Benzylpenicillin 3 MU IV or IM every 4 hours</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Or ampicillin 3 g IV every 6 hours</li> </ul> <p><b>Notes</b></p> <ul style="list-style-type: none"> <li>▪ Both medicines are equally effective</li> <li>▪ Therapy may need to be prolonged for up to 6 weeks in some patients</li> </ul>	H
	H

## Prevention

- Ⓐ Avoid overcrowding
- Ⓑ Improve sanitation and nutrition
- Ⓒ Prompt treatment of primary infection (e.g. in respiratory tract)
- Ⓓ Immunisation as per national schedules
- Ⓔ Mass immunisation if N. Meningitis epidemic

### 2.1.5.1 Neonatal Meningitis

Bacterial infection of the meninges in the first month of life.

- Ⓐ Organisms causing neonatal meningitis are similar to those causing neonatal septicaemia and pneumonia, i.e. S.pneumoniae, group A & B streptococci, and enteric Gram-negative bacilli.

**Meningitis due to group B streptococci:** These organisms often colonise the vagina and rectum of pregnant women, can be transmitted to babies during labour, and cause infection. Meningitis and septicaemia during the 1st week after birth may be particularly severe.

- Ⓐ Clinical presentation is aspecific with temperature disturbances, lethargy, irritability, vomiting, feeding problems, convulsions, apnoea, bulging fontanel

## Management

TREATMENT	LOC
<b>Refer to hospital after initial dose of antibiotics Supportive care</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Keep baby warm</li> <li><input type="checkbox"/> For high temperature control environment (undress), avoid paracetamol</li> </ul>	H

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Prevent hypoglycaemia (breastfeeding if tolerated/possible, NGT or IV glucose)</li> <li><input type="checkbox"/> Ensure hydration/nutrition</li> <li><input type="checkbox"/> Give oxygen if needed (<math>\text{SpO}_2 &lt; 92\%</math>)</li> </ul> <p><b>Empirical regimen (for 21 days)</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Ampicillin IV</li> </ul> <p><b>Neonate &lt; 7 days:</b> 50-100 mg/kg every 12 hours</p> <p><b>Neonate &gt; 7 days:</b> 50-100 mg/kg every 8 hours</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Plus Gentamicin 2.5 mg/kg IV every 12 hours Need for blood culture</li> </ul> <p><b>If group B streptococci</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Benzylpenicillin 100,000-150,000 IU/kg IV every 4-6 hours</li> <li><input type="checkbox"/> Neonates &lt;7 days: 50,000-100,000 IU/kg IV every 8 hours</li> <li><input type="checkbox"/> Plus gentamicin 2.5 mg/kg IV every 12 hours</li> <li><input type="checkbox"/> Continue treatment for a total of 3 weeks</li> </ul>	H

### 2.1.5.2 Cryptococcal Meningitis

ICD10 CODE: B45.1

Fungal meningitis caused by *Cryptococcus neoformans* and usually occurs in severely immunosuppressed patients (e.g. advanced HIV, usually CD4 < 100).

- Ⓐ It commonly presents with headache, fever, malaise developing over 1 or 2 weeks, progressing into confusion, photophobia, stiff neck
- Ⓑ Diagnosis is through identification of the microorganism in the CSF with Indian Ink stain, antigen in CSF or culture

#### Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Refer to hospital</li> </ul>	H



### 2.1.5.3 TB Meningitis

ICD10 CODE: A17.0

Meningitis caused by M. tuberculosis. Onset may be gradual with fatigue, fever, vomiting, weight loss, irritability, headache, progressing to confusion, focal neurological deficits, meningeal irritation, till coma.

- For diagnosis: check CSF (raised protein, lymphocytosis), look for possible primary TB site

#### Management

TREATMENT	LOC
<input type="checkbox"/> Refer to hospital <input type="checkbox"/> Treat as per pulmonary TB but continuation phase is 10 months instead of 4 (2RHZE/10RH) <input type="checkbox"/> See section 5.3 for more details	H

### 2.1.6 Plague

ICD10 CODE: A20.9

Severe acute bacterial infection with high fatality rate transmitted by infected rodent fleas. It is a notifiable disease.

#### Cause

- Yersinia pestis (a coccobacillus) transmitted from ground rodents to man by bites from infected fleas
- It may also be spread from person to person by droplet infection and may occur in epidemics

#### Clinical features

TYPE	FEATURES
Bubonic (A20.0)	<ul style="list-style-type: none"> <li>○ Involves lymph nodes (usually femoral and inguinal)</li> <li>○ Rapidly rising temperature with rigors</li> <li>○ Headache</li> </ul>

TYPE	FEATURES
Pneumonic (A20.2)	<ul style="list-style-type: none"> <li>Ⓐ Very infectious and highly fatal: PATIENT MUST BE ISOLATED           <ul style="list-style-type: none"> <li>- Death occurs within 2 days if not treated early</li> </ul> </li> <li>Ⓐ Infection is localised in the lungs with fever, general malaise, headache, and frothy blood stained sputum</li> <li>Ⓐ May be complicated by respiratory and cardiac distress</li> </ul>

### Differential diagnosis

- Ⓐ Malaria, typhoid
- Ⓐ Lymphogranuloma venereum
- Ⓐ Pneumonia

### Investigations

- Bubo aspirate: for microscopy, C&S
- Blood and sputum: check for presence of the bacilli

### Management

TREATMENT	LOC
<input type="checkbox"/> Doxycycline 100 mg every 12 hours for 14 days <b>Child &gt; 8 years: 2 mg/kg per dose</b> <p><b>Alternatives:</b></p> <input type="checkbox"/> Chloramphenicol 500 mg orally or IV every 6 hours for 10 days <b>Child: 25 mg/kg per dose</b> <input type="checkbox"/> Or gentamicin 1.7 mg/kg (adult and child) IV or IM every 8 hours for 7-10 days	HC2
	HC4



### Note

- For use in pregnancy, consider gentamicin

### Prevention

- Ⓐ Health education
- Ⓐ Improved housing
- Ⓐ Destruction of rats (rodents) and fleas
- Ⓐ Early detection and treatment to reduce further spread

### 2.1.7 Septicaemia

ICD10 CODE: A41.9

Blood infection due to various bacteria which may be associated with infection in specific sites (e.g., lungs, urinary tract, gastrointestinal tract) or there may be no specific focus. It is life threatening because it can progress into multi-organ dysfunction and septic shock.

### Cause

- Ⓐ Organisms commonly involved are *Staphylococcus aureus*, *Klebsiella*, *Pseudomonas*, *Staphylococcus epidermidis*, fungal (*Candida spp*), Coliforms and *Salmonella spp*, *Pneumococci*, *Proteus spp*

### Risk factors

- Ⓐ Extremes of age (children, elderly)
- Ⓐ Diabetes, cancer, immunosuppression
- Ⓐ Hospital admission
- Ⓐ Community acquired pneumonia

### Clinical features

- Ⓐ Fever, prostration (extreme tiredness)
- Ⓐ Hypotension, anaemia

- Ⓐ Toxic shock is a complication
- Ⓐ Signs and symptoms of the primary site of infection (e.g., pneumonia)

### Differential diagnosis

- Ⓐ Severe cerebral malaria
- Ⓐ Meningitis
- Ⓐ Typhoid fever (enteric fever)
- Ⓐ Infective endocarditis

### Investigations

- ¾** Look for possible primary source of infection
- Ⓐ (If identified use SOP for respective sample collection coey to the lab)
- ¾** Blood: WBC count, culture and sensitivity
- Ⓐ (Use the aseptic technique and collect sample(s) for culture and sensitivity, to RRH (if service present) before initiation of treatment)

### Management

Septicaemia is a life-threatening condition, refer to hospital after pre-referral dose of antibiotics.

TREATMENT	LOC
<b>General measures</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> IV fluids</li> <li><input type="checkbox"/> Control of temperature</li> <li><input type="checkbox"/> Nutrition support (NGT if necessary)</li> <li><input type="checkbox"/> Monitoring of vitals and urinary output</li> </ul>	H
If known focus of infection, treat immediately with IV antibiotics as per guidelines. If unknown focus, give:	

TREATMENT	LOC
<p>Use aseptic technique to take blood sample before initiating treatment</p> <p><b>Adult</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Gentamicin 7 mg/kg IV every 24 hours or 1.5-2 mg/kg IV or IM every 8 hours</li> <li><input type="checkbox"/> Plus either cloxacillin 2 g IV every 4-6 hours OR chloramphenicol 750 mg IV every 6 hours</li> </ul> <p><b>Child</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Gentamicin 3.5-4 mg/kg IV every 8 hours (neonate: every 8-12 hours)</li> <li><input type="checkbox"/> Plus either: Ceftriaxone 50 mg/kg every 8 hours (&lt; 7 days old: every 12 hours)</li> <li><input type="checkbox"/> Or cloxacillin 50 mg/kg IV every 4-6 hours</li> <li><input type="checkbox"/> Or benzylpenicillin 50,000 IU/kg IV every 4-6 hours</li> </ul>	H

### Prevention

- ① Protect groups at risk, for example immunosuppressed and post-surgical patients
- ② Follow strictly aseptic surgical procedures

#### 2.1.7.1 Neonatal Septicaemia

Organisms causing neonatal septicemia are similar to the ones causing neonatal pneumonia and meningitis. Refer to hospital after pre-referral dose of antibiotics.

### Management

TREATMENT	LOC
<p><b>Supportive care</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Keep baby warm</li> </ul>	H

TREATMENT	LOC
<input type="checkbox"/> For high temperature, control environment i.e. (undress), avoid paracetamol <input type="checkbox"/> Prevent hypoglycaemia (breastfeeding if tolerated/possible, NGT or IV glucose) <input type="checkbox"/> Ensure hydration/nutrition <input type="checkbox"/> Give oxygen if needed ( $\text{SpO}_2 < 90\%$ )	
<b>First line treatment</b> <input type="checkbox"/> Give ampicillin 50 mg/kg IV every 6 hours plus gentamicin 5 mg/kg every 24 hours for 10 days <b>If risk of staphylococcus infection (infected umbilicus or multiple skin pustules,</b> <input type="checkbox"/> Give cloxacillin 50 mg/Kg IV/IM every 6 hours and gentamicin 5-7 mg/Kg every 24 hours - Clean infected umbilicus and pustules and apply gentian violet <b>If no improvement after 48-72 hours change from ampicillin to:</b> <input type="checkbox"/> Ceftriaxone 100 mg/kg daily	H

### 2.1.7.2 Septic Shock Management, In Adults

#### 1. At Emergency Unit

- Early recognition and resuscitation with iv crystalloids Or Blood
- Empirical Broad spectrum antibiotics Treatment:
- Early and adequate broad-spectrum antibiotics
- Intravenous access. Administer 30ml/kg of crystalloids. A large bore cannula, in an adult (gauge 16) is preferred.
- Urinary catheterization: UOP in an adult is 0.5ml/kg/hr or more, an equivalent of 30-50mls/hr.
- Transfer for management to ICU if not responding to resuscitation

## 2. At ICU, Intubation and Mechanical Ventilation.

- The recommended tidal volume is kept at 6ml/Kg, with plateau pressure kept at or below 30ml of water.
- Iv vasopressor Norepinephrine; 5-20 $\mu$ g/min.
- Second line is synthetic human angiotensin ii,  
or vasopressin CVP; 8mmHg
- Ionotropic therapy and Augumented oxygen therapy
- Dobutamine up to 20 $\mu$ g/kg/ml
- Corticosteroids Therapy:
  - Iv hydrocortisone 200mg/Kg/day in 4 divided dosages,
  - Maintenance infusion of methyl prednisolone 1mg/kg/day for 7 days, then taper down for at least another 7 days.
- Glycemic control Maintain glycemic level below 180mg/dl through insulin therapy
- Deep Venous Thrombosis prophylaxis
- UFH 2 or 3 times a day and LMWH

## Disseminated Intravenous Coagulation Management

- Platelets and plasma transfusion
- Anticoagulant
- Fresh Frozen Plasma (FFP)
- Antifibrinolytic e.g. tranexamic acid 1g 8hly

### 2.1.8 Tetanus ICD10 CODE: A35

Bacterial disease characterised by intermittent spasms (twitching) of voluntary muscles. Incubation period is from few days to few weeks (average 7-10 days).

#### Cause

- ⦿ Exotoxin of Clostridium tetani
- ⦿ Common sources of infection: tetanus spores enter the body through deep penetrating skin wounds, the umbilical cord of the newborn, ear infection, or wounds produced during delivery and septic abortions

## Clinical features

- Stiff jaw, difficulty in opening mouth (trismus)
- Generalised spasms induced by sounds and/or strong light, characterised by grimace (*risus sardonicus*)
- Arching of back (*opisthotonus*) with the patient remaining clearly conscious
- Fever
- Glottal spasms and difficulty in breathing
- Absence of a visible wound does not exclude tetanus

## Differential diagnosis

- Meningoencephalitis, meningitis
- Phenothiazine side-effects
- Febrile convulsions

## Management

TREATMENT	LOC
<b>General measures</b> <ul style="list-style-type: none"><li><input type="checkbox"/> If at HC2 or 3, refer to hospital</li><li><input type="checkbox"/> Nurse patient intensively in a quiet isolated area</li><li><input type="checkbox"/> Maintain close observation and attention to airway, temperature, and spasms</li><li><input type="checkbox"/> Insert nasogastric tube (NGT) for nutrition, hydration, and medicine administration</li></ul>	H

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Oxygen therapy if needed</li> <li><input type="checkbox"/> Prevent aspiration of fluid into the lungs</li> <li><input type="checkbox"/> Avoid IM injections as much as possible; use alternative routes (e.g. NGT, rectal) where possible</li> <li><input type="checkbox"/> Maintain adequate nutrition as spasms result in high metabolic demands</li> <li><input type="checkbox"/> Treat respiratory failure in ICU with ventilation</li> </ul>	
<b>Neutralise toxin</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Give tetanus immunoglobulin human (TIG)</li> <li>- 150 IU/kg (adults and children). Give the dose in at least 2 different sites IM, different from the tetanus toxoid site</li> <li><input type="checkbox"/> In addition, administer full course of age- appropriate TT vaccine (TT or DPT) – starting immediately</li> <li><input type="checkbox"/> See section 18.1.4</li> </ul>	H
<b>Treatment to eliminate source of toxin</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Clean wounds and remove necrotic tissue.</li> </ul>	H
<b>First line antibiotics</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Metronidazole 500 mg every 8 hours IV or by mouth for 7 days</li> </ul> <p><b>Child: 7.5 mg/kg every 8 hours</b></p> <p><b>Second line antibiotics</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Benzylpenicillin 2.5 MU every 6 hours for 10 days</li> </ul> <p><b>Child: 50,000-100,000 IU/kg per dose</b></p>	
<b>Control muscle spasms First line</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Diazepam 10 mg (IV or rectal) every 1 to 4 hours</li> </ul> <p><b>Child: 0.2 mg/kg IV or 0.5 mg/kg rectal (maximum of 10 mg) every 1 to 4 hours</b></p>	H

TREATMENT	LOC
<p><b>Other agents</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Magnesium sulphate (alone or with diazepam): 5 g (or 75 mg/kg) IV loading dose then 2 g/hour till spasm control is achieved           <ul style="list-style-type: none"> <li>- Monitor knee-jerk reflex, stop infusion if absent</li> </ul> </li> <li><input type="checkbox"/> Or chlorpromazine (alone or alternate with diazepam) 50-100 mg IM every 4-8 hours</li> </ul> <p><b>Child: 4-12 mg IM every 4-8 hours or</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> 12.5 mg-25 mg by NGT every 4-6 hours</li> <li>- Continue for as long as spasms/rigidity lasts</li> </ul>	
<p><b>Control pain</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Morphine 2.5-10 mg IV every 4-6 hours (monitor for respiratory depression)</li> </ul> <p><b>Child: 0.1 mg/kg per dose</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Paracetamol 1 g every 8 hours</li> </ul> <p><b>Child: 10 mg/kg every 6 hours</b></p>	

### Prevention

- Ⓐ Immunise all children against tetanus during routine childhood immunisation
- Ⓐ Proper wound care and immunisation (see chapter 18):
  - Full course if patient not immunised or not fully immunised
  - Booster if fully immunised but last dose >10 years ago
  - Fully immunised who had a booster <10 years ago do not need any specific treatment
- Ⓐ Prophylaxis in patients at risk as a result of contaminated wounds: give Tetanus immunoglobulin human (TIG) IM  
Child < 5 years: 75 IU

**Child 5-10 years: 125 IU**

**Child > 10 years and adults: 250 IU**

**Double the dose if heavy contamination or wound obtained > 24 hours.**



## 2.1.8.1 Neonatal Tetanus

ICD10 CODE: A33

Neonatal tetanus is a notifiable disease

- ⦿ Caused by infection of the umbilicus through cutting of the cord with unsterile instruments or from putting cow dung or other unsuitable materials on the stump
- ⦿ Usually presents 3-14 days after birth with irritability and difficulty in feeding due to masseter (jaw muscle) spasm, rigidity, generalised muscle spasms. The neonate behaves normally for the first few days before the symptoms appear.

### Management

TREATMENT	LOC
<input type="checkbox"/> Refer to hospital immediately <b>General measures</b> <input type="checkbox"/> Nurse in quite, dark and cool environment <input type="checkbox"/> Suction the mouth and turn the infant 30 min after sedative. A mucous extractor or other suction should be available for use prn <input type="checkbox"/> Ensure hydration/feeding <ul style="list-style-type: none"> <li>- Start with IV fluids (half saline and dextrose 5%)</li> <li>- Put NGT and start feeding with expressed breast milk 24 hours after admission – in small frequent feeds</li> <li>- Monitor and maintain body temperature</li> <li>- Monitor cardiorespiratory function closely. Refer for ICU management if possible</li> </ul>	H
<input type="checkbox"/> Neutralise toxin <ul style="list-style-type: none"> <li><input type="checkbox"/> Give tetanus immunoglobulin human (TIG)</li> <li>- 500 IU IM. Give the dose in at least 2 different sites IM, different from the tetanus toxoid site</li> <li><input type="checkbox"/> In addition give 1st dose of DPT</li> </ul>	RR
	H

TREATMENT	LOC
<b>Treatment to eliminate source of toxin</b> <input type="checkbox"/> Clean and debride the infected umbilicus	H
<b>First line antibiotics</b> <input type="checkbox"/> Metronidazole loading dose 15 mg/kg over 60 min then - Infant <4 weeks : 7.5 mg/kg every 12 hours for 14 days - Infant >4 weeks: 7.5 mg/kg every 8 hours for 14 days	H
<b>Second line antibiotics</b> <input type="checkbox"/> Benzylpenicillin 100,000 IU/kg every 12 hours for 10-14 days	
<b>Control muscle spasm</b> <input type="checkbox"/> Diazepam 0.2 mg/kg IV or 0.5 mg/kg rectal every 1 to 4 hours	
<b>Other medicines</b> <input type="checkbox"/> Chlorpromazine oral 1 mg/kg 8 hourly via NGT	

### Prevention

- ④ Immunise all pregnant women during routine ANC visits
- ④ Proper cord care

## 2.1.9 Typhoid Fever (Enteric Fever)

ICD10 CODE: A01.00

Bacterial infection characterised by fever and abdominal symptoms. It is spread through contaminated food and water.

### Causes

- ④ *Salmonella typhi* and *S. paratyphi A & B*

### Clinical features

- ④ Gradual onset of chills and malaise, headache, anorexia, epistaxis, backache, and constipation



- ⦿ Usually occurring 10-15 days after infection
- ⦿ Abdominal pain and tenderness are prominent features
- ⦿ High fever > 38 C
- ⦿ Delirium and stupor in advanced stages
- ⦿ Tender splenomegaly, relative bradycardia, cough
- ⦿ Complications may include perforation of the gut with peritonitis, gastrointestinal hemorrhage

### Differential diagnosis

- ⦿ Severe malaria, other severe febrile illnesses

### Investigations

- ¾** Blood culture (most reliable)
- ¾** Stool culture
- ¾** Rapid antibody test (e.g. Tubex, Typhidot) – not very sensitive or specific, possibly useful in epidemics

Widal's agglutination reaction is neither sensitive nor specific for typhoid diagnosis: a single positive screening does not indicate presence of infection

### Management

TREATMENT	LOC
<ul style="list-style-type: none"><li>⦿ Do culture and sensitivity to confirm right treatment</li><li>◻ Ciprofloxacin 500 mg every 12 hours for 10–14 days</li></ul> <p><b>Child: 10-15 mg/kg per dose</b></p> <p><b>Other antibiotics</b></p>	HC3

TREATMENT	LOC
<p><input type="checkbox"/> Chloramphenicol 500 mg 6 hourly for 10 days  <b>Child: 25 mg/kg IV, IM or oral for 10-14 days</b>  <b>In severe, resistant forms or pregnancy</b></p> <p><input type="checkbox"/> Ceftriaxone 1 g IV every 12 hours for 10-14 days  <b>Child: 50 mg/kg per dose</b>  <b>Alternative in pregnancy</b></p> <p><input type="checkbox"/> Amoxicillin 1 g every 8 hours for 10 days  <b>Child: 10-15 mg/kg per dose</b></p>	HC3
	HC4

### Prevention

- Ⓐ Early detection, isolation, treatment, and reporting
- Ⓐ Proper faecal disposal
- Ⓐ Use of safe clean water for drinking
- Ⓐ Personal hygiene especially hand washing
- Ⓐ Good food hygiene

## 2.1.10 Typhus Fever ICD10 CODE: A75.9

### Febrile infection caused by Rickettsia species

#### Causes

- Ⓐ Epidemic louse-borne typhus fever: caused by Rickettsia prowazekii; the common type in Uganda, which is transmitted to man (the reservoir) by lice
- Ⓐ Murine (endemic) typhus fever: caused by Rickettsia typhi (mooseri) and transmitted by rat fleas. Rats and mice are the reservoir
- Ⓐ Scrub typhus fever (mite-borne typhus): caused by R. tsutsugamushi and transmitted by rodent mites

## Clinical features

- Ⓐ Headaches, fever, chills, severe weakness, muscle pains
- Ⓐ Macular rash that appears on the 5th day on the rest of the body except the face, palms, and soles
- Ⓐ Jaundice, confusion, drowsiness
- Ⓐ Murine typhus has a similar picture but is less severe

## Differential diagnosis

- Ⓐ Any cause of fever such as malaria, HIV, UTI, or typhoid

## Investigations

$\frac{3}{4}$  Blood: For Weil-Felix reaction

## Management

TREATMENT	LOC
<input type="checkbox"/> Doxycycline 100 mg every 12 hours for 5-7 days <b>Child &gt; 8 years: 2 mg/kg per dose</b>	HC2 HC4
<input type="checkbox"/> Or chloramphenicol 500 mg orally or IV every 6 hours for 5 days	
<b>Child: 15 mg/kg per dose</b>	

### Note

- One single dose of doxycycline 200 mg may cure epidemic typhus but there is risk of relapse

## Prevention

- Ⓐ Personal hygiene
- Ⓐ Destruction of lice and rodents

## 2.2 FUNGAL INFECTIONS

### 2.2.1 Candidiasis

ICD10 CODE: B37

Fungal infection usually confined to the mucous membranes and external layers of skin. Severe forms are usually associated with immunosuppressive conditions, such as HIV/AIDS, diabetes, pregnancy, cancer, prolonged antibiotic use, and steroids.

#### Causes

- *Candida albicans*, transmitted by direct contact

#### Clinical features

It may present as:

- Oral thrush
- Intertrigo (between skin folds)
- Vulvo vaginitis and abnormal vaginal discharge (vaginal candida is not a sexually transmitted disease)
- Chronic paronychia (inflammation involving the proximal and lateral fingernail folds)
- Gastrointestinal candidiasis may present with pain on swallowing, vomiting, diarrhoea, epigastric and retrosternal pain

#### Investigations

- Diagnosis is mainly clinical
- In case of vaginitis, sample collection –a high vaginal swab (protected by a speculum), pH, KOH , wet preparation and
- Gram stain, C&S
- Smear examination with potassium hydroxide (KOH)

#### Investigations

- Diagnosis is mainly clinical
- In case of vaginitis, sample collection –a high vaginal swab (protected by a speculum), pH, KOH , wet preparation and
- Gram stain, C&S
- Smear examination with potassium hydroxide (KOH)

## Investigations

- Diagnosis is mainly clinical
- In case of vaginitis, sample collection –a high vaginal swab (protected by a speculum), pH, KOH , wet preparation and
  - Gram stain, C&S
- Smear examination with potassium hydroxide (KOH)

## Management

TREATMENT	LOC
<b>Oral candidiasis</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Nystatin tablets 500,000-1,000,000 IU every 6 hours for 10 days (chewed then swallowed)</li> </ul> <b>Child &lt; 5 years:</b> Nystatin oral suspension 100,000 IU every 6 hours for 10 days	HC3 HC2
<b>Child 5-12 years:</b> 200,000 IU per dose every 6 hours for 10 days	
<b>Oropharyngeal candidiasis</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Fluconazole 150-200 mg daily for 14 days</li> </ul> <b>Child:</b> loading dose 6 mg/kg, then 3 mg/kg daily	HC3
<b>Vaginal</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Insert clotrimazole pessary 100 mg high into the vagina with an applicator each night for 6 days or twice a day for 3 days</li> <li><input type="checkbox"/> Or insert one nystatin pessary 100,000 IU each night for 10 days</li> <li><input type="checkbox"/> For recurrent vaginal candidiasis, give fluconazole 150-200 mg once daily for 5 days</li> </ul> <p>Fluconazole is associated with spontaneous abortions and congenital anomalies and should be avoided in pregnancy</p>	HC2

TREATMENT	LOC
<b>Chronic paronychia</b> <input type="checkbox"/> Keep hand dry and wear gloves for wet work <input type="checkbox"/> Hydrocortisone cream twice daily	HC3
<b>If not responding</b> <input type="checkbox"/> Betametasone cream twice daily <input type="checkbox"/> Fluconazole 150-200 mg once a day for 5-7 days	HC4
<b>Intertrigo</b> <input type="checkbox"/> Clotrimazole cream twice a day for 2-4 weeks <input type="checkbox"/> In severe forms use fluconazole 150-200 mg once a day for 14-21 days	HC3

**Prevention**

- Ⓐ Early detection and treatment
- Ⓐ Improve personal hygiene
- Ⓐ Avoid unnecessary antibiotics

**2.3 VIRAL INFECTIONS****2.3.1 Avian Influenza**

ICD10 CODE: J09.X2

Influenza caused by avian (bird) influenza Type A viruses (mainly H5N1 strain). It is endemic in the poultry population in Eurasia and can occasionally be transmitted to humans through direct contact with sick birds (inhalation of infectious droplets). Disease can be mild or severe and has limited potential to spread from person to person but there is risk of mutations giving rise to a very infectious virus which could cause widespread epidemics. Avian flu is a notifiable disease.

**Cause**

- Ⓐ Avian (bird) influenza Type A viruses

**Clinical features**

- Ⓐ Conjunctivitis

- Flu symptoms: fever, cough, sore throat, muscle aches
- Gastrointestinal (diarrhoea) and neurological symptoms
- In some cases, severe acute respiratory syndrome (SARS)

## Investigations

- Blood and respiratory specimens, nose swab: lab test for influenza and rule out bacterial infection
  - Testing must be in a special laboratory

## Management

TREATMENT	LOC
<p><b>If patient requires hospitalisation</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Hospitalise patient under appropriate infection control precautions</li> <li><input type="checkbox"/> Administer oxygen as required. Avoid nebulisers and high air flow oxygen masks</li> <li><input type="checkbox"/> Give paracetamol or ibuprofen for fever prm</li> <li><input type="checkbox"/> Give oseltamivir phosphate in patients 1 year who have been symptomatic for no more than two days. Treat for 5 days as below:</li> </ul> <p><b>Adults and children 13 years:</b> 75 mg twice daily  <b>Child &gt; 1 year and &lt; 15 kg:</b> 30 mg twice daily  <b>Child 15– 23 kg:</b> 45 mg twice daily  <b>Child 23–40 kg body weight:</b> 60 mg twice daily  <b>Child &gt; 40 kg body weight:</b> 75 mg twice daily If a case does not require hospitalisation f Educate the patient and his/her family on:</p> <p><b>Personal hygiene and infection control measures</b></p> <p>Hand-washing, use of a paper or surgical mask by the ill person</p> <p><b>Restriction of social contacts</b></p> <p><b>Seek prompt medical care if the condition worsens</b></p> <p><b>Prophylactic use of oseltamivir</b></p>	RR
	RR

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Indicated in persons 13 years and above who have come into contact with affected birds/patients</li> <li><input type="checkbox"/> Close contact: 75 mg once daily for at least 7 days</li> <li><input type="checkbox"/> Community contacts: 75 mg once daily up to 6 weeks</li> <li><input type="checkbox"/> Protection lasts only during the period of chemoprophylaxis</li> </ul>	RR

### Discharge policy

- Ⓐ Infection control precautions for adult patients should remain in place for 7 days after resolution of fever and for 21 days in children younger than 12 years
- Ⓐ Children should not attend school during this period

### Control and Prevention of Nosocomial Spread of Influenza A (H5N1)

Health workers should observe the following to prevent the spread of avian influenza in the health care facilities:

- Ⓐ Observe droplet and contact precautions. In addition, get negative pressure room if available
- Ⓐ Isolate the patient to a single room
- Ⓐ Place beds more than 1 metre apart and preferably separated by a physical barrier (e.g., curtain, partition)
- Ⓐ Appropriate personal protective equipment (APPE) in all those entering patients' rooms. APPE includes high efficiency mask, gown, face shield or goggles, and gloves
- Ⓐ Limit the number of health care workers (HCWs) and other hospital employees who have direct contact with the patient(s). These HCWs should:
  - Ⓐ Be properly trained in infection control precautions
  - Ⓐ Monitor their own temperature twice daily and report any febrile event to hospital authorities
  - Ⓐ A HCW who has a fever ( $>38.0^{\circ}\text{C}$ ) and who has had direct patient contact should be treated immediately

- ⦿ Restrict the number of visitors, provide them with APPE, and instruct them in its use

### 2.3.2 Chicken pox ICD10 CODE: B01

A highly contagious viral infection. Patients are contagious from 2 days before onset of the rash until all lesions have crusted. An attack of chicken pox usually confers lifelong immunity. Disease is more severe and complicated in adults.

#### Causes

- ⦿ Varicella Zoster virus (VZV) by droplet infection

#### Clinical features

- ⦿ Incubation period is 14 days, but shorter in immuno-compromised host
- ⦿ Mild fevers occur 10-20 days after exposure
- ⦿ Prodromal symptoms consisting of low fever, headache, and malaise occurring 2 to 3 days before the eruption
- ⦿ Eruptive phase: they appear as macules, papules, vesicles, pustules and crusts. The most characteristic lesion is a vesicle looking like a drop of water on the skin. Vesicles rupture easily and may become infected
- ⦿ The rash begins on the trunk and spreads to the face and extremities
- ⦿ Lesions of different stages (crops) exist together at the same time in any given body area
- ⦿ Complications may include septicaemia, pneumonia, fulminating haemorrhagic varicella, and meningoencephalitis

#### Differential diagnosis

- ⦿ Drug-induced eruption
- ⦿ Scabies
- ⦿ Insect bites
- ⦿ Erythema multiforme, impetigo
- ⦿ Other viral infections with fever and skin rash

## Investigations

- Virus isolation possible but not necessary
- Diagnosis is practically clinical

## Management

TREATMENT	LOC
<b>Symptomatic and supportive treatment</b> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Apply calamine lotion every 12 hours f Cool, wet compresses to provide relief</li> </ul> <p><b>Chlorpheniramine:</b> Adult 4 mg every 12 hours Child &lt;5 years: 1-2 mg every 12 hours for 3 days</p> <p><b>Pain relief:</b> paracetamol 10 mg/kg every 6 hours</p> <p>In adults and children &gt;12 years consider antivirals: Oral aciclovir 800 mg every 6 hours for 7 days Keep child at home/remove from school till healed to avoid spread</p>	HC2
	HC4

## Prevention

- Isolation of infected patient
- Avoid contact between infected persons and immuno-suppressed persons

### 2.3.3 Measles ICD10 CODE: B05

An acute, highly communicable viral infection characterized by a generalised skin rash, fever, and inflammation of mucous membranes. Measles is a notifiable disease.

#### Cause

- Measles virus spreads by droplet infection and direct contact

## Clinical features

- Ⓐ Catarrhal stage: high fever, Koplik's spots (diagnostic) runny nose, barking cough, conjunctivitis
- Ⓐ Misery, anorexia, vomiting, diarrhoea
- Ⓐ Later: generalised maculopapular skin rash followed by desquamation after few days

## Complications

- Ⓐ Secondary bacterial respiratory tract infection, e.g. bronchopneumonia, otitis media
- Ⓐ Severe acute malnutrition especially following diarrhoea
- Ⓐ Cancrum oris (from mouth sepsis)
- Ⓐ Corneal ulceration and panophthalmitis – can lead to blindness
- Ⓐ Demyelinating encephalitis
- Ⓐ Thrombocytopaenic purpura

## Differential diagnosis

- Ⓐ German measles (Rubella)
- Ⓐ Other viral diseases causing skin rash

## Investigations

- Clinical diagnosis is sufficient though virus isolation is possible

## Management (symptomatic)

TREATMENT	LOC
<input type="checkbox"/> Isolate patients (at home or health centre) <input type="checkbox"/> Paracetamol prn for fever  <b>Apply tetracycline eye ointment 1% every 12 hours for 5 days</b> <input type="checkbox"/> Increase fluid and nutritional intake (high risk of mal-nutrition and dehydration)	HC2

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Give 3 doses of vitamin A: first dose at diagnosis, 2nd dose the next day and 3rd dose on day 14 Child &lt;6 months: 50,000 IU <b>Child 6-12 months: 100,000 IU</b> <b>Child &gt;12 months: 200,000 IU</b></li> <li><input type="checkbox"/> Monitor for and treat secondary bacterial infections with appropriate antibiotics immediately</li> <li><input type="checkbox"/> Refer to hospital in case of complications</li> </ul>	

### Prevention

- Measles vaccination (see chapter 18)
- Avoid contact between infected and uninfected persons
- Educate the public against the common local myths e.g. stopping to feed meat and fish to measles patients

### 2.3.4 Poliomyelitis

ICD10 CODE: A80.3

An acute viral infection characterised by acute onset of flaccid paralysis of skeletal muscles. It is transmitted from person to person through the faecal-oral route. Poliomyelitis is a notifiable disease.

#### Cause

- Polio virus (enterovirus) types I, II, and III

#### Clinical features

- Majority of cases are asymptomatic, only 1% result in flaccid paralysis
- Non-paralytic form: minor illness of fever, malaise, headache, and vomiting, muscle pains, spontaneous recovery in 10 days
- Paralytic form: after the aspecific symptoms, rapid onset (from morning to evening) of asymmetric flaccid paralysis,

predominantly of the lower limbs, with ascending progression

- Ⓐ Paralysis of respiratory muscles is life threatening (bulbar polio)
- Ⓐ Aseptic meningitis may occur as a complication

### Differential diagnosis

- Ⓐ Guillain-Barré syndrome
- Ⓐ Traumatic neuritis
- Ⓐ Transverse myelitis
- Ⓐ Pesticides and food poisoning

Consider all cases of Acute Flaccid Paralysis as possible Poliomyelitis: alert the district focal person for epidemic control, and send 2 stool samples (refrigerated).

### Investigations

- Isolation of the virus from stool samples
- Viral culture
- Ensure that Giardia intestinalis, Entamoeba histolytica, Cryptosporidium, Cyclospora, sarcocystis, Toxoplasma gondii are included in the investigations

### Management

TREATMENT	LOC
<b>Acute stage</b> Poliomyelitis in this stage without paralysis is difficult to diagnose <b>Paralytic form</b> <input checked="" type="checkbox"/> If paralysis is recent, rest the patient completely Note: Do not give IM injections as they make the paralysis worse	H

TREATMENT	LOC
<input type="checkbox"/> Refer the patient to a hospital for supportive care <input type="checkbox"/> After recovery (if partially/not immunised), complete recommended immunisation schedule	H
<b>Chronic stage</b> <input type="checkbox"/> Encourage active use of the limb to restore muscle function/physiotherapy <input type="checkbox"/> In event of severe contractures, refer for corrective surgery	

### Prevention

- Isolate patient for nursing and treatment, applying contact and droplets precautions
- Immunise all children below 5 years from the area of the suspected case
- If case is confirmed, organize mass immunisation campaign
- Proper disposal of children's faeces
- Immunisation (see chapter 18)
- Proper hygiene and sanitation

### 2.3.5 Rabies ICD10 CODE: A82

Rabies is a viral infection of wild and domestic animals, transmitted to humans by saliva of infected animals through bites, scratches or licks on broken skin or mucous membranes. Once symptoms develop, rabies presents as a fatal encephalitis: there is no cure and treatment is palliative.

Before symptomatic disease has developed, rabies can effectively be prevented by post-exposure prophylaxis.

#### Cause

- Rabies virus. Incubation is average 20-90 days but can be

shorter in severe exposure (multiple bites, bites on face/neck) or even longer (> a year) in a few cases

## Clinical features

- Ⓐ Itching or paraesthesiae (abnormal sensation) around site of exposure, malaise, fever
- Ⓑ Neurologic phase
- Ⓒ Furious form: psychomotor agitation or hydrophobia (throat spasm and panic, triggered by attempt to drink or sight/sound/touch of water) and aerophobia (similar response to a draft of air)
- Ⓓ Paralytic form (rarer): progressive ascending paralysis

## Management

TREATMENT	LOC
<input type="checkbox"/> There is no cure. In case of suspected exposure, take all the appropriate steps to prevent the infection (see section 1.2.1.3 on animal bites) <input type="checkbox"/> Start as soon as the exposure happens or as soon as the patient comes for medical attention, regardless of whatever time has passed from the exposure	H
<input type="checkbox"/> Admit case <input type="checkbox"/> Palliative and supportive care <input type="checkbox"/> Observe strict hygienic precautions Avoid contact with patient's body fluids or secretions PPE (personal protective equipment) <b>Caution: the patient may bite</b> <input type="checkbox"/> Counsel caregivers on rabies and consequences	H

## 2.3.6 VIRAL HAEMORRHAGIC FEVERS

### 2.3.6.1 Ebola and Marburg

ICD11 CODE: A99

Ebola and Marburg are severe zoonotic multisystem febrile diseases caused by RNA viruses. They are notifiable diseases.

#### Cause

- ⦿ Ebola and Marburg viruses. Transmission to humans happens through contact with meat or body fluids of an infected animal. The disease can then be transmitted from human to human through body fluids (including semen for months after recovery) and it is highly contagious.

#### Risk factors

- ⦿ Communities around game parks
- ⦿ Communities in endemic area
- ⦿ Cultural practices like burial rituals
- ⦿ Poor infection control practices
- ⦿ History of exposure to infected people in the last 2 to 21 days i.e sexual partner, breastfeeding mothers
- ⦿ Recent contact with infected animals e.g. monkeys, bats, infected game meat
- ⦿ Clinical features
- ⦿ Early signs (non specific): sudden fever, weakness, headache, muscle pains, loss of appetite, conjunctivitis
- ⦿ Late signs:
  - ⦿ Diarrhoea (watery or bloody), vomiting
  - ⦿ Mucosal and gastrointestinal bleeding: chest pain, respiratory distress, circulatory shock
  - ⦿ CNS dysfunction, confusion, seizures



- ⦿ Miscarriage in pregnancy
- ⦿ Elevated AST and ALT, kidney injury, electrolyte abnormalities

**Note:** Haemorrhage is seen in less than a third of Ebola patients

### Differential diagnosis

- ⦿ Malaria, rickettsiosis, meningitis
- ⦿ Shigellosis, typhoid
- ⦿ Anthrax, sepsis, viral hepatitis, dengue, leptospirosis

### Investigations

- ⦿ Send blood sample to a referral laboratory for specific testing (taking off blood samples from patients suspected of viral hemorrhagic fever should be done by a trained healthcare worker in appropriate PPE).
- ⦿ Notify district surveillance focal person

### Management

TREATMENT	LOC
<input type="checkbox"/> Refer all patients to regional referral hospital for management in an appropriate setting	RR
<input type="checkbox"/> Notify the district health team	

### Safety of health workers: maximum level of infection control procedures

Health workers should maintain a high level of suspicion for Ebola virus disease. While standard precautions should be followed for all patients at all times, implementation of transmission-based precautions for cases suspected or confirmed to have Ebola or Marburg virus diseases is essential. This includes: screening for rapid identification and isolation of cases,

- Hand hygiene according to the WHO 5 moments safe injection practices use of personal protective equipment (e.g. eye protection, mask (medical or respirator), gloves, gown or coverall, head covering, apron and gum (rubber) boots).
- Handling and disposing of all waste related to the care of an Ebola patients as infectious
- Safe handling and disinfection of linens (or disposal if not possible) and thorough cleaning and disinfection of the environment and medical equipment.
- Disinfectants (e.g. chlorine mixture of 0.5% for surfaces) used must be prepared and used ensuring adequate concentration and contact time on surfaces.
- Handling of the deceased is particularly high risk and should be kept to a minimum. Strict adherence to IPC measures including hand hygiene, use of personal protective equipment (e.g. eye protection, mask (medical or respirator), gloves, gown or coverall, head covering, apron and gum (rubber) boots is required.

### Patient care

Refer to the MoH recent guidelines for management of viral hemorrhagic fevers

- Optimised Supportive treatment of signs and symptoms
- Replace and monitor fluids and electrolytes for patients with diarrhoea or vomiting

### Triage and contact tracing

- Triage patient (those who had contact with a patient or not)
- Contact identification, contact listing and contact follow up

### Dead Body handling

- Avoid washing or touching the dead f There should be no gathering at funerals. The dead should be buried promptly by a designated burial team

### Prevention

- Health education of the population (e.g. avoid eating wild animals)

- ⦿ Effective outbreak communication and having haemorrhagic viral fever protocols in place
- ⦿ Appropriate safety gear for patients/health workers in suspect cases
- ⦿ Modification of burial practices
- ⦿ Use of condoms

### **2.3.6.2 Yellow Fever**

An acute viral haemorrhagic fever transmitted through the bite of infected female Aedes aegypti mosquito. Incubation period is 3 to 6 days. It is a notifiable disease.

#### **cause**

- ⦿ Yellow fever RNA virus

#### **Risk factors**

- ⦿ Residents in endemic area
- ⦿ Hunters and settlers around game parks

#### **Clinical features**

##### **First stage:**

- ⦿ Fever, chills, headache, backache, muscle pain, prostration, nausea, vomiting, fatigue. Usually resolves within 3-4 days.

##### **Second stage:**

- ⦿ About 15% of cases enter into a second or toxic stage after 1-2 day of remission: high fever, prostration, signs and symptoms of hepatic failure, renal failure and bleeding (jaundice, nose bleeding, gingival bleeding, vomiting blood, blood in stool)
- ⦿ About half of these patients die within 7-10 days

#### **Differential diagnosis**

- ⦿ Hepatitis E, liver failure
- ⦿ Malaria, Ebola

## investigations

- Ⓐ PCR in early phases
  - Ⓑ ELISA in the late stage
- It is a notifiable disease.

## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Refer all cases to regional referral hospital</li> <li><input type="checkbox"/> Notify the district health team</li> <li><input type="checkbox"/> There is no specific antiviral drug treatment</li> <li><input type="checkbox"/> Supportive treatment is recommended:           <ul style="list-style-type: none"> <li>- Rehydration</li> <li>- Management of liver and kidney failure</li> <li>- Antipyretics for fever</li> <li>- Blood transfusion</li> </ul> </li> <li><input type="checkbox"/> Treat associated bacterial infections with antibiotics</li> </ul>	RR

**Note**

- Individuals who have recovered from a yellow fever infection develop life-long immunity

## Prevention

- Ⓐ Vaccination (see chapter 18)
- Ⓑ Elimination of mosquito breeding sites
- Ⓒ Epidemic preparedness i.e prompt detection and treatment

### 2.3.7 COVID-19 Disease

Coronavirus disease (COVID-19) results from infection with the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). It is a novel virus in humans, knowledge of which and its pathogenesis still evolving. Additionally, the population-level immunity is uncertain. Complications of the severe infection can result in death.

## Clinical features

Early symptoms are non-specific and may include:

- fever, cough, myalgia, fatigue, shortness of breath, sore throat, headache, flu-like symptoms, diarrhea, nausea, respiratory distress, features of renal failure, pericarditis, and Disseminated Intravascular Coagulation (DIC).

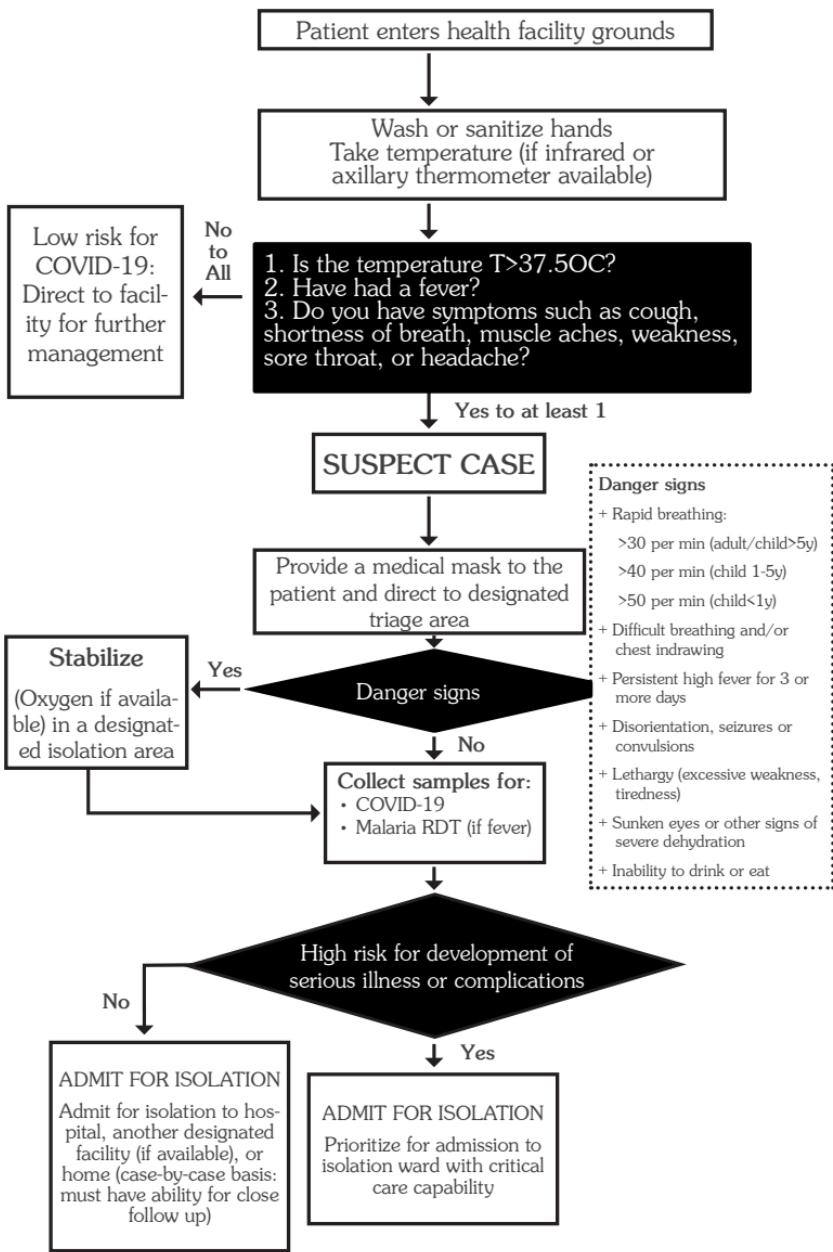
It is important to know that many individuals with COVID-19 are asymptomatic. It is therefore paramount that all health workers observe strict infection prevention and control (IPC) measures at all times.

## Classification of COVID 19 disease

Disease Stage	Hallmark	Features
Mild Disease	No Respiratory Distress	Normal Vital Signs
Moderate Disease	Non-Severe Pneumonia	Crackles in chest but Normal SPO <sub>2</sub> , mild respiratory distress (Resp Rate <30)
Severe Disease	Oxygen De saturation	Severe Respiratory distress (Resp Rate >30) & SPO <sub>2</sub> <90%,
Critical	Organ Dysfunction	<ul style="list-style-type: none"> <li>• CNS: Altered Mental State</li> <li>• CVS: Hypotension &amp; Shock</li> <li>• Kidney: Decreased Urine Output, Raised Creatinine</li> <li>• Liver: Elevated liver enzymes</li> <li>• Coagulation: Raised PT &amp; INR, Thrombocytopenia</li> <li>• Endocrine: Hypoglycemia</li> </ul>

## Groups at High Risk of Developing Severe Disease or Complications

- Age > 65 year
- Obesity
- Lung diseases (e.g. asthma, TB, COPD)
- Hypertension



- Heart conditions such as history of heart attack or stroke
- Diabetes
- Cancer patients whether or not on chemotherapy
- Advanced liver disease
- Person living with HIV
- Kidney disease
- Severe Acute Malnutrition
- Sickle cell disease
- COVID 19 unvaccinated
- Pregnancy and recent pregnancy
- Hypertension

## Differential diagnoses

- Malaria and other febrile illnesses.
- common respiratory, infectious, cardiovascular, oncological, and gastrointestinal diseases.

## Investigations

<b>WHO COVID-19: Case Definitions</b>	
<p><i>Updated in Public health surveillance for COVID-19, published 16 December 2020</i></p> <p><b>Suspected case of SARS-CoV-2 infection</b></p> <p><b>A</b> A person who meets the clinical AND epidemiological criteria:  <b>Clinical Criteria:</b>            • Acute onset of fever AND cough; OR            • Acute onset of ANY THREE OR MORE of the following signs or symptoms: Fever, cough, general weakness/fatigue<sup>1</sup>, headache, myalgia, sore throat, coryza, dyspnoea, anaesthesia/nausea/vomiting<sup>1</sup>, diarrhoea, altered mental status.  <b>AND</b>  <b>Epidemiological Criteria:</b>            • Residing or working in an area with high risk of transmission of virus: closed residential settings, humanitarian settings such as camp and camp-like settings for displaced persons; anytime within the 14 days prior to symptom onset, or            • Residing or travel to an area with community transmission anytime within the 14 days prior to symptom onset; or            • Working in any health care setting, including within health facilities or within the community, any time within the 14 days prior of symptom onset.  <b>B</b> A patient with severe acute respiratory illness:            (SARI) acute respiratory infection with history of fever or measured fever of ≥ 38 °C<sup>1</sup>; and cough; with onset within the last 10 days; and requires hospitalization.  <b>C</b> Asymptomatic person not meeting epidemiologic criteria with a positive SARS-CoV-2 Antigen-RDT<sup>2</sup></p> <p><sup>1</sup> Signs separated with slash (/) are to be counted as one sign.  <sup>2</sup> NAAT is required for confirmation, see <a href="#">Diagnostic testing for SARS-CoV-2</a></p> <p>See <a href="#">Antigen detection in the diagnosis of SARS-CoV-2 infection using rapid immunochromatographic detection</a></p> <p>Note: Clinical and public health judgment should be used to determine the need for further investigation in patients who do not strictly meet the clinical or epidemiological criteria.            Surveillance case definitions should not be used as the sole basis for guiding clinical management.</p>	 <p><b>Case Definitions</b></p> <p><b>Probable case of SARS-CoV-2 infection</b></p> <p><b>A</b> A patient who meets clinical criteria above AND is a contact of a probable or confirmed case, or linked to a COVID-19 cluster<sup>3</sup></p> <p><b>B</b> A suspect case with chest imaging showing findings suggestive of COVID-19 disease<sup>4</sup></p> <p><b>C</b> A person with recent onset of anosmia (loss of smell) or ageusia (loss of taste) in the absence of any other identified cause.</p> <p><b>D</b> Death, not otherwise explained, in an adult with respiratory distress preceding death AND was a contact of a probable or confirmed case or linked to a COVID-19 cluster<sup>3</sup></p> <p><b>Confirmed case of SARS-CoV-2 infection</b></p> <p><b>A</b> A person with a positive Nucleic Acid Amplification Test [NAAT]</p> <p><b>B</b> A person with a positive SARS-CoV-2 Antigen-RDT AND meeting either the probable case definition or suspect criteria A OR B</p> <p><b>C</b> An asymptomatic person with a positive SARS-CoV-2 Antigen-RDT who is a contact of a probable or confirmed case</p> <p><sup>3</sup>A group of symptomatic individuals linked by time, geographic location and common exposures, and who have been identified through active case finding and/or passively linked, symptomatic (meeting clinical criteria of Suspect case definition A or B) persons with positive Ag-RDTs (based on ≥97% specificity of test and desired &gt;99.9% probability of at least one positive result being a true positive)</p> <p><sup>4</sup> Typical chest imaging findings suggestive of COVID-19 include the following:            • Chest radiograph: hazy opacities, often rounded in morphology, with peripheral and upper lobe distribution            • Chest CT: multiple bilateral ground glass opacities, often rounded in morphology, with peripheral and lower lung distribution            • Lung ultrasound: thickened pleural lines, B lines (multifocal, discrete, or confluent), consolidative patterns with or without air bronchograms.</p>

## Management

- Perform SARS-CoV-2 Rapid Diagnostic Test (RDT)
- Carry out nasopharyngeal swabs for RT-RNA test

## COVID-19 screening and triage process at health facilities

- COVID-19 triage aims to flag suspected patients at first point of contact within the healthcare system in order to
- protect other patients and staff from potential exposure.
- identify and rapidly address severe symptoms, rule out other conditions with features similar to COVID-19, ascertain if suspect case definition is met
- All suspected patients should be directed to a designated area away from other patients and handled as per standard covid protection guidelines
- Refer to the Comprehensive COVID-19 Case Management Guidelines for details.

TREATMENT	LOC
<b>Safety of health workers and caregivers: maximum level of infection control procedures</b>	HC2
Strict isolation of suspect cases Use of adequate protective gear Minimize invasive intervention Safe handling of linen Appropriate use of chlorine mixtures Proper disposal of health care waste Educate the patient and care givers on appropriate infection control measures	
No Hospitalization (mild to moderate diseases)	HC2

TREATMENT	LOC
All patients with no risk of developing severe COVID-19 diseases. <input type="checkbox"/> symptom management, supportive care, and monitoring (at home, or in the community). <input type="checkbox"/> Control fevers with paracetamol, multivitamins and advise on balanced diet <b>Adults and Children &gt;40kg at increased risk of developing severe COVID-19 diseases. Refer to current Covid-19 treatment guidelines.</b> <input type="checkbox"/> nirmatrelvir/ritonavir 300/100mg orally (PO) twice daily for 5 days (must be initiated within 5 days of symptom onset) <input type="checkbox"/> OR remdesivir IV infusion Once daily for 3 days with a loading dose 200mg on Day 1 and 100mg on subsequent days. (initiated within 7 days of symptom onset) <input type="checkbox"/> OR molnupiravir 800mg orally (PO) twice daily for 5 days <b>ONLY</b> when ritonavir-boosted nirmatrelvir or remdesivir cannot be used; treatment should be initiated as soon as possible and within 5 days of symptom onset (contraindicated in pregnant or breastfeeding women and children)	
If the patient requires hospitalization (Severe to Critical disease) <ul style="list-style-type: none"> <li>○ Oxygen therapy</li> <li>○ And Corticosteroids</li> <li>○ And Venous thromboembolism prophylaxis</li> <li>○ And Interleukin-6 receptor blocker (tocilizumab or sarilumab)</li> </ul> or JAK Inhibitor (baricitinib) <b>For details refer to the Comprehensive COVID-19 case Management Guidelines</b>	RR

## Prevention

- ① Vaccination (Refer to chapter 18: Immunization)
- ② Epidemic preparedness i.e. prompt detection and treatment
- ③ Infection Prevention and control measures including Mask wearing, social distancing, regular handwashing, avoid shaking hands etc.

## 2.4 HELMINTHES PARASITES

### 2.4.1 Intestinal Worms

ICD10 CODE: B83.9

Intestinal worms enter the human body through ingestion of the worm eggs in food or water via dirty hands or through injured skin when walking barefoot. Examples include:

TYPE OF INFESTATION	FEATURES
<b>Ascariasis:</b> Ascaris lumbricoides (round worm). Infests small intestines	<ul style="list-style-type: none"> <li>▪ Oro-faecal transmission</li> <li>▪ Usually few or no symptoms</li> <li>▪ Persistent dry irritating cough</li> <li>▪ Patient may pass out live worms through the anus, nose, or mouth</li> <li>▪ Pneumonitis-Loeffler's syndrome</li> <li>▪ Heavy infestations may cause nutritional deficiencies</li> <li>▪ Worms may also cause obstruction to bowel, bile duct, pancreatic duct, or appendix</li> </ul>
<b>Enterobiasis:</b> (thread-worm) Enterobius vermicularis	<ul style="list-style-type: none"> <li>▪ Transmitted by faecal-oral route</li> <li>▪ Mainly affects children</li> <li>▪ Intense itching at the anal orifice</li> </ul>

TYPE OF INFESTATION	FEATURES
<b>Hook worm</b> Caused by <i>Necator americanus</i> and <i>Ancylostoma duodenale</i>	<ul style="list-style-type: none"><li>▪ Chronic parasitic infestation of the intestines</li><li>▪ Transmitted by penetration of the skin by larvae from the soil</li><li>▪ Dermatitis (ground itch)</li><li>▪ Cough and inflammation of the trachea (tracheitis) common during larvae migration phase</li><li>▪ Iron-deficiency anaemia</li><li>▪ Reduced blood proteins in heavy infestations</li><li>▪ Reduced blood proteins in heavy infestations</li></ul>
<b>Strongyloidiasis</b> <i>Strongyloides stercoralis</i>	<ul style="list-style-type: none"><li>▪ Skin symptoms: Itchy eruption at the site of larval penetration</li><li>▪ Intestinal symptoms e.g. abdominal pain, diarrhoea, and weight loss</li><li>▪ Lung symptoms due to larvae in the lungs, e.g. cough and wheezing</li><li>▪ Specific organ involvement, e.g. meningoencephalitis</li><li>▪ Hyperinfection syndrome: Occurs when immunity against auto-infection fails, e.g. in immunosuppressed cases</li></ul>
<b>Whip worm</b> Infests human caecum and upper colon	<ul style="list-style-type: none"><li>▪ May be symptomless</li><li>▪ Heavy infestation may cause bloody, mucoid stools, and diarrhoea</li><li>▪ Complications include anaemia and prolapse of the rectum</li></ul>



## Differential diagnosis

- Other causes of cough, diarrhea
- Other causes of intestinal obstruction and nutritional deficiency
- Loeffler's Syndrome
- Other causes of iron-deficiency anaemia

## Investigations

- Stool examination for ova, live worms or segments
- Full blood count

## Management

TREATMENT	LOC
Roundworm, threadworm, hookworm, whipworm <input type="checkbox"/> Albendazole 400 mg single dose Child <2 years: 200 mg <input type="checkbox"/> Mebendazole 500 mg single dose Child <2 years: 250 mg Strongyloides <input type="checkbox"/> Albendazole 400 mg every 12 hours for 3 days <input type="checkbox"/> Or Ivermectin 150 micrograms/kg single dose	HC1
	HC3

## Prevention

- Proper faecal disposal
- Personal and food hygiene
- Regular deworming of children every 3-6 months
- Avoid walking barefoot

## 2.4.1.1 Taeniasis (Tapeworm)

ICD10 CODE: B68

An infestation caused by *Taenia* (*Taenia saginata* (from undercooked beef), *Taenia solium* (from undercooked pork), *Diphyllobothrium latum* (from undercooked fish).

### Cause

- ⦿ Adult Tapeworms: intestinal infestation, by ingestion of undercooked meat containing cysticerci (larval form of the worm)
- ⦿ Larvae forms (cysticercosis): by ingestion of food/water contaminated by eggs of *T.solium*. The eggs hatch in the intestine, the embryos invade the intestinal walls and disseminate in the brain, muscles or other organs

### Clinical features

#### *T. saginata*, *T.solium* (adult tapeworm)

- Usually asymptomatic, but live segments may be passed
- Epigastric pain, diarrhoea, sometimes weight loss

#### Cysticercosis

- Muscular: muscle pains, weakness, fever, subcutaneous nodules
- Neurocysticercosis: headache, convulsions, coma, meningo-encephalitis, epilepsy
- Ocular: exophthalmia, strabismus, iritis

#### *D. latum*

- Usually asymptomatic, but mild symptoms may occur
- Megaloblastic anaemia may occur as a rare complication

#### Differential diagnosis

- Other intestinal worm infestations

## Investigations

- Laboratory: eggs, worm segments in stool or collected from perianal skin (scotch tape method)
- Cysticercosis: hypereosinophilia in blood and CSF

## Management

TREATMENT	LOC
<b>Tapeworm</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Praziquantel 5-10 mg/kg single dose Alternative</li> <li><input type="checkbox"/> Niclosamide</li> </ul> <p><b>Adult and child &gt; 6 years:</b> 2 g single dose  <b>Child &lt; 2 years:</b> 500 mg  <b>Child 2-6 years:</b> 1 g            - Give Bisacodyl 2 hours after the dose</p>	HC3 HC4
<b>Cysticercosis</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Refer to specialised facilities</li> <li><input type="checkbox"/> Antiparasitic treatment without diagnosis of location by CT or MRI scan can worsen symptoms, and even threaten the life of the patient.</li> <li><input type="checkbox"/> Neurosurgical treatment required</li> </ul>	RR

## Prevention

- Cook all fish and meat thoroughly
- Proper hygiene: handwashing, nail cutting, proper disposal of faeces

### 2.4.2 Echinococcosis (Hydatid Disease) ICD10CODE:B67

Tissue infestation by larvae of *Echinococcus granulosus*. It is transmitted through direct contact with dogs or by ingesting water and food contaminated by dog faeces.

## Clinical features

- Cough, chest pain
- Liver cysts may be asymptomatic but may also give abdominal pain, palpable mass and jaundice (if the bile duct is obstructed)
- Rupture of cysts may cause fever, urticaria, or anaphylactic reaction
- Pulmonary cysts can be seen on chest X-ray and may rupture to cause cough, chest pain and haemoptysis

## Differential diagnosis

- Amoebiasis, hepatoma
- Other causes of liver mass and obstructive jaundice
- Tuberculosis (TB)

## Investigations

- Skin test
- Ultrasound
- Chest X-ray: for pulmonary cysts
- Serological tests
- Needle aspiration under Ultrasound Sonography (US) or CT-scan guidance

## Management

TREATMENT	LOC
<p><b>Refer for specialist management</b></p> <ul style="list-style-type: none"><li><input type="checkbox"/> Surgical excision</li><li><input type="checkbox"/> Prior to surgery or in cases not amenable to surgery</li><li><input type="checkbox"/> Albendazole<ul style="list-style-type: none"><li>- Child &gt;2 years and adults: 7.5 mg/kg every 12 hours for 3-6 months</li></ul></li></ul>	RR

## Prevention

- Ⓐ Food hygiene
- Ⓐ Health education
- Ⓐ Proper disposal of faeces

### **2.4.3 Dracunculiasis (Guinea Worm) ICD10 CODE: B72**

An infestation of the subcutaneous and deeper tissue with the guinea worm. It is a notifiable disease.

#### Cause

- Ⓐ *Dracunculus medinensis*, transmitted to man by drinking water containing cyclops (waterflea or small crustacean) infected with larvae of the guinea worm

#### Clinical features

- Ⓐ Adult worm may be felt beneath the skin
- Ⓐ Local redness, tenderness, and blister (usually on the foot) at the point where the worm comes out of the skin to discharge larvae into the water
- Ⓐ There may be fever, nausea, vomiting, diarrhoea, dyspnoea, generalised urticaria, and eosinophilia before vesicle formation
- Ⓐ Complications may include cellulitis, septicaemia, and aseptic or pyogenic arthritis; tetanus may also occur

#### Differential diagnosis

- Ⓐ Cellulitis from any other causes
- Ⓐ Myositis

#### Investigations

- ¾ Recognition of the adult worm under the skin

**3/4** X-ray may show calcified worms

## Management

TREATMENT	LOC
<p>There is no known drug treatment for guinea worm</p> <p>All patients:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> To facilitate removal of the worm, slowly and carefully roll it onto a small stick over a period of days</li> <li><input type="checkbox"/> Dress the wound occlusively to prevent the worm passing ova into the water</li> <li><input type="checkbox"/> Give analgesics for as long as necessary</li> </ul> <p>If there is ulceration and secondary infection give:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Amoxicillin 500 mg every 8 hours for 5 days</li> </ul> <p><b>Child: 250 mg every 8 hours for 5 days</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Or cloxacillin 500 mg every 6 hours for 5 days</li> </ul>	HC2

## Prevention

- Filter or boil drinking water
- Infected persons should avoid all contact with sources of drinking water

### 2.4.4 Lymphatic Filariasis

ICD10 CODE: B74.9

Lymphatic filariasis is a disease caused by tissue dwelling nematode, transmitted by the Aedes aegypti mosquito bite

## Causes

- ⦿ Wuchereria bancrofti

## Clinical features

### Acute

- ⦿ Adenolymphangitis- inflammation of lymph nodes and lymphatic vessels (lower limbs, external genitalia, testis, epididymis or breast)

- With or without general signs like fever, nausea, vomiting
- Attacks resolve spontaneously in one week and recur regularly in patients with chronic disease

### **Chronic**

- Lymphoedema (chronic hard swelling) of limbs or external genitalia, hydrocele, chronic epididymo orchitis, initially reversible but progressively chronic and severe (elephantiasis)

### **Differential diagnosis**

- DVT
- Cellulitis

### **Investigations**

- Blood slide for Microfilaria (collect specimen between 9 pm and 3 am)

### **Management**

TREATMENT	LOC
<b>Case treatment</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Supportive treatment during an attack (bed rest, limb elevation, analgesics, cooling, hydration)</li> <li><input type="checkbox"/> Doxycycline 100 mg twice a day for 4-6 weeks (do not administer antiparasitic treatment during an acute attack)</li> </ul>	HC2
<b>Chronic case</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Supportive treatment: bandage during the day, elevation of affected limb at rest, analgesics and surgery (hydrocelectomy)</li> </ul>	
Large scale treatment/preventive chemotherapy Give annually to all population at risk, for 4-6 years <ul style="list-style-type: none"> <li><input type="checkbox"/> Ivermectin 150-200 mcg/kg plus albendazole 400 mg single dose</li> </ul>	

TREATMENT	LOC
<p><b>Not effective against adult worms</b></p> <p>Ivermectin is not recommended in children &lt; 5 years, pregnancy, or breast-feeding mothers</p> <p>No food or alcohol to be taken within 2 hours of a dose</p>	

## Prevention

- Use of treated mosquito nets
- Patient Education

## 2.4.5 Onchocerciasis (River Blindness) ICD10 CODE: B73.0

Chronic filarial disease present in areas around rivers

### Cause

- ⦿ Onchocerca volvulus, transmitted by a bite from a female black fly (*Simulium damnosum*, *S. naevi* and *S. oodi*, etc), which breeds in rapidly flowing and well-aerated water

### Clinical features

#### Skin

- ⦿ Onchocercoma: painless smooth subcutaneous nodules containing adult worms, adherent to underlying tissues, usually on body prominences like iliac crests, pelvic girdle, ribs, skull
- ⦿ Acute papular onchodermititis: Intense pruritic rash, oedema (due to microfilariae)
- ⦿ Late chronic skin lesions: dry thickened peeling skin (lizard skin), atrophy, patchy depigmentation Eye
- ⦿ Inflammation of the eye (of the cornea, uvea, retina) leading to visual disturbances and blindness

### Differential diagnosis

- ⦿ Other causes of skin depigmentation (e.g. yaws, burns, vitiligo)
- ⦿ Other causes of fibrous nodules in the skin (e.g. neurofibromatosis)

## Management

TREATMENT	LOC
<p><b>Case treatment (adult worms)</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Doxycycline 100 mg twice a day for 6 weeks followed by</li> <li><input type="checkbox"/> Ivermectin 150 micrograms/kg single dose</li> </ul> <p><b>Mass treatment</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Ivermectin 150 micrograms/kg once yearly for 10-14 years (see also dose table below)           <ul style="list-style-type: none"> <li>▪ Not recommended in children &lt;5 years, pregnancy, or breast-feeding mothers</li> <li>▪ No food or alcohol should be taken within 2 hours of a dose Ivermectin dose based on height</li> </ul> </li> </ul>	HC3

## Investigations

- Skin snip after sunshine to show microfilariae in fresh preparations
- High eosinophils at the blood slide/CBC
- Excision of nodules for adult worms
- Slit-lamp eye examination for microfilariae in the anterior chamber of eye

HEIGHT (CM)	DOSE
>158	12 mg
141–158	9 mg
120–140	6 mg
90–119	3 mg
< 90	Do not use

## Prevention

- Vector control
- Mass chemoprophylaxis

### 2.4.6 Schistosomiasis (Bilharziasis) ICD10 CODE: B65.1

Disease of the large intestine and the urinary tract due to infestation by a Schistosoma blood fluke.

#### Causes

- ⦿ The larvae form (cercariae) of Schistosoma penetrate the skin from contaminated water and they migrate to different parts of the body, usually the urinary tract (*Schistosoma haematobium*) and the gut (*S. mansoni*)

#### Clinical features

##### ***S. haematobium* (urinary tract)**

- ⦿ Painless blood stained urine at the end of urination - terminal haematuria
- ⦿ Frequent and painful micturition
- ⦿ In females: low abdominal pain and abnormal vaginal discharge
- ⦿ Late complications: fibrosis of bladder and ureters with increased UTI risks, hydronephrosis, infertility

##### ***S. mansoni* (gastrointestinal tract)**

- ⦿ Abdominal pain, frequent stool with blood-stained mucus, hepatomegaly
- ⦿ Chronic cases: hepatic fibrosis with cirrhosis and portal hypertension, haematemesis/melena are frequent

#### Differential diagnosis

- ⦿ Cancer of the bladder (*S. haematobium*)
- ⦿ Dysentery (*S. mansoni*)

## Investigations

- History of staying in an endemic area (exposure to water bodies)
- Urine examination (for *S. haematobium* ova)
- Stool examination (for *S. mansoni* ova)
- Rectal snip (for *S. mansoni*)

## Management

TREATMENT	LOC
<input type="checkbox"/> Praziquantel 40 mg/kg single dose	HC4
<input type="checkbox"/> Refer patient if they develop obstruction or bleeding	

## Prevention

- Avoid urinating or defecating in or near water
- Avoid washing or stepping in contaminated water
- Effective treatment of cases
- Clear bushes around landing sites

## 2.5 PROTOZOAL PARASITES

### 2.5.1 Leishmaniasis

ICD10 CODE: B55

A chronic systemic infectious disease transmitted by the bite of a sand fly.

#### Cause

- Flagellated protozoa *Leishmania* species

#### Clinical features

##### Visceral Leishmaniasis (Kala-azar)

- Chronic disease characterized by fever, hepatosplenomegaly, lymphadenopathy, anaemia, leucopenia, progressive emaciation and weakness
- Fever of gradual onset, irregular, with 2 daily peaks and alternating periods of apyrexia



- The disease progresses over several months and is fatal if not treated
- After recovery from Kala-azar, skin (cutaneous) leishmaniasis may develop

### Cutaneous and Mucosal Leishmaniasis (Oriental sore)

- Starts as papule, enlarges to become an indolent ulcer
- Secondary bacterial infection is common

### Differential diagnosis

- Other causes of chronic fever, e.g. brucellosis
- (For dermal leishmaniasis) Other causes of cutaneous lesions, e.g. leprosy

### Investigations

- ¾** Stained smears from bone marrow, spleen, liver, lymph nodes, or blood to demonstrate Leishman Donovan bodies
- ¾** Culture of the above materials to isolate the parasites
- ¾** Serological tests, e.g. indirect fluorescent antibodies
- ¾** Leishmanin skin test (negative in Kala-azar)

### Management

Refer all cases to regional referral hospital

TREATMENT	LOC
Cutaneous Leishmaniasis (all patients) <ul style="list-style-type: none"> <li><input type="checkbox"/> Frequently heals spontaneously but if severe or persistent, treat as for Visceral Leishmaniasis below</li> </ul>	RR
Visceral Leishmaniasis (Kala-azar): All patients <ul style="list-style-type: none"> <li><input type="checkbox"/> Combination: Sodium stibogluconate 20 mg /kg per day IM or IV for 17 days</li> <li><input type="checkbox"/> Plus paromomycin 15 mg/kg [11 mg base] per day IM for 17 days</li> </ul>	

TREATMENT	LOC
<p><input type="checkbox"/> Plus paromomycin 15 mg/kg [11 mg base] per day IM for 17 days</p> <p>Alternative first line treatment is:</p> <p><input type="checkbox"/> Sodium Stibogluconate 20 mg/kg per day for 30 days (in case paromomycin is contraindicated)</p> <p>In relapse or pregnancy</p> <p><input type="checkbox"/> Liposomal amphotericin B (e.g. AmBisome) 3 mg/kg per day for 10 days</p> <p>In HIV+ patients</p> <p><input type="checkbox"/> Liposomal amphotericin B 5 mg/kg per day for 8 days</p>	RR
Post Kala-Azar Dermal Leishmaniasis (PKDL)	RR
<p><input type="checkbox"/> Rare in Uganda</p> <p><input type="checkbox"/> Sodium Stibogluconate injection 20 mg/kg/day until clinical cure. Several weeks or even months of treatment are necessary</p>	
<p>Note</p> <p>Continue treatment until no parasites detected in 2 consecutive splenic aspirates taken 14 days apart</p> <p>Patients who relapse after a 1st course of treatment with Sodium stibogluconate should immediately be re- treated with Ambisome 3 mg/kg/day for 10 days</p>	

### Prevention

- Case detection and prompt treatment
- Residual insecticide spraying
- Elimination of breeding places

### 2.5.2 Malaria ICD10 CODE: B50

Malaria is an acute febrile illness caused by infection with Plasmodium parasites and is transmitted from person to person by an infected female anopheles mosquito.

## Cause

- There are five Plasmodium species of malaria parasites which infect humans namely: P. falciparum, P. vivax, P. ovale, P. malariae and P. knowlesi.
- P. falciparum is the most virulent and also the most common malaria parasite in Uganda.

## Clinical Features of Malaria

- It may be asymptomatic, mild illness (uncomplicated malaria) or severe illness (severe malaria)
- Intermittent fever is the most characteristic symptom of malaria. Three classical stages can be distinguished in a typical attack of malaria:
  - The cold stage: the patient feels cold and shivers
  - The hot stage: the patient feels hot
  - The sweating stage: associated with sweating and relief of symptoms.
- A complete physical examination has to be performed in any patient presenting with fever or history of fever.
- When people are frequently exposed to malaria, they develop partial immunity. In such people, the classical stages of a malaria attack above may not be observed.
- Also, in people who have had partial treatment with antimalarial medicines, these classical stages may not be pronounced.

### 2.5.2.1 Uncomplicated Malaria

ICD 10 CODE: B50.9

Common symptoms/signs of uncomplicated malaria

- Ⓐ Fever: above 37.5 C (taken from the axilla ) or history of fever.
- Ⓐ Loss of appetite, mild vomiting, diarrhoea
- Ⓐ Weakness, headache, joint and muscle pain
- Ⓐ Mild anaemia (mild pallor of palms and mucous membranes); occurs commonly in children.
- Ⓐ Mild dehydration

- Enlarged spleen (in acute malaria it may be minimally enlarged, soft and mildly tender)

### **2.5.2.2 Complicated/Severe Malaria ICD10 CODE: B50.0, B50.8**

It is an immediate threat to life and is therefore a medical emergency. Malaria is regarded as severe if there are asexual forms of *P. falciparum* in blood plus one or more of the following complications in the table below.

#### **Classical definition of severe malaria**

COMPLICATION	CRITERION FOR DIAGNOSIS
Defining manifestations	
Cerebral malaria	Deep coma (unable to localise a painful stimulus), Normal CSF, parasitaemia
Severe anaemia	Hb <5g/dl with parasitaemia (<7 g/dl in pregnancy)
Respiratory distress	Tachypnoea, nasal flaring and intercostal recession in a patient with parasitaemia
Hypoglycaemia	Blood glucose <40 mg/dl (2.2 mmol/L) with parasitaemia
Circulatory collapse	Clinical shock (systolic pressure <50 mmHg for children and <80mmHg for adults, with cold peripheries, clammy skin) with parasitaemia
Renal failure	Urine output < 12 ml/kg in 24 hours and plasma creatinine > 3.0 mg/dl, with parasitaemia
Spontaneous bleeding	Parasitaemia with unexplained spontaneous bleeding (haematemesis, melaena, or prolonged bleeding from nose, gum or venipuncture site)
Repeated convulsions	2 or more convulsions in 24 hours, with parasitaemia

COMPLICATION	CRITERION FOR DIAGNOSIS
Acidosis	Deep (acidotic) breathing and plasma bicarbonate <15 mmol/L, with parasitaemia
Haemoglobinuria	Parasitaemia, haemoglobin in urine (dark coloured urine but no RBC's)
Pulmonary Oedema	Deep breathing, fast breathing, laboured breathing (nasal flaring, intercostal recession and chest in-drawing), Cheyne stokes breathing
Supporting manifestations (some other signs in addition to above complications)	
Impaired consciousness	Parasitaemia with depressed level of consciousness but can localize a painful stimulus, or change of behavior, confusion, drowsiness
Jaundice	Parasitaemia with unexplained jaundice
Prostration	Unable to sit, in a child normally able to do so or unable to drink in one too young to sit
Severe vomiting	Vomiting everything, not able to drink or breastfeed
Severe dehydration	Sunken eyes, coated tongue, lethargy, inability to drink
Hyperpyrexia	Temperature >39.50 C, with parasitaemia
Hyper-parasitaemia	Parasite count > 250,000 / $\mu$ l, > 10%
Threatening abortion	Uterine contractions and vaginal bleeding

### Differential diagnosis

- Ⓐ Respiratory tract infection
- Ⓑ Urinary tract infection

- Meningitis, otitis media, tonsillitis
- Abscess, skin sepsis
- Measles or other infections with rashes (before rash comes)

## Investigations for Malaria

**Note:** All suspected malaria patients MUST be tested by blood slide or RDT before they are treated. NOT all fevers are malaria.

- RDT or thick blood slide for diagnosis of malaria
  - Random blood sugar and Hb level if clinically indicated
  - Lumbar puncture: in case of convulsion/coma and negative malaria test
- ¾** Thin film for parasite identification

### Note on RDTs

- RDTs (Rapid Diagnostic tests) detect malaria antigen (not whole parasites like the blood slide) and remain positive for 2 to 3 weeks after effective treatment
- RDT do not become negative if the patient has already taken antimalarials
- RDTs are reliable, quick and easily accessible tools for malaria diagnosis.

A blood slide for microscopy is specifically recommended over RDT in the following situations:

- ¾** Patients who have completed antimalarial treatment and symptoms persist
- ¾** Patients who completed treatment but comes back within 3 weeks
- ¾** RDT negative patients without any other evident cause of fever

## Management of Malaria

NATIONAL MALARIA TREATMENT POLICY	
Uncomplicated Malaria	
All patients: including children <4 months of age and pregnant women in 2nd and 3rd trimesters	First line medicine Artemether/Lumefantrine First line alternative Artesunate/Amodiaquine Second line medicine Dihydroartemisinin/ Piperaquine If not available: quinine tablets
Pregnant women 1st trimester	ACT currently used
Severe Malaria	
All age groups or patient categories	First line IV Artesunate First line alternative IV Quinine Or Artemether injection Pre-referral treatment Rectal artesunate for children 6 years and below only. IM Artesunate, IM artemether or quinine where the parental medicine is available
Intermittent preventive treatment in pregnancy	
Sulfadoxine/Pyrimethamine (SP) for IPT. Start at 13 weeks and give monthly till delivery	

### Treatment of uncomplicated malaria

The following tables contain dosages for medicines used in treatment of uncomplicated malaria.

### Dosage of artemether/lumefantrine 20/120 mg

WEIGHT (KG)	DAY 1	DAY 2	DAY 3
<14	1 tablet at 0 hours then 1 tablet at 8 hours	1 tab twice daily	1 tab twice daily
15–24	2 tablets at 0 hours, then, 2 tablets at 8 hours	2 tab twice daily	2 tab twice daily
25–34	3 tablets at 0 hours then 3 tablets at 8 hours	3 tab twice daily	3 tab twice daily
>35	4 tablets at 0 hours then 4 tablets at 8 hours	4 tab twice daily	4 tab twice daily

Note: Give day 2 and day 3 doses every 12 hours

### Dosage of artesunate (AS) tablets 50 mg once a day

AGE	DAY 1	DAY 2	DAY 3
0–11 months	25 mg (½ tab)	25 mg (½ tab)	25 mg (½ tab)
1–6 years	50 mg (1 tab)	50 mg (1 tab)	50 mg (1 tab)
7–13 years	100 mg (2 tabs)	100 mg (2 tabs)	100 mg (2 tabs)
>13 years	200 mg (4 tabs)	200 mg (4 tabs)	200 mg (4 tabs)

Note: Do not use artesunate alone, give with amodiaquine tabs

## Dosage of amodiaquine (AQ) 153 mg tablets

AGE	DAY 1	DAY 2	DAY 3
0–11 months	76 mg (1/2 tab)	76 mg (1/2 tab)	76 mg (1/2 tab)
1–6 years	153 mg (1 tab)	153 mg (1 tab)	153 mg (1 tab)
7–13 years	306 mg (2 tabs)	306 mg (2 tabs)	306 mg (2 tabs)
>13 years	612 mg (4 tabs)	612 mg (4 tabs)	612 mg (4 tabs)

Note: Do not use amodiaquine alone, use with artesunate tabs

## Dosage of dihydroartemisinin (DHA)/Piperaquine tablets (PPQ) (40/320 mg) tablets

WEIGHT (KG)	AGE	DAY 1	DAY 2	DAY 3
<5–9.9	<6 month– 1 year	0.5	0.5	0.5
10–20	2–7 years	1	1	1
20–40	8–13 years	2	2	2
40–60		3	3	3
60–80		4	4	4
>80		5	5	5

## Dosage for Pyronaridine Tetraphosphate / Artesunate

PYRONARIDINE TETRAPHOSPHATE / ARTESUNATE (PYRAMAX)				
Body Weight	Product Description	Day 1 Dose	Day 2 Dose	Day 3 Dose
5kg to < 8kg	Pyronaridine/Artesunate (60mg/20mg) Sackett granules for Oral Suspension	1 Sachet	1 Sachet	1 Sachet
8kg to < 15kg		2 Sachet	2 Sachet	2 Sachet
15kg to < 20kg		3 Sachet	3 Sachet	3 Sachet
20kg to < 24kg	Pyronaridine/Artesunate (180mg/60mg) Film Coated Tablet	1 Tablet	1 Tablet	1 Tablet
24kg to < 45kg		2 Tablet	2 Tablet	2 Tablet
45kg to < 65kg		3 Tablet	3 Tablet	3 Tablet
> = 65kg		4 Tablet	4 Tablet	4 Tablet

## Dosage of quinine tablets (1 quinine tab = 300 mg salt)

WEIGHT (KG)	AGE	DOSE (TO BE GIVEN EVERY 8 HOURS FOR 7 DAYS)
<5-10	3 months–1 year	75 mg ( tab)
10-18	1-5 years	150 mg (½ tab)
18-24	5-7 years	225 mg ( tab)
24-30	7-10 years	300 mg (1 tab)
30-40	10-13 years	375 mg (1 tab)
40-50	13-15 years	450 mg (1½ tab)
> 50	> 15 years	600 (2 tabs)

## Management of severe malaria

### General principles

Manage complications as recommended in the section below

Manage fluids very carefully. Adults with severe malaria are very vulnerable to fluid overload, while children are more likely to be dehydrated

Monitor vital signs carefully, including urine output.

Intravenous artesunate is the medicine of choice

- At a health unit without admission and IV drug administration facilities, give a pre-referral dose of rectal artesunate\* only recommended for children of 6 years and below( see dosing tables below) as soon as possible and refer for further management
- At a health unit with admission and IV drug administration facilities, treat with IV artesunate as in the table below
- If IV route is not possible, use IM route.
- If Iv artesunate is not available, use IM artemether (into the thigh, never in the buttock) or IV quinine

## Dosage of rectal artesunate

WEIGHT (KG)	AGE	ARTESUNATE DOSE (MG)	REGIMEN (SINGLE DOSE)
5kg to<14	4 months to <3years	100mg	1 supp (100 mg)
14-19	3 years to less than 6 years	100 mg	2 supp of 100mg

### Note

- In the event that an artesunate suppository is expelled from the rectum within 30 minutes of insertion, insert a repeat dose.
- Hold the buttocks (especially in young children) together for 10 minutes to ensure retention of rectal dose

## Dosage of intravenous artesunate for severe malaria

### Artesunate IV

DOSE	TIME	QUANTITY
First dose: on admission Loading dose	At 0 hours	Child less than 20 kg: 3 mg/kg Adults and child >20kg: 2.4 mg/kg
Second dose	At 12 hours	
Third dose	At 24 hours	

Then once a day until patient is able to tolerate oral medication, then give a full course of oral ACT.\* currently all severe malaria cases to be discharged on DP. Then reviewed every month for 3 months and given monthly DP for post severe malaria chemoprevention.

### Preparation of IV or IM artesunate

- IV artesunate is usually dispensed in powder vial of 30mg, 60mg,120mg, pre-packed with sodium bicarbonate solution 1 ml

## Preparation of IV or IM artesunate

- Ⓐ IV artesunate is usually dispensed in powder vial of 30mg, 60mg, 120mg, pre-packed with sodium bicarbonate solution 1 ml
- Ⓑ Calculate the dose in mg according to the weight and the number of vials needed
- Ⓒ Reconstitute each vial separately, and use within 1 hour
- Ⓓ Reconstitution: inject all the content of the bicarbonate ampoule (1 ml) in the artesunate vial. Shake gently till solution become clear (discard if not clear after 2 minutes)

### IV use

- Ⓐ Dilution: dilute solution by adding 5 ml of sodium chloride 0.9% (normal saline) or Dextrose 5%, obtaining a concentration of 10 mg/ml
- Ⓑ Calculate the required volume and withdraw
- Ⓒ Give by IV injection slowly over 5 minutes

### IM use

- Ⓐ Dilution: dilute solution by adding 2 ml of sodium chloride 0.9%, obtaining a concentration of 20 mg/ml
- Ⓑ Inject into the upper outer anterior thigh, NEVER in the buttock

Do not use water for injection for dilution

### Dosage of IM artemether

#### Artemether

DOSE	TIME	QUANTITY
First dose: on admission Loading dose	At 0 hours	3.2 mg/kg
Second dose	At 24 hours	1.6 mg/kg
Third dose	At 48 hours	1.6 mg/kg

Then once a day until patient is able to tolerate oral medication, then give a full course of oral ACT. If after 48hours (day 3) the patient is still unstable and parasites density is still almost the same as at day 0, switch to IV quinine for 3 to 4 doses then discharge on ACT (DP).

### Dosage of quinine IV

<b>Dose</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> 10 mg/kg in dextrose 5% every 8 hours till patient is able to tolerate oral medication</li> <li><input type="checkbox"/> Then complete with a full dose of ACT (3 days) or quinine tablets to complete 7 days</li> </ul>
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### 2.5.3.3 Management of Complications of Severe Malaria

#### Dosage of IM artemether

COMPLICATION	TREATMENT
Hyperpyrexia	Give paracetamol 1 g every 6 hours Child: 10 mg/kg + tepid sponging + fanning
Convulsions	<p>Give diazepam 0.2 mg/kg (max 10 mg) slow IV or (in adults) IM or 0.5 mg/kg rectally</p> <p><b>If convulsions still persist:</b></p> <p>Give phenobarbital 200 mg IM/IV</p> <p>Child: 10-15 mg/kg loading dose then 2.5 mg/kg once or twice daily if still necessary or phenytoin 15 mg/kg loading dose</p>
Hypoglycaemia	<p>Adult: dextrose 25% 2 ml/kg by slow IV bolus over 3-5 min (to prepare, take dextrose 50% 1 ml/kg and dilute with an equal volume of water for injections)</p> <p>Child: dextrose 10% 5 ml/kg by slow IV bolus over 5-7 min (to prepare, take 1 ml/kg of dextrose 50% and dilute with 4 ml/kg water for injection)</p> <p><b>DO NOT GIVE UNDILUTED 50% dextrose</b></p> <p>Monitor blood glucose frequently</p> <p>Ensure patient is feeding</p>
Acidosis	<p>Correct fluid &amp; electrolyte balance</p> <p>If there is severe acidosis without sodium depletion:</p>

## Dosage of IM artemether

COMPLICATION	TREATMENT
	<ul style="list-style-type: none"> <li>- Give sodium bicarbonate 8.4% infusion 50 ml IV</li> <li>- Monitor plasma pH</li> </ul>
Severe anaemia	<ul style="list-style-type: none"> <li><input type="checkbox"/> Do blood grouping and cross-matching</li> <li><input type="checkbox"/> Transfuse patient with packed cells 10-15 ml/kg or whole blood 20 ml/kg especially if the anaemia is also causing heart failure</li> <li><input type="checkbox"/> Repeat Hb before discharge and preferably 28 days after discharge</li> </ul>
Pulmonary Oedema	<p>Regulate the IV infusion (do not overload with IV fluids)</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Prop up the patient</li> <li><input type="checkbox"/> Give oxygen</li> <li><input type="checkbox"/> Give furosemide 1-2 mg/kg</li> </ul>
Acute Renal Failure	<ul style="list-style-type: none"> <li><input type="checkbox"/> Urine output: &lt;17 ml/hour for adult or &lt;0.3 ml/kg/hour for a child</li> <li><input type="checkbox"/> Check to ensure that the cause of oliguria is not dehydration or shock</li> <li><input type="checkbox"/> If due to acute renal failure: Give a challenge dose of furosemide 40 mg IM or slow IV (child: 1 mg/kg)</li> </ul> <p><b>If this fails:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Refer for peritoneal dialysis or haemodialysis</li> </ul>
Shock	<ul style="list-style-type: none"> <li><input type="checkbox"/> If systolic BP &lt;80 mmHg (adult) or &lt;50 mmHg (child) or if peripheral pulse absent and capillary refill is slow (&gt;2 seconds)           <ul style="list-style-type: none"> <li>- Raise the foot of the bed</li> <li>- Give sodium chloride 0.9% by fast IV infusion bolus 20 ml/kg in 15 min</li> <li>- Review fluid balance and urinary outputs</li> <li>- Look for evidence of haemorrhage or septicaemia and treat accordingly</li> </ul> </li> </ul>

COMPLICATION	TREATMENT
Haemoglo- biniuria (intravascular haemolysis)	<input type="checkbox"/> Rehydrate the patient <input type="checkbox"/> Assess for anaemia and transfuse if necessary
Dehydration	<input type="checkbox"/> Rehydrate using ORS or IV RL or NS (see rehydration, section 1.1.3) <input type="checkbox"/> Over-enthusiastic IV infusion may harm the patient and lead to fluid overload and pulmonary oedema
Bleeding	<input type="checkbox"/> Transfuse patient with whole fresh blood to provide lacking clotting factors
Coma	<input type="checkbox"/> Check and treat for hypoglycaemia: if not responding within 20 min, consider another cause <input type="checkbox"/> Provide intensive nursing care with: <ul style="list-style-type: none"> <li>- IV drip (for rehydration and IV medication)</li> <li>- NGT (for feeding and oral medication)</li> <li>- Urethral catheter (to monitor urine output)</li> <li>- Turning of patient frequently to avoid bed sores</li> </ul>

### Criteria for referral to regional/tertiary hospital

- Ⓐ Persistent renal failure needing dialysis
- Ⓐ Any complication that cannot be managed locally

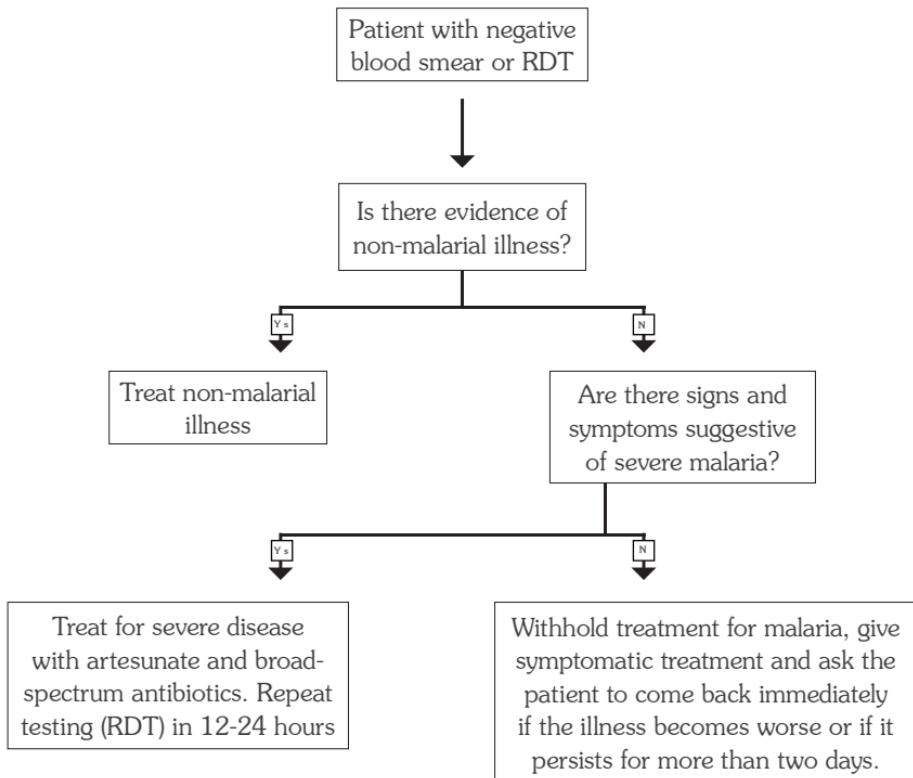
### Management of RDT/Blood Smear Negative Patients

Patients who have a negative malaria test (most likely, if RDT is used) do not have malaria so other causes of fever have to be investigated for appropriate treatment.

- ⑤ Re-assess patient history, clinical signs and laboratory results. Consider other frequent causes of fever such as:
  - If running nose, sore throat and cough: viral upper respiratory infection
  - If swollen tonsils with exudate on it: tonsilitis
  - If ear pain and discharge: otitis
  - If cough, rapid breathing and difficulty in breathing: pneumonia
  - If urinary symptoms: urinary tract infection
  - If vomiting, diarrhoea and abdominal pain: gastro-enteritis
  - If skin rash: measles or other viral rash
- ⑥ If malaria is still suspected, investigate according to the flowchart below
- If signs/symptoms of severe malaria, RDT and blood slide negative but no other diagnosis is found, consider treating for malaria anyway but repeat RDTs after 24 hours to confirm. Also add a broad spectrum antibiotic
- If RDT and blood slide negative, no signs of other illness and no signs of severe sickness (patient has no danger signs) treat symptomatically with antipyretics, advise patient to return immediately if condition worsens or in 2 days if fever persists.

**Possible reasons for false negative tests (test is negative but patient has malaria):**

- ⑦ Low peripheral parasitaemia
- ⑦ Technical error in performing the test or test reagents that are out of date
- ⑦ Sequestration of parasites in the internal organs
- ⑦ Having already taken antimalarial drugs, inadequate or incomplete dose: this affects only microscopy, while RDT remains positive even if the patient has already taken an antimalarial using prophylactic treatment for malaria



#### 2.5.3.4 Malaria Prophylaxis

Not recommended for all those living in a highly endemic area like Uganda. However, it is recommended for certain high-risk groups but is not 100% effective

PATIENT GROUP	PROPHYLAXIS
Pregnancy In endemic areas, pregnant women carry malaria parasites in their blood or placenta, which is harmful to the health of both mother and foetus	<ul style="list-style-type: none"> <li><input checked="" type="radio"/> Give intermittent preventive treatment (IPT) to ensure the well-being of mother and foetus</li> <li><input type="checkbox"/> SP single dose (3 tabs) given at 13 weeks and continued monthly until delivery</li> <li><input type="checkbox"/> Ensure doses are taken under supervision by the health provider as directly observed therapy (DOT)</li> <li><input type="checkbox"/> Record doses on the patient's card and treatment register and summarise further in the delivery book and monthly returns</li> <li><input type="checkbox"/> Do not give SP in HIV patients on cotrimoxazole</li> </ul>
Sickle cell disease	<ul style="list-style-type: none"> <li><input checked="" type="radio"/> Sulphadoxine-pyrimethamine (SP) - see section 11.1.3</li> </ul> <p>Chloroquine is the alternative:</p> <p>Adult: 300 mg base weekly</p> <p>Child: 5 mg (base)/kg weekly</p>
People living with HIV	<ul style="list-style-type: none"> <li><input checked="" type="radio"/> Cotrimoxazole daily as per national guidelines</li> </ul>
Non-immune visitors/tourists	<ul style="list-style-type: none"> <li><input checked="" type="radio"/> Mefloquine</li> </ul> <p>Adult: 250 mg once weekly</p> <p>Child: 5 mg/kg once weekly</p>

### 2.5.3.5 Malaria Prevention and Control

#### Give effective treatment and prophylaxis

- Eliminate parasites from the human population by early diagnosis and effective treatment
- Protect vulnerable groups with chemoprophylaxis
- Give IPT to all pregnant women



### Reduce human-mosquito contact

- Use insecticide-treated materials (e.g. bed nets)
- Destroy adult mosquitoes by indoor residual spraying of dwellings with insecticide or use of knock-down sprays
- Screen houses
- Carefully select house sites avoiding mosquito-infested areas
- Wear clothes which cover the arms and legs and use repellent mosquito coils and creams/sprays on the skin when sitting outdoors at night

### Control mosquito breeding sites

- Eliminate collections of stagnant water where mosquitoes breed, e.g. in empty cans/ containers, potholes, old car tyres, plastic bags, and footprints by disposal, draining, or covering with soil or sand
- Destroy mosquito larvae by dosing stagnant water bodies with larvicides or with biological methods (e.g. larvae-eating fish)

Give public health education on the above measures include the need for self testing (self-care) using RDT before any medication.

### 2.5.4 Human African Trypanosomiasis (Sleeping Sickness)

ICD10 CODE: B56

A disease caused by trypanosomes (a protozoa) and transmitted to humans by several species of tsetse fly

#### Cause

- Trypanosoma rhodesiense (mostly in the Central and Eastern regions of Uganda)
- Trypanosoma gambiense (mostly in West Nile region)
- Clinical features
- May be history of tsetse fly bite and swelling at site of bite after 7-14 days (more often in T. rhodesiense, rarely in T. Gambiense)

## T. Rhodesiense

- Incubation is 2-3 weeks
- Early stage (haemolympathic stage): headache not responding to common analgesics, fever, generalised lymphadenopathy, joint pains
- Late stage (meningoencephalitis stage): after some weeks, neurological and psychiatric symptoms like apathy, day sleepiness, paralysis, seizures
- If not treated: cachexia, lethargy, coma and death within 3-6 months

## T. gambiense

- Similar to the rhodesiense but less acute and with slower progression
- Incubation can last several years

## Differential diagnosis

- Malaria, meningitis
- TB, HIV/AIDS

## Investigations

- Blood: Slides for trypanosomes
- CSF: For trypanosomes, lymphocyte count
- Aspirate from chancre/lymph node: for trypanosomes

## Management

This is based on the findings of the CSF analysis, determining the stage of disease. To determine the medicine of choice, the disease is divided into two stages: early and late stage

STAGE	FEATURES
Early (first) stage	<ul style="list-style-type: none"> <li>Ⓐ CSF is normal</li> <li>Ⓐ Lymphocytes &lt;5 cells/mm<sup>3</sup></li> <li>Ⓐ Total protein &lt;37 mg/dl (by dye-binding protein assay) or &lt; 25 mg/dl (by Double Standard &amp; Centrifuge Method)</li> <li>Ⓐ Absence of trypanosomes (by Double Standard and Centrifuge Method)</li> </ul>
Late (second) stage	<ul style="list-style-type: none"> <li>Ⓐ Lymphocytes &gt; 5 cell/ mm<sup>3</sup> And/ or</li> <li>Ⓐ Presence of trypanosomes</li> </ul>

Patient with suspected or diagnosed sleeping sickness should be managed at referral facilities.

TREATMENT	LOC
<b>Early (first) stage</b> <b>T. rhodesiense sleeping sickness</b> For both children and adults <input checked="" type="checkbox"/> Suramin IV <ul style="list-style-type: none"> <li>- A test dose of 5 mg/kg of body weight should first be administered to test for anaphylactic reaction</li> <li>- Followed by five injections of 20 mg/kg every 5 days interval</li> </ul> Day 0: 5 mg/kg body weight Day 3: 20 mg/kg body weight Day 8: 20 mg/kg body weight Day 13: 20 mg/kg body weight Day 18: 20 mg/kg body weight Day 23: 20 mg/kg body weight If anaphylaxis: do not administer	RR

TREATMENT	LOC
<p><b>T. gambiense sleeping sickness</b></p> <p>For both children and adults</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Pentamidine IM 4 mg/kg daily for 7 days           <ul style="list-style-type: none"> <li>- Give food 1 hour before to prevent hypoglycaemia</li> <li>- The patient should be in a supine position during administration and 1 hour after to prevent hypotension</li> </ul> </li> </ul>	
<p><b>Late (second) stage</b></p> <p><b>T. rhodesiense sleeping sickness</b></p> <ul style="list-style-type: none"> <li>- For both children and adults</li> <li><input checked="" type="checkbox"/> IV Melarsoprol 2.2 mg/kg body weight daily for 10 days           <ul style="list-style-type: none"> <li>- T.gambiense sleeping sickness Children 12 years and &lt;35 kg</li> <li>- f Eflornithine IV 150 mg/kg 6 hourly for 14 days (total dose of 600 mg/kg/day. Dilute 150 mg/kg dose of eflornithine into the 100 ml of distilled water. Administer the infusion over at least 2 hours)</li> <li>- Children &gt;12 years up to 15 years</li> </ul> </li> <li><input checked="" type="checkbox"/> Eflornithine IV 100 mg/kg 6 hourly for 14 days (total dose of 400 mg/kg per day). Dilute the eflornithine dose of 100 mg/kg into the 100 ml of distilled water. Administer the infusion over at least 2 hours (rate 20 drops/minute)</li> </ul>	RR

#### Adults >15 years

- Nifurtimox/Eflornithine combination therapy (NECT)
- Nifurtimox: 5 mg/kg every 8 hours orally for 10 days (15 mg/kg/day)
  - Plus Eflornithine 200 mg/kg 12 hourly for 7 days (400 mg/kg/day). Dilute Eflornithine dose of 200 mg/kg into 250 ml of distilled water and administer the infusion over at least 2 hours (50 drops/minute)
  - Infusions are given slowly to prevent convulsions

### Relapses

- IV melarsoprol 2.2 mg/kg once daily for 10 days

### Note

- Ⓐ Corticosteroids: Should be given to patients with late trypanosomiasis on melarsoprol who may have hypoadrenalinism - the steroids may also reduce any drug reactions
- Ⓐ Do not give hydrocortisone after day 24, even though the melarsoprol treatment is not yet complete
- Ⓐ If prednisolone is used instead of hydrocortisone, the anti-inflammatory action is similar but the correction of the hypoadrenalinism will be much less marked
- Ⓐ Suramin: Do not use this medicine for early or late stage *T. gambiense* treatment in onchocerciasis-endemic areas as it may cause blindness in any onchocerciasis-infected patients by killing the filariae in the eye

### Prevention

- Ⓐ Trapping of tsetse flies
- Ⓐ Clearing of bushes around homes and paths
- Ⓐ Early detection and treatment of cases

# 3 HIV/AIDS and Sexually Transmitted Infections

Always refer to the latest Ministry of Health PMTCT, ART, and STI Guidelines for the management of HIV and Sexually Transmitted Infections. This section has been adapted from the “current Consolidated guidelines for prevention and treatment of HIV in Uganda”.

## 3.1 HIV INFECTION AND ACQUIRED IMMUNODEFICIENCY SYNDROME (AIDS) ICD 10 CODE: B20

Acquired Immunodeficiency Syndrome (AIDS) is a condition of reduced immunity as a result of infection with the Human Immunodeficiency Virus (HIV). HIV should be confirmed with an HIV test.

### Test and Treat policy

Uganda has adopted the “Test and Treat Policy”, which involves providing lifelong antiretroviral therapy (ART) to ALL people living with HIV irrespective of CD4 count or clinical staging.

### Causes

- ⦿ Human Immunodeficiency Virus

### Modes of transmission

- ⦿ Sexual intercourse with an HIV-infected person
- ⦿ Transfusion with HIV-infected blood
- ⦿ Mother-To-Child Transmission during pregnancy, delivery, or through breastfeeding



- ④ HIV-contaminated sharp instruments, e.g., dental and surgical equipment, needles, scalpels, razors, hair shaving equipment, nail cutters, and other sharp objects
- ④ Exposure to HIV-infected materials through an open wound or cut

### Epidemiological risk factors for HIV

- ④ Present or past high-risk behaviour (multiple sexual partners)
- ④ Loss of a spouse or partner from HIV disease
- ④ Having sexually transmitted infections, especially Herpes simplex virus type 2
- ④ Being an uncircumcised man
- ④ Being in an HIV-discordant sexual relationship or marriage
- ④ History of blood transfusion between 1975 and 1986

#### 3.1.1 Clinical Features of HIV

The WHO Clinical Staging of HIV for adults and children in the tables below shows the typical clinical features of HIV infection. The staging is based on demonstration of one or more opportunistic infections or key findings and correlates with disease progression and prognosis. Clinical staging should be performed at HIV diagnosis, on entry into HIV care, at ART initiation and at every visit hereafter to help guide patient care and monitor disease progress.

## WHO Staging for HIV Infection and Disease in Adults and Adolescents

### Clinical Stage I: Asymptomatic

1. Asymptomatic
2. Persistent generalised lymphadenopathy

Performance Scale 1: asymptomatic, normal activity

### Clinical Stage II: Mild

1. Moderate unexplained weight loss (< 10% of presumed or measured body weight)
2. Minor mucocutaneous manifestations (seborrheic dermatitis, popular pruritic eruptions, fungal nail infections, recurrent oral ulcerations, angular cheilitis)
3. Herpes zoster
4. Recurrent upper respiratory tract infections (e.g., bacterial sinusitis, tonsillitis, otitis media, pharyngitis)

And/or performance scale 2: symptomatic but normal activity

### Clinical Stage III: Advanced

1. Unexplained severe weight loss (more than 10% of presumed or measured body weight)
2. Unexplained chronic diarrhoea for longer than one month
3. Unexplained persistent fever (intermittent or constant for longer than one month)
4. Persistent oral candidiasis
5. Oral hairy leukoplakia
6. Pulmonary tuberculosis
7. Severe bacterial infections (such as pneumonia, pyomyositis, empyema, bone or joint infection, bacteraemia, meningitis)

8. Acute necrotizing ulcerative stomatitis, gingivitis or periodontitis
9. Unexplained anaemia (below 8 g/dl), neutropenia (below 0.5 10<sup>9</sup>/per litre), or chronic thrombocytopenia (below 50 10<sup>9</sup> per litre)

And/or performance scale 3: Bed ridden for less than 50% of the day during the last month

#### Clinical Stage IV: Severe

1. HIV wasting syndrome
2. Pneumocystis jirovecii pneumonia (PCP)
3. Recurrent severe bacterial pneumonia (> 2 episodes within 1 year)
4. Toxoplasmosis of the brain
5. Cryptosporidiosis with diarrhoea for longer than 1 month
6. Chronic isosporiasis
7. Extrapulmonary cryptococcosis including meningitis
8. Cytomegalovirus infection (retinitis or infection of other organs other than liver, spleen or lymph nodes)
9. Chronic oro-labial, genital or ano-rectal herpes simplex virus (HSV) infection for >1 month
10. Progressive multifocal leukoencephalopathy (PML)
11. Any disseminated endemic mycosis such as histoplasmosis, coccidioidomycosis
12. Candidiasis of the oesophagus, trachea, bronchi, or lungs
13. Disseminated non-tuberculous mycobacterial infection
14. Recurrent septicaemia (including non-typhoid salmonella)
15. Extrapulmonary tuberculosis
16. Lymphoma (cerebral or B-cell non-Hodgkin)
17. Invasive cancer of the cervix

18. Kaposi sarcoma
19. HIV encephalopathy
20. Atypical disseminated leishmaniasis
21. Symptomatic HIV-associated nephropathy or symptomatic HIV associated cardiomyopathy and/or performance scale 4: Bed-ridden for more than 50% of the day during the last month

### Differential diagnosis

- TB
- Untreated diabetes mellitus
- Malnutrition
- Cancer
- Other chronic diseases

#### **3.1.2 Diagnosis and Investigations of HIV**

HIV testing is the point of entry into comprehensive care HIV services. The aim of HIV testing services (HTS) is to promptly identify HIV status to ensure early linkage to prevention, treatment, and support services. Early diagnosis is fundamental for early treatment, good prognosis and reduction in transmission. HTS should be availed to all persons at risk of HIV infection using cost-effective and high-impact approaches. HTS should be differentiated to subpopulations and geographical locations because less than 20% of PLHIV aged 15 years and above do not know their status. Uganda is currently implementing targeted HIV testing to optimize HIV case identification and linkage to care. People at high risk of HIV acquisition include: being in a sexual relationship with multiple concurrent partners; belonging to a key, vulnerable or priority population (e.g., children, adolescent girls and young women, pregnant or breastfeeding women); being a sexual contact to an index client; being a biological child to an HIV positive client; not knowing your partner's HIV status; or being in a serodiscordant relationship.



The following approaches are utilized in targeted HIV testing.

1. Screening for HIV testing eligibility for children, adolescents and adults
2. Index client testing (ICT), including Assisted Partner notification (APN) and testing for biological children/ Know Your Child Status (KYCS).
3. Social Network Strategy (SNS)
4. HIV Self-Testing (HIVST)

Pre and post counselling and consent are needed except in the following situations:

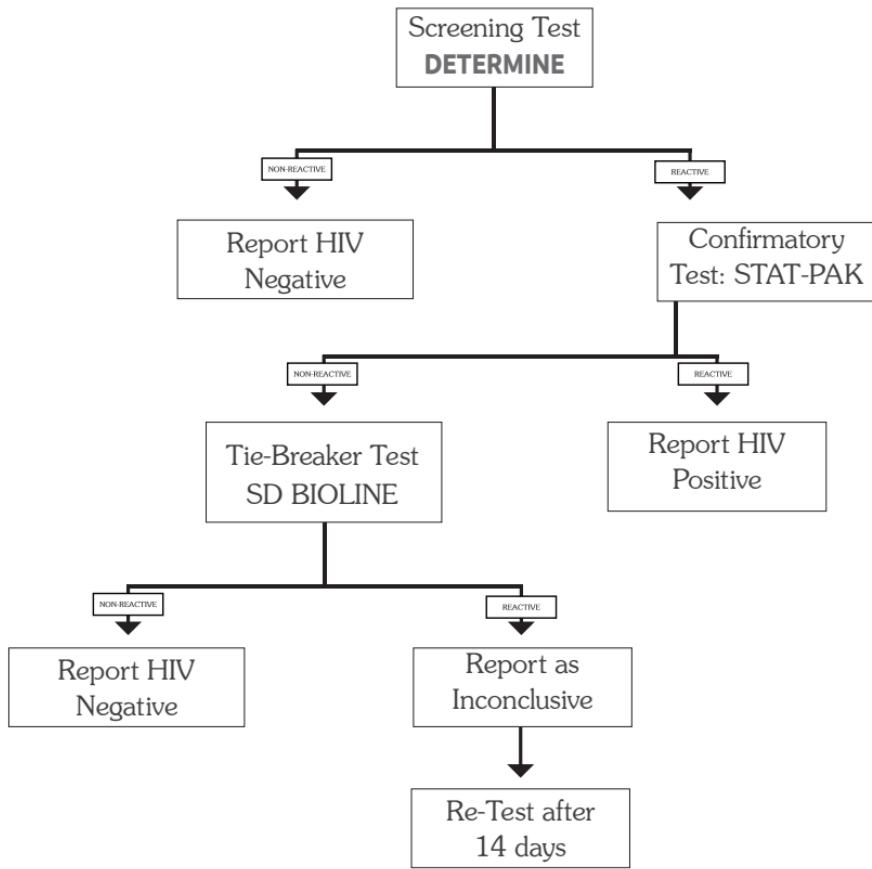
- Diagnostic testing: test carried out on very sick, unconscious, symptomatic or mentally ill by attending health care team for the purpose of better patient management
- Routine testing: for individuals likely to pose a risk of HIV infection to others e.g. pregnant and breastfeeding mothers, sexual offenders and survivors, blood or body tissue or organ donors. Individuals tested using this approach must be given an opportunity to know their status

If a patient is positive, he/she must be IMMEDIATELY connected to HIV care services.

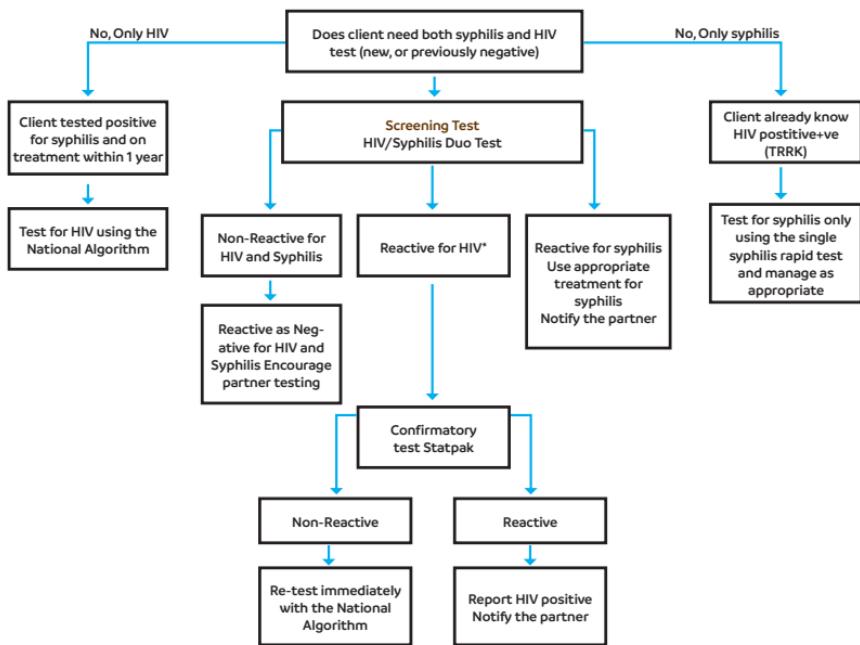
In adults and children >18 months, testing is based on serological (antibody) testing.

Due to the window period between infection and production of detectable levels of antibodies, patients who are negative should be re-tested after three months if they had a possible exposure in the 3 months before the test.

## Serial HIV Testing Algorithm for testing persons above 18 months of age in Uganda.



## HIV Testing Algorithm using the HIV-Syphilis Duo Kit in MCH Settings



Serological testing is available from HC2 level.

In children below 18 months, testing is virological, that is based on direct detection of viral DNA (DNA-PCR).

Virological testing (DNA-PCR and viral load) is done on DBS (dried blood spots) samples which can be collected from HC2 and are sent to a central national laboratory through the hub system.

## HIV testing in children less than 18 months

The recommended test for children <18 months is virological (DNA-PCR) testing, since antibody tests will detect antibodies passed to the child from the mother (so the test can give a false positive).

If the mother is HIV negative:

f The child is classified as HIV negative

If the mother is positive:

- Do DNA PCR at 6 weeks of age or at an earlier opportunity thereafter
- Start cotrimoxazole prophylaxis and Niverapine syrup till HIV status is confirmed for the child
- If PCR is positive, enroll child for ART
- If PCR is negative and child never breastfed the child is negative.
- Stop cotrimoxazole and Niverapine.
- Follow up every 3 months and do HIV rapid test (serological) at 18 months.
- If PCR is negative BUT child is breastfeeding/has breastfed in the last 6 weeks, re-check PCR 6 weeks after cessation of breastfeeding.

If mother's status is unknown:

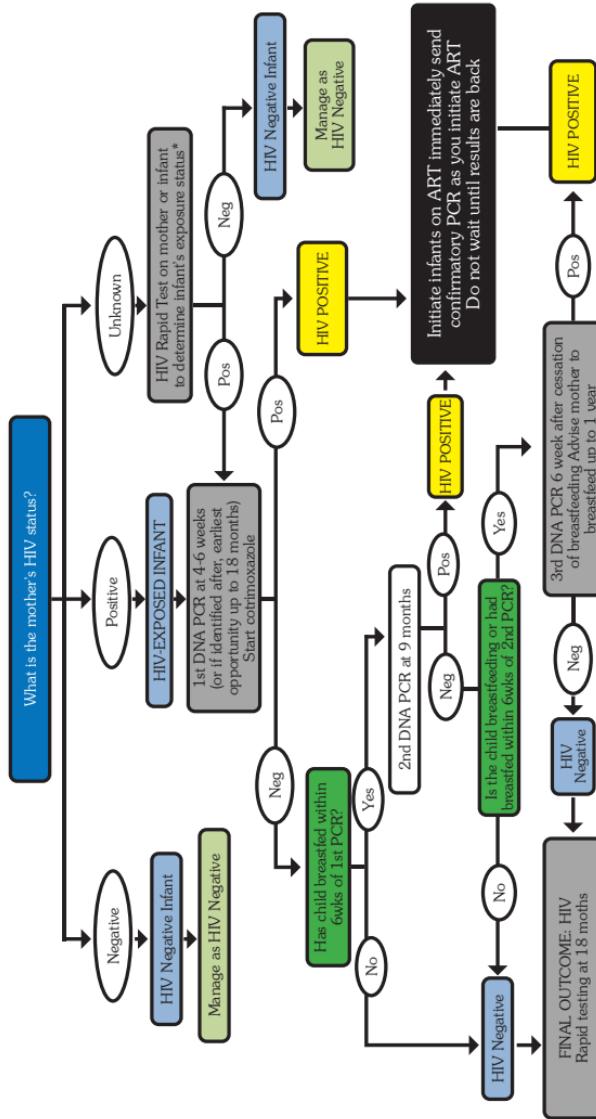
- Test the mother and continue management according to the result

**If mother unavailable:**

- Perform rapid antibody testing on the child. The result will give indication on the mother's status:
  - If the test is negative: child negative
  - If the test is positive, follow algorithm for managing a child from a HIV positive mother.

TEST	DESCRIPTION	LOC
CD4	It measures the level of CD4 T lymphocytes, a subtype white blood cell. It reflects the level of compromise of the immune system. It is used for initial assessment pre ART and for monitoring of ART effect.	HC2
Viral Load	It measures the quantity of virus in the blood. It is used to monitor the effect of ARVs. It is currently done by DBS (Dried Blood Spot)	HC2
Genotype Testing	HIV genotypic resistance test is a qualitative test that detects mutations associated with ARV drug resistance. The test evaluates if the HIV strain infecting the individual has developed resistance to one or more ARV drugs. This is useful in identifying a combination of ARVs to which the HIV strain is susceptible	

## HIV-Exposed Infants Testing Algorithm



- If an infant with a Negative previous PCR is symptomatic while still breastfeeding, take off a PCR sample at that point in time. If negative, another PCR sample must be taken according to the algorithm either 9 months or 6 weeks after breastfeeding
- If mother's status cannot be ascertained, may use rapid test in babies to determine HIV exposure status, should perform DNA PCR for baby who is symptomatic, malnourished or has TB as routine
- If breastfeeding is stopped before 9 months then a final DNA PCR can be done at any point 6 weeks after cessation of breastfeeding
- For infants whose mothers are failing on any regimen: take off 2 DBS at the time of confirming the positive test – one for confirmation and one for HIVDR testing

### 3.1.3 Measures before ARV Treatment

Even without the use of specific ARV treatment, there are many ways in which good HIV management can help patients:

TREATMENT	LOC
<p>Prophylaxis against opportunistic infections</p> <p><b>The following groups have been prioritized for cotrimoxazole preventive therapy:</b></p> <ul style="list-style-type: none"><li>• All PLHIV newly initiating on ART.</li><li>• Those having a current WHO stage 3 or 4 event or other symptoms of advanced disease.</li><li>• Pregnant and breast-feeding women.</li></ul> <p>Note: Additional intermittent preventive treatment for malaria using Sulfadoxine-Pyrimethamine (SP) is not required for pregnant women on CPT.</p> <ul style="list-style-type: none"><li>• Children and adolescents aged 0-15 years.</li></ul> <p>Patients suspected to have treatment failure</p> <p><input type="checkbox"/> Cotrimoxazole 960 mg once daily for adults and children &gt;30 kg Child &lt;5 kg: 120 mg once daily Child 5-14.9 kg: 240 mg once daily Child 15-29.9 kg: 480 mg once daily</p> <p><input type="checkbox"/> Contraindications: known allergies, severe anaemia and neutropenia</p> <p><b>Guidance for when to stop CPT in stable PLHIV</b></p> <ul style="list-style-type: none"><li>• Patient should be older than 15 years of age.</li><li>• Patient should not be pregnant.</li></ul>	HC2

TREATMENT	LOC
<ul style="list-style-type: none"> <li>Patient should have been on ART for at least one year.</li> <li>Patient's last VL should be suppressed.</li> <li>Patient should not have a current WHO stage 3 or 4 event or other symptoms of advanced HIV disease at the time of stopping CPT.</li> </ul> <p><b>When to re-start CPT in PLHIV</b> CPT can be restarted in the following scenarios:</p> <ul style="list-style-type: none"> <li>New pregnancy</li> <li>Suspected treatment failure</li> <li>New Treatment WHO stage 3 or 4 condition</li> </ul> <p>Alternative: dapsone Adults and child &gt;12 years: dapsone 100 mg daily Children below 12 years: dapsone 2 mg/kg daily</p>	HC2
<p><b>TPT (TB Preventive treatment)</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> such as; isoniazid + rifapentine(3HP) weekly for 3 months in all adults, adolescents and children &gt;12 months living with HIV and in whom TB disease has been excluded (other medications for TPT refer to the current HIV/TB guidelines)</li> <li><input type="checkbox"/> If child &lt;12 months, give only if history of contact with TB case and no active disease (one-month daily rifapentine and isoniazid (1HP).)</li> </ul> <p>- Dose: (see section 5.3.2.1 )</p>	HC3
<p><b>Prompt and appropriate medical care</b> By treating opportunistic infections as they occur By treating symptoms, such as pain, diarrhoea, and skin problems, as they develop Going for treatment promptly if unwell</p>	HC3

## Positive health, dignity, and prevention intervention

Intervention	Description
<b>Preventing HIV transmission</b>	PLHIV should be encouraged to adopt safer sexual practices including abstinence, correct and consistent condom use. Condom use prevents HIV transmission, reduces risk of other STIs, and prevents unintended pregnancies.
<b>Disclosure and partner testing</b>	PLHIV should actively explore ways of disclosing their HIV status to sexual partners, family members and significant others. Offer provider- and/or counselor-mediated or supported disclosure as options for those who do not feel comfortable disclosing on their own.
<b>Family planning</b>	Encourage PLHIV to discuss their reproductive choices and support them to adopt those which do not compromise their health. For women who choose to conceive, link them to eMTCT services.
<b>Alcohol and other risk reduction</b>	Educate on risks of alcohol abuse leading to poor treatment adherence resulting in disease progression, and the likelihood of engaging in risky sexual behaviours, placing themselves at increased risk for acquiring STIs and placing their negative partners at risk for infection.

### 3.1.4 General Principles of Antiretroviral Treatment (ART)

#### Assessment of patient's history

- Level of understanding of HIV/AIDS
- Length of time since the diagnosis of HIV infection
- Demographics and lifestyle: whether employed and nature of work
- History of previous ART
- Pregnancy risks: contraception options and choices, current or planned pregnancy, access to contraceptive services
- Sexual risks and disclosure: willingness to practice safer sex, disclosure of HIV serostatus, use of condoms, HIV counselling, and testing of sex partners and children
- Symptoms of chronic pain and depression
- History of opportunistic infections and other significant illnesses e.g. TB and STIs, hospitalisations, and surgeries
- Current medications (including anti-TB drugs, traditional therapies, etc.)

#### Physical exam

- Weight
- Nutritional status
- Functional capacity and level of disability
- Vital signs, skin, eyes, oropharynx (presence of thrush), lymph nodes, lungs, heart, abdomen, genital tract (STIs), extremities, nervous system

#### Baseline laboratory tests to assess immunosuppression and disease aggressiveness

- Confirming HIV serostatus
- CD4 testing



- Pregnancy test
- Full blood count particularly for patients starting on a AZT-containing regimen

### **Baseline Labs to assess general health and diagnose any pre-existing HIV complications**

- Sputum smear for AFB for patients who have coughed for > 2-3 weeks and a chest X-ray for patients who have unproductive cough or whose AFB smears are negative
- Urine analysis for proteinuria, particularly for patients starting on TDF-containing regimen
- Syphilis and Hepatitis B screening
- Liver and renal function tests if available
- Cryptococcal antigen and urine LAM screening for patients whose CD4 count is < 200 cells/ml
- Symptom-directed lab tests to diagnose pre-existing illnesses

### **Staging of disease**

- Using WHO clinical criteria (see tables above) Counselling and assessment of patient's readiness to start therapy
- Assess for education, information or counselling support needs
- Develop an adherence plan

### **Goals of treatment with antiretroviral medicines are to:**

- Inhibit viral replication as reflected in plasma HIV concentration to as low as possible and for as long as possible. This promotes restoration of the immune system.
- Preserve or enhance the immune function (CD4 restoration), which prevents/delays the clinical progression of HIV disease
- Minimise toxicities and side effects associated with the medicines

- Improve quality of life and reduce HIV-related morbidity and mortality
- Promote growth and neurological development in children

### Tools to achieve the goals of therapy

- Maximisation of adherence to ART: adequate support to patient to adhere to treatment and/or access to community/facility level adherence counselling
  - Disclosure of HIV serostatus reinforces patient's adherence to ART
- Rational sequencing of medicines to preserve future treatment options
- Use of ARV medicine resistance testing when appropriate and available
- Use of viral load estimates for monitoring

### Principles of ART

- Antiretroviral therapy is part of comprehensive HIV care. The guiding principles of good ART include:
  - Efficacy and durability of the chosen medicine regimens
  - Freedom from serious adverse effects; low toxicity
  - Ease of administration including no food restrictions, better palatability, and lower pill burden
  - Affordability and availability of medicines and medicine combinations
  - Organised sequencing – spares other available formulations for use in second line while allowing for harmonisation of regimens across age and population
  - Ongoing support of the patient to maintain adherence



## Limitations of ART

- ⦿ Antiretroviral medicines are not a cure for HIV but greatly improve quality of life when used appropriately
- ⦿ ARVs are relatively expensive, require an adequate infrastructure, and knowledgeable healthcare workers
- ⦿ Medicine interactions and resistance may decrease the potency of ARVs
- ⦿ Patients may develop adverse medicine reactions
- ⦿ Patients have to take at least 95% of their pills in order to respond well (adherence is key to successful therapy)
- ⦿ The medications have to be taken for life
- ⦿ Some patients may not respond (benefit) to treatment and continue to regress in spite of high adherence
- ⦿ Children are dependent on adults for adherence to ART

## Available Medicines for ART

At present, antiretroviral medicines come in six classes, which attack different sites and stages of the HIV life cycle, thereby interfering with its reproduction.

CLASS	EXAMPLES
<b>Nucleoside reverse transcriptase inhibitors (NtRTIs)</b> incorporate themselves into the DNA of the virus, thereby stopping the building process	Tenofovir (TDF) Zidovudine (AZT) Lamivudine (3TC) Abacavir (ABC)
<b>Non-nucleoside reverse transcriptase inhibitors (NNRTIs)</b> stop HIV production by binding directly onto the reverse transcriptase enzyme, and prevent the conversion of RNA to DNA	Efavirenz (EFV) Nevirapine (NVP) Etravirine (ETV)

CLASS	EXAMPLES
<b>Integrase inhibitors</b> interfere with the HIV DNA's ability to insert itself into the host DNA and copy itself.	Dolutegravir (DTG) Raltegravir (RAL)
<b>Protease inhibitors (PIs)</b> prevent HIV from being successfully assembled and released from the infected CD4 cell. Boosted PIs are combinations of low-dose ritonavir (RTV) with a PI for pharmacoenhancement	Atazanavir (ATV) Lopinavir (LPV) Darunavir (DRV)  Ritonavir (RTV, abbreviated as "r" if boosting other PIs, e.g. ATV/r, LPV/r)
<b>Entry inhibitors (HIV fusion inhibitors)</b> prevent the HIV virus particle from infecting the CD4 cell	Enfuvirtide (T-20)
<b>CCR5 antagonists</b> block the CCR5 co-receptor molecules that HIV uses to infect new target T-cells. Some forms of HIV use a different co-receptor and thus, some patients may not benefit from maraviroc	Maraviroc

### Initiation of ART

It is recommended to initiate ART at the earliest opportunity in all documented HIV-infected adults, adolescents and children regardless of CD4 count and WHO clinical staging (Test and Treat)

Evidence and programmatic experience have shown that early initiation of ART results in reduced mortality, morbidity and HIV transmission outcomes. However,

priority should be given to patients with lower CD4 counts as well as those who are symptomatic.



A CD4 count is not necessary for initiation but should be used to identify patients with advanced HIV disease.

### **ART in children**

The vast majority (about 90%) of infants and children with HIV acquire the infection through mother-to-child transmission.

HIV infection follows a more aggressive course among infants and children than among adults; 30% die by age 1 year and 50% die by age 2 years without access to life-saving medicines, including ART and preventive interventions, such as cotrimoxazole prophylaxis.

Early HIV diagnosis and ARV treatment is critical for infants. A significant number of lives can be saved by initiating ART for HIV-positive infants immediately after diagnosis within the first 12 weeks of life.

### **General principles**

- Ⓐ ARV doses need to be adjusted from time to time as the children grow quickly and thus, their weight changes.
- Ⓐ Before a child begins ART, the following assessments must be made:
  - ☐ Readiness of parents/caretakers or child (if older) to start

### **ART**

- ☐ Complete pre-treatment baseline assessment (see previous sections)  
Process of initiating ART

Health workers should do the following before initiating ART:

Assess all clients for any evidence of opportunistic infections (OIs). If the patient has TB or cryptococcal meningitis, ART should be deferred and initiated after starting treatment of these OIs.

For patients without TB or cryptococcal meningitis, offer ART on the same day through an opt-out approach. In this approach, patients should be prepared and assessed for readiness to start ART on the same day.



If a client is ready, ART should be initiated on the same day. If a client is not ready or opts out of same-day initiation, a timely ART preparation plan should be agreed upon with the aim of initiating ART within seven days for children and pregnant women, and within one month for adults.

### **3.1.5 Recommended First Line Regimens in Adults, Adolescents, Pregnant Women and Children**

HIV management guidelines are constantly being updated according to evidence and public policy decisions. Always refer to the latest official guidelines.

The 2022 guidelines recommend DOLUTEGRAVIR (DTG) an integrase inhibitor as the anchor ARV in the preferred first and second-line treatment regimens for all HIV infected clients; children, adolescents, men, women (including pregnant women, breastfeeding women, adolescent girls and women of child bearing potential).

ART regimens in children are age and weight dependent. When children grow, doses and regimens have to be changed according to the guidelines below.

#### **Recommended first-line ARV regimens in adults, adolescents, pregnant or breastfeeding women and children**

Patient Category	Preferred regimens	Alternative regimens
<b>Adults And Adolescents</b>		
Adults (including pregnant women and breast feeding mothers and adolescents 30Kg)	TDF +3TC+ DTG	If DTG is contraindicated1 use: ; TDF + 3TC + EFV400 If TDF is contraindicated use: TAF-+FTC+ DTG If TDF or TAF is contraindicated,

Patient Category	Preferred regimens	Alternative regimens
Adults And Adolescents		
		<p>ABC +</p> <p>3TC +DTG</p> <p>If TDF or TAF and DTG are contraindicated:</p> <p>ABC +3TC +EFV400</p> <p>If EFV and DTG are contraindicated:</p> <p>TDF +3TC + ATV/r or + 3TC + ATV/r</p>
Children		
Children 20Kg<30Kg	ABC + 3TC + DTG	<p>If DTG is contraindicated:</p> <p>ABC + 3TC + LPV/r (tablets)</p> <p>If ABC is contraindicated:</p> <p>TAF+FTC+ DTG (For Children &gt;6 years and &gt;25kgs)</p> <p>if ABC and TAF are contraindicated</p> <p>AZT + 3TC + DTG</p>
Children<20Kg	ABC + 3TC + DTG	<p>If intolerant or appropriate DTG formulations are not available:</p> <p>ABC +3TC + LPV/r Granules.</p> <p>If intolerant to LPV/r:</p> <p>ABC + 3TC + EFV (in children &gt; 3 years and &gt;10Kg)</p> <p>If ABC is contraindicated:</p> <p>AZT + 3TC + DTG or LPV/r</p>

<p>1. Contraindications for DTG (use DTG screening tool prior to DTG initiation) including: known diabetics, patients on anticonvulsants (carbamazepine, phenytoin, phenobarbital)</p> <p>2. Contraindications for TDF and TAF: Renal disease and/or GFR &lt;60ml/min, weight &lt;30Kg</p>	<p>3 TAF can be used in sub populations with bone density anomalies.</p> <p>4. Children will be assessed individually for ability to correctly take the different formulations of LPV/r.</p>
--	--

### Important drug interactions

Drug Family	ARV Drug	Interaction	Action
Anti-TB medicines	NVP	Rifampicin decreases NVP concentrations in blood.  Could cause liver toxicity	Do not co-administer NVP and rifampicin  See Table 30 and Table 31 for TB/ARV co-management
	DTG	Rifampicin lowers DTG levels	Adjust DTG dose to twice daily
	A T V / r , LPV/r, DRV and RTV	Rifampicin boosts metabolism of PIs	If given together with LPV/r increase the dose of RTV to achieve 1:1 ratio

## Important drug interactions

Drug Family	ARV Drug	Interaction	Action
Combined oral contraceptive pills, hormonal implants (ethonogestrel)	EFV or AT-V/r, LPV/r, DRV and RTV	Risk of contraceptive failure due to increased metabolism of contraceptives	Use additional barrier method or Use Depo-Provera or IUDs
Anxiolytics, e.g. midazolam, diazepam	ATV / r , LPV/r, DRV and RTV	Risk of respiratory depression (midazolam) Increased sedation (diazepam)	Reduce dose of midazolam or diazepam
Simvastatin, rosuvastatin, atorvastatin	ATV / r , LPV/r, DRV and RTV	Inhibition of CYP450 3A4 (reduced metabolism of statins)	Use atorvastatin with lowered dose and monitor for side effects like muscle pains
Anti-epileptics, e.g. carbamazepine, phenobarbital, and phenytoin.	EFV, DTG, Etravirine	Carbamazepine decreases DTG levels by 30-70%	Use valproic acid
Drugs for acid reflux or ulcers, e.g. omeprazole, esomeprazole, lan-soprazole, pantoprazole	ATV/r	Reduced concentrations of Atazanavir	Use alternatives like ranitidine, cimetidine, etc.

Drug Family	ARV Drug	Interaction	Action
Polyvalent cation products containing Mg, Al, Fe, Ca, Zn (e.g. vitamin supplements and antacids)	DTG	Reduce DTG levels	Use DTG 2 hours before or 6 hours after the product to avoid interaction
Antimalarial drugs: artemether/lumefantrine, halofantrine	ATV	Both could prolong QT interval	When given with artemether/lumefantrine monitor closely for undesired effects Halofantrine: do not give together (contraindicated)
Metformin	DTG	DTG increases metformin levels. May increase risk of hypoglycaemia and metabolic acidosis	Close follow-up (routine electrolytes, BUN and Creatinine, Random Blood Sugar tests) recommended

### 3.1.6 Monitoring of ART

The purpose of monitoring patients on ART is to assess:

- Response to ART and early detection of treatment failure
- Side effects and toxicity
- Adherence

The schedule of monitoring visits follow a pre-set calendar for the 1st one year after initiation of ART, i.e:

- At 1, 2 and 3 months from start of ART
- At 6, 9, 12 months

After 12 months from initiation of ART, the Differentiated Model of Care Delivery is followed, in which schedule and modalities of periodic checks are based on individual needs and characteristics of the patient.

The aim of this model is:

- A client centered approach, so that stable patients have spaced checks and fast tracks drug pick ups
- More efficient use of resources by avoiding overcrowding and long waiting times
- More focus on unstable/complex patients

(Refer to MOH HIV/ART guidelines for more details).

#### Important drug interactions

TYPE OF MONITORING	COMPONENTS
Clinical Monitoring	<ul style="list-style-type: none"><li>- Screen for and manage opportunistic infections (OI) and STI</li><li>- Assess for pregnancy, and/or use or need of FP</li><li>- Screen and manage comorbidities including depression</li><li>- Weight and nutritional assessment</li></ul>

TYPE OF MONITORING	COMPONENTS
	<ul style="list-style-type: none"> <li>- Disclosure</li> </ul> <p><b>For children and adolescents:</b></p> <ul style="list-style-type: none"> <li>- Growth and development, school attendance, behavioural issues, sexual awareness</li> </ul> <p>ATV/r, LPV/r, DRV and RTV</p>
<b>Laboratory Monitoring</b>	<ul style="list-style-type: none"> <li><input type="radio"/> Viral load</li> <li><input type="radio"/> Is preferred method to monitor response to ART and treatment failure:</li> <li><input type="radio"/> Children and adolescents under 19 years of age: first VL at 6 and 12 months from initiation, if suppressed every 6 months thereafter.</li> <li><input type="radio"/> Adults: First VL at 6 months after initiation. Second VL following suppressed viral load at 12 months , then every 12 months if suppressed.</li> </ul>
	<ul style="list-style-type: none"> <li><input type="radio"/> HIV positive pregnant and breastfeeding women: If newly initiated on ART at ANC, conduct a VL test at 3 months on ART. If VL suppressed repeat VL every 3 months throughout pregnancy and until cessation of breastfeeding.</li> <li><input type="radio"/> HIV-positive pregnant and breastfeeding women already on ART at ANC1 or MBCP: conduct a VL test at first ANC or MBCP visit. If VL is suppressed repeat VL every 3 months throughout pregnancy until cessation of breastfeeding.</li> </ul>

TYPE OF MONITORING	COMPONENTS
	<ul style="list-style-type: none"><li><input type="radio"/> If unsuppressed in the above, refer to the algorithm below.</li><li><input type="radio"/> After every switch in treatment (after failure): VL at 6 months after a switch to second- and third-line ART.</li><li><input type="radio"/> Third line ART patients: VL every 6 months. If VL is un-suppressed, then genotype testing is recommended.</li></ul>
	<ul style="list-style-type: none"><li><input type="radio"/> CD4 monitoring</li><li><input type="radio"/> Recommended at baseline to screen for risk of opportunistic infections</li><li><input type="radio"/> In patients who are suppressed but are in clinical stage 3-4</li><li><input type="radio"/> In patients on prophylaxis for cryptococcus to inform decision on when to stop fluconazole</li></ul>
	<p><b>Other tests</b></p> <ul style="list-style-type: none"><li>- According to clinical findings</li></ul>

(Refer to MOH HIV/ART guidelines for more details).



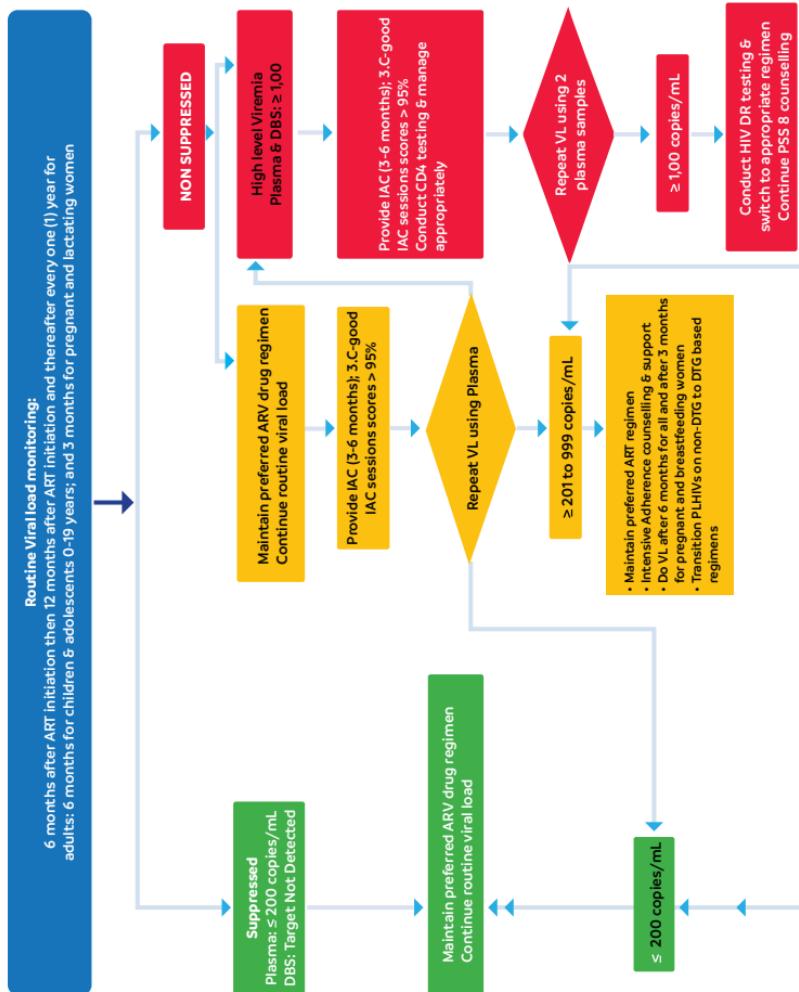
Time	Before ART	During ART			DSD from 6 months			After 12 months on ART		
		Base-line	1 month	2 months	3 months	6 months	9 months	12 months	3 months	6 months
<b>Clinical assessment</b>										
Assess for Immune reconstitution inflammatory syndrome (IRIS)		X	X	X	X	X	X			
Adherence assessment, monitoring, and support	X	X	X	X	X	X	X	X	X	X
ART and CTX refill (in children adjust dose based on weight)	X	X	X	X	X	X	X	X	X	X
FP refill	X	X	X	X	X	X	X	X	X	X
TB Screening	X						X	X	X	X
Follow up review: If the patient is clinically well:										
Give ONE month refill and appointment			X	X	X	X	X	X	X	X



x\* If VL is not suppressed, call the patient back for intensive adherence counseling

x\*\* This is to be done in children, adolescents, pregnant and breastfeeding women

## VL testing algorithm for children, adolescents and adults for health facilities using plasma and DBS samples



### 3.1.7 ARV Toxicity

ARV drugs can cause a wide range of toxicities, from mild to life threatening. Active monitoring and management of toxicities and side effects is important not only to avoid negative medical outcome but also to ensure that they do not negatively affect adherence.

CATEGORY	ACTION
<b>Severe Life-Threatening Reactions (e.g. SJS/TEN, severe hepatitis)</b>	Immediately discontinue all ARV drugs (possibly all drugs in general), manage the medical event and substitute the offending drug when the patient is stabilised
<b>Severe Reactions (e.g. Hepatitis, anaemia)</b>	Stop the offending drug and substitute it without stopping the ART (if clinically possible)
<b>Moderate Reactions (Gynaecomastia, lipodystrophy)</b>	Substitute with a drug in the same ARV class but with a different toxicity profile, or with a drug in a different class Do not discontinue ART. Continuation of ART as long as feasible. If the patient does not improve on symptomatic therapy, consider single- drug substitution
<b>Mild Reactions (Headache, minor rash, nausea)</b>	Do not discontinue or substitute ART. Reassure the patient or caregiver that while the reaction may be bothersome, it does not require a change in therapy and often it subsides in few weeks.
	Provide support to mitigate the adverse reactions as well as counseling about the events

Major Adverse/ Toxicity Events	PRESENTING SIGNS/SYMPOTMS	SUGGESTED MANAGEMENT
<b>REGIMENS FOR ADULTS AND ADOLESCENTS</b>		
1. 2. 3. 4. Hyperglycaemia Insomnia Hepatotoxicity Hypersensitivity reactions	1. 2. 3. 4. Excessive drinking/eating, excessive urination Difficulty falling asleep Nausea, vomiting, right upper quadrant abdominal pain, yellow urine or eyes  Skin itching (localized or diffuse), dizziness, faintness, difficulty breathing, nausea, vomiting, diarrhoea, and abdominal cramping	<p>Do RBS to confirm hyperglycaemia then substitute with EFV</p> <p>Insomnia: Ensure patient is taking DTG during the day if it persists then substitute with EFV</p> <p>If EFV is contraindicated: Substitute with ATV/r</p>
EFV	1. 2. 3. 4. 5. Persistent central nervous system toxicity	<p>In case on EFV 600mg</p> <ul style="list-style-type: none"> <li>Lower the dose of EFV to 400mg.</li> </ul> <p>In case on EFV 400mg</p> <ul style="list-style-type: none"> <li>Reassure,</li> </ul>

Major Adverse/ Toxicity Events	PRESENTING SIGNS/SYMPOTMS	SUGGESTED MANAGEMENT
Convulsions  Hepatotoxicity  Severe skin and hypersensitivity reactions  Gynecomastia	New-onset seizures  Nausea, vomiting, right upper quadrant abdominal pain, yellow urine or eyes New-onset skin rash  Breast enlargement in men	If symptoms persist • Substitute EFV with DTG If DTG is contraindicated: substitute with ATV/r
TDF  Chronic kidney disease, acute kidney injury and Fanconi syndrome  Decreased bone mineral density  Lactic acidosis or severe  Hepatomegaly with steatosis	1. 2. 3. 4. Lower back pain, change in urine volume Bone aches, spontaneous fractures  Exhaustion or extreme fatigue, muscle cramps or pain, headache. Abdominal pain or discomfort, decrease in appetite.	Do LFTs and RFTs. If deranged (elevated liver enzymes and/or GFR is < 60mls/min) then substitute with ABC If ABC is contraindicated: substitute with AZT

		SUGGESTED MANAGEMENT	
		PRESENTING SIGNS/ SYMPTOMS	
ABC	1. Hypersensitivity reaction	1. Skin itching (localized or diffuse) dizziness, faintness, difficulty breathing, nausea, vomiting, diarrhoea, and abdominal cramping	Substitute with TDF If TDF is contraindicated: substitute with AZT
AZT	1. 2. 3.  4. Severe anaemia, neutropenia Lactic acidosis or severe hepatomegaly with steatosis Lipodatrophy, lipodystrophy, myopathy  Severe vomiting	1. 2. 3.  4. Easy fatigability, breathlessness, recurrent infections Exhaustion or extreme fatigue, muscle cramps or pain, headache.  Abdominal pain or discomfort decrease in appetite.  Persistent vomiting resulting in severe dehydration	Do Hb (if < 8mg/dl): Substitute with TDF  If TDF is contraindicated: substitute with ABC

### 3.1.8 Recommended Second Line Regimens in Adults, Adolescents, Pregnant Women and Children

Patients may need to be switched to second line regimens in case of treatment failure, and to third line if they fail on second line drugs. Third line regimens require resistance testing to inform the choice of appropriate drugs, and needs referral to specialised ART centres.

Factors involved in treatment failure are poor adherence, inadequate drug levels or prior existing drug resistance.

Before switching therapy, it is essential to assess and address adherence issues, and provide intensive adherence counselling if necessary.

Criteria for defining treatment failure are presented in the following table:

DEFINITION	COMMENT
<b>VIROLOGICAL FAILURE</b>  Two consecutive viral loads >1000 copies/ml, done at three to six months apart, with intensive adherence support following the 1st VL test	Patient should have been on ART for at least six months
<b>CLINICAL FAILURE</b>  <b>Adults and adolescents:</b>  New or recurrent WHO clinical stage 3 or 4 (with exception of TB) in a patient who has been on effective ART regimen for at least six months  <b>Children:</b>  New or recurrent WHO clinical stage 3 or stage 4 event (with the exception of TB) in a patient who has been on effective ART regimen for at least six months	The condition must be differentiated from Immune Reconstitution Inflammatory Syndrome (IRIS)  occurring after initiating ART

**Criteria for defining treatment failure are presented in the following table:**

Population	Failing first line regimens	Recommended second line regimen	Alternative second line regimen	Third line regimens <sup>1,2</sup>
Adults and adolescents 30Kg, including pregnant and breast-feeding women	TDF + 3TC+EFV TDF+3TC+NVP TAF + FTC + EFV  TDF+3TC+DTG or TAF + FTC + DTG  AZT+3TC+NVP AZT+3TC+EFV ABC/3TC/NVP ABC+ 3TC+ EFV  AZT+3TC+DTG ABC+3TC+DTG  ABC+3TC+EFV ABC+3TC+NVP	AZT+3TC+DTG  AZT+3TC+DRV/r  TDF+3TC+DTG or TAF + FTC + DTG  TDF+3TC+ATV/r or TAF + FTC + ATV/r  TDF+3TC+ATV/r or TAF + FTC + ATV/r  TDF+3TC+DRV/r or TAF + FTC + DRV/r  AZT+3TC+DTG	AZT+3TC+DRV/r orATV/r  In case of susceptibility to all drugs, use the table to guide the preferred or alternative choices.	All third line regimens to be guided by HIV drug resistance testing.
Children 20Kg - <30Kg	ABC+3TC+LPV/r ABC+3TC+DTG	AZT+3TC+DTG  AZT+3TC+DRV/r	AZT+3TC+LPV/r  AZT+3TC+DRV/r	AZT+3TC+LPV/r  AZT+3TC+LPV/r

Population	Failing first line regimens	Recommended second line regimen	Alternative second line regimen	Third line regimens 1,2
	AZT+3TC+EFV AZT+3TC+NVP	ABC+3TC+DTG or TAF + FTC + DTG	ABC+3TC+LPV/r or TAF + FTC + LPV/r	NOTE: For details on the third-line ART,
	AZT+3TC+LPV/r	ABC+3TC+DTG or TAF + FTC + DTG	ABC+3TC+DRV/r or TAF + FTC + DRV/r	
	AZT+3TC+DTG	ABC+3TC+DRV/r or TAF + FTC + DRV/r	ABC+3TC+LPV/r or TAF + FTC + LPV/r	Please see the third-line ART
Children <20Kg	ABC+3TC+EFV ABC+3TC+NVP	AZT+3TC+DTG	AZT+3TC+LPV/r	implementation guides.
	AC+3TC+LPV/r	AZT+3TC+DTG	AZT+3TC+DRV/r	
	AZT+3TC+EFV AZT+3TC+NVP	ABC+3TC+DTG	ABC+3TC+LPV/r	
	AT+3TC+LPV/r	ABC+3TC+DTG	ABC+3TC+DRV/r	
	AZT+3TC+DTG	ABC+3TC+DRV/r	ABC+3TC+LPV/r	

- All PLHIV should receive resistance testing to inform the prescription of 2nd and 3rd-line medicines.
- Since all 3rd-line PLHIV will have prior PI Exposure, DRV/r will be taken twice a day.
- For recipients of care on NNRTI-based First Line regimen whose VL is not suppressed, switch without a second VL but conduct IAC to improve adherence to new regimen.
- For all PLHIV failing first-line ART, optimize the second-line ART using HIVDR test



## Dosing Tables for ARV Medicines

Formulations and strengths		3.0–5.9kg		6.0–9.9kg		10.0–13.9kg		14.0–19.9kg		20.0–24.9kg		25.0–34.9kg		Adolescents and adults >35kg	
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Fixed Dose Combi-nation Tablets/ Granules	ABC/3TC 120/60mg	1		1.5		2		2.5		3		-	-	-	-
	ABC/3TC 600/300mg	-	-	-	-	-	-	-	-	-	-	1	1	1	1
	AZT/3TC 60/30mg	1	1	1.5	1.5	2	2	2.5	2.5	3	3	-	-	-	-
	AZT/3TC 300/150mg	-	-	-	-	-	-	-	-	-	-	1	1	1	1
	TDF/3TC 300/300mg	-	-	-	-	-	-	-	-	-	-	-	-	1	1
	TDF/3TC/EFV 300/300/400mg	-	-	-	-	-	-	-	-	-	-	-	-	-	1



Formulations and strengths	3.0–5.9kg			6.0–9.9kg			10.0–13.9kg			14.0–19.9kg			20.0–24.9kg			25.0–34.9kg			Adolescents and adults >35kg		
	A	P	M	A	M	M	P	M	M	A	P	M	A	P	M	A	P	M	A	P	M
Fixed Dose Combi-nation Tablets/ Granules																					
DTG 50mg	-	-	-	-	-	-	-	-	-	1	-	1	-	1	-	1	-	1	-	1	-
DTG 10mg	1	-	1.5	-	2	-	2.5	-	3	-	-	-	-	-	-	-	-	-	-	-	-
EFV 200mg	-	-	-	-	1	-	1	-	1.5	-	1.5	-	1.5	-	2	-	-	-	-	-	-
LPV/r 40/10mg1	2	2	3	3	4	4	4	5	5	6	6	6	6	-	-	-	-	-	-	-	-
Oral Granules																					
LPV/r 100/25mg2	-	-	-	-	2	1	2	2	2	2	2	2	-	-	-	-	-	-	-	-	-
LPV/r 200 /50mg	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	2	1	2	1	2	1
DRV/r 400/50mg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-
ATV/r 300/100mg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
Raltegravir 25mg Chewable Tablet	-	-	-	-	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Formulations and strengths	3.0–5.9kg		6.0–9.9kg		10.0–13.9kg		14.0–19.9kg		20.0–24.9kg		25.0–34.9kg		Adolescents and adults >35kg	
	A	P	A	P	A	P	A	P	A	P	A	P	A	P
	M	M	M	M	M	M	M	M	M	M	M	M	M	M
Fixed Dose Combi-nation Tablets/ Granules	Raltegravir 100mg Chew-able Tablet	-	-	-	-	-	1	1	1.5	1.5	-	-	-	-
DRV 75mg Tablets3	Raltegravir 400mg	-	-	-	-	-	-	-	-	-	1	1	1	1
DRV 150mg	DRV 75mg Tablets3	-	-	-	-	-	3	5	5	5	-	-	-	-
DRV 600mg4	DRV 150mg	-	-	-	-	-	0.5ml	0.5ml	50mg	50mg	50mg	4	4	4
RTV 25mg	DRV 600mg4	-	-	-	-	-	-	-	-	+RTV	+RTV	+RTV	+RTV	+RTV
RTV 100mg	RTV 25mg	-	-	-	-	-	-	-	-	100mg	100mg	100mg	100mg	100mg
ETV 200mg	RTV 100mg	-	-	-	-	-	-	-	-	-	1	1	1	1

1. For children 10kg that are able to swallow tablets, give LPV/r 100/25mg tablet.
2. tablets of LPV/r 100/25mg can be substituted with 1 tablet of LPV/r 200/50mg in order to reduce the pill burden. These tablets should be administered fully intact/whole i.e. not cut or crushed.
3. DRV must be administered with 0.5mL of RTV 80mg/mL oral suspension in children <15kg, with 2 tab of RTV 25mg in children 15 to 25kg and 3 tab of RTV 25mg in children above 25kg. DRV is always taken with food.
4. DRV 600mg must be co-administered with RTV 100mg.

### **3.1.9 Mother-to-Child Transmission of HIV**

Approximately one-third of the women who are infected with HIV can pass it to their babies.

#### **Cause**

#### **Time of transmission**

- ⦿ During pregnancy (15-20%)
- ⦿ During time of labour and delivery (60%-70%)
- ⦿ After delivery through breast feeding (15%-20%)

#### **Pre-disposing factors**

- ⦿ High maternal viral load
- ⦿ Depleted maternal immunity (e.g. very low CD4 count)
- ⦿ Prolonged rupture of membranes
- ⦿ Intra-partum haemorrhage and invasive obstetrical procedures

- If delivering twins, first twin is at higher risk of infection than second twin
- Premature baby is at higher risk than term baby
- Mixed feeding carries a higher risk than exclusive breastfeeding or use of replacement feeding

### **Investigations**

- Blood: HIV serological test
- HIV DNA PCR testing of babies (see algorithm in section 3.1.2 above)
- Viral load testing every 6 months

### **Management**

All HIV services for pregnant mothers are offered in the MCH clinic. After delivery, mother and baby will remain in the MCH postnatal clinic till HIV status of the child is

confirmed, then they will be transferred to the general ART clinic.

The current policy aims at elimination of Mother-to-Child Transmission (eMTCT) through provision of a continuum of care with the following elements:

- Primary HIV prevention for men, women and adolescents
- Prevention of unintended pregnancies among women living with HIV
- Prevention of HIV transmission from women living with HIV to their infants
- Provision of treatment, care and support to ALL women infected with HIV, their children and their families

### 3.1.9.1 Management of HIV Positive Pregnant Mother

#### Key Interventions for eMTCT

##### eMTCT Services for Pregnant Women

Service	Description
Provide HTS and syphilis testing in ANC	<ul style="list-style-type: none"><li>▪ Offer routine HTS and testing for syphilis to pregnant women and their partner(s) with same-day results using the SD-Bioline duo HIV/syphilis test according to algorithm If found positive treat for syphilis in order to reduce HIV transmission from mother to child using the following:<ul style="list-style-type: none"><li>▫ o Pregnant women/girls with early syphilis: give Benzathine Penicillin G 2.4 million units intramuscularly once. Early syphilis for this guideline is: (primary, secondary and early latent syphilis of not more than two years' duration).</li><li>▫ o In late syphilis or unknown stage of syphilis: give Benzathine Penicillin G 2.4 million units intramuscularly once weekly for three consecutive weeks. Late syphilis for this guideline is defined as infection of more than two years' duration without evidence of treponemal infection.</li><li>▫ o Note: Adequate maternal treatment for prevention of congenital syphilis is defined as at least one injection of 2.4 million units of intramuscular Benzathine Penicillin at least 30 days prior to delivery.</li><li>▫ o Alternative treatment with Procaine Penicillin or Erythromycin, Azithromycin and Ceftriaxone if allergic to penicillin.</li></ul></li></ul>

Service	Description
	<ul style="list-style-type: none"> <li>• Offer syphilis screening using syphilis rapid tests for mothers who are already on ART.</li> <li>○ Offer HTS (including PITC, VCT and couple testing) and support mutual disclosure.</li> <li>• Link all HIV-positive seroconcordant couples as well as HIV-positive individuals in serodiscordant relationships to ART.</li> <li>• Offer PrEP to all pregnant and breast-feeding mothers at substantial risk of HIV acquisition as well as negative partners in the discordant couples.</li> <li>• For HIV-negative pregnant women, re-test in the third trimester, during labor, or shortly after delivery, because of the high risk of acquiring HIV infection during pregnancy.</li> <li>• Re-test HIV-negative pregnant women in a discordant relationship every three months.</li> <li>• Re-test the following HIV negative pregnant women within four weeks of the first test: <ul style="list-style-type: none"> <li>○ STI, HBV or TB-infected pregnant women.</li> <li>○ Those with a specific incident of HIV-exposure within the past three months</li> </ul> </li> <li>• Provide risk reduction counseling to HIV-negative women.</li> <li>• Test pregnant women/girls and their partners for Hepatitis B during antenatal</li> </ul>

Service	Description
	<ul style="list-style-type: none"><li>○ For patients who are HBsAg positive, assess the HBeAg and HBV viral load. Patients who are HBeAg negative with a HBV VL of &lt;200,000 IU/ml should be monitored with CBC, LFTs and VL at 6 and 12 months (see Figure 10).</li><li>○ For patients who are HBsAg positive assess the HBeAg and HBV viral load. Patients who are HBeAg positive with HBV VL of &gt;200,000 IU/ml should initiate prophylactic treatment at 24 weeks gestation or at the earliest contact. Discontinue medication 3 months after delivery. After starting treatment, LFTs should be monitored at 4, 8, 12 and 24 weeks and thereafter annually. Monitor HBV viral load at 6 and 12 months</li></ul>
Antenatal care package for all pregnant women (regardless of HIV status)	<p><b>General care:</b></p> <ul style="list-style-type: none"><li>• All pregnant women/girls should have at least eight ANC visits: encourage and support mothers to start ANC in the first trimester</li><li>• Routinely provide iron, folic acid, and multi-vitamin supplements</li><li>• Deworm in the 2nd trimester using Mebendazole</li><li>• Provide nutrition assessment, counseling and support</li><li>• Counsel and encourage women to deliver at the health facility</li><li>• Screen for TB and take appropriate action</li><li>• Take weight and BP at every visit</li></ul>

Service	Description
	<p><b>Laboratory services:</b></p> <ul style="list-style-type: none"> <li>• Screen and treat for syphilis, HIV, hepatitis B, other STIs and anemia. Use syndromic approach to treating STIs</li> <li>• Perform urinalysis to detect a urinary tract infection (UTI), protein in the urine (proteinuria), or blood in the urine (hematuria) indicating kidney damage, or sugar in urine suggesting diabetes</li> <li>• Do a blood slide for malaria for all pregnant women.</li> <li>• Perform a blood group test in anticipation of blood transfusion and check for hereditary conditions if suspected (sickle cell test)</li> </ul>
Laboratory investigations specific to HIV-positive pregnant women	<ul style="list-style-type: none"> <li>• For HIV-positive women, perform a baseline CD4 count. The test result is not required for ART initiation.</li> <li>• Do Hb test for women/girls beginning AZT-based ART at baseline and four weeks after initiating ART.</li> <li>• For HIV-positive pregnant women/girls already on ART, do VL test at first ANC visit, then follow the VL testing algorithm for pregnant and breast feeding women.</li> <li>• For newly diagnosed HIV-positive pregnant women/girls, do VL test 3 months after initiating ART and then every 3 months until end of MTCT period</li> </ul>

Service	Description
Comprehensive care for pregnant women with HIV	<p><b>At each visit provide:</b></p> <ul style="list-style-type: none"><li>• Comprehensive clinical evaluation</li><li>• Pregnant women on CPT should not be given Sulphadoxine-Pyrimethamine (Fansidar) for intermittent preventive treatment for malaria (IPTp)</li><li>• Screen for TB and take appropriate action</li><li>• INH for eligible women/girls</li><li>• Screening and management of opportunistic infections (OIs)</li></ul>
Assess risk of unborn baby among pregnant women with HIV at ANC 1	<ul style="list-style-type: none"><li>• Conduct a risk assessment of the unborn baby at 1st ANC among all HIV positive pregnant women and at every visit and flag those at high-risk including:<ul style="list-style-type: none"><li>○ Newly initiated on ART in the 3rd trimester or breastfeeding period</li><li>○ Most recent VL is non-suppressed</li><li>○ Mothers testing HIV positive later in pregnancy or during breastfeeding</li></ul></li><li>• Closely monitor all high-risk pregnancies</li></ul>

Service	Description
ART	<ul style="list-style-type: none"><li>o All women/girls living with HIV identified during pregnancy, labour and delivery or while breastfeeding should be started on lifelong ART</li><li>o ART should be initiated on the same day, and adherence counseling should be initiated and sustained intensively for the first three months then maintained for life.</li><li>o Initiate mother on once-daily FDC of TDF+3TC+DTG with pharmacovigilance</li><li>o The mothers initiated on TDF + 3TC +EFV400 shall be transitioned to TDF + 3TC + DTG at 6-9 months post-partum if VL within past 6 months is suppressed.</li><li>o If mother is already on ART &gt;6 months with TDF/3TC/EFV, do VL test. If she is virally suppressed, maintain her on TDF/3TC/EFV400 until 6-9 months after delivery and then substitute EFV with DTG if VL within the past 6 months is suppressed.</li><li>o If she is already on a DTG-based 1st-line regimen and virally suppressed, maintain on the same regimen.</li><li>o If she is already on ART and VL is not suppressed, manage as treatment failure and switch to DTG-based 2nd line regimen (if no previous exposure to DTG).</li></ul>

Service	Description
ART	<ul style="list-style-type: none"><li>o If she is on 2ndline ART with ATV/r or LPV/r and virally suppressed, maintain on the same regimen until 6-9 months after delivery and then substitute PI with DTG if VL within the past 6 months is suppressed and no previous exposure to DTG.</li><li>o All women should receive Pre-ART adherence counseling before initiating ART and ongoing adherence support after that</li><li>o ART should be initiated and maintained in mother-baby care point in MCH.</li></ul>
	<p>What to do if mum refuses ART or if you know adherence is poor:</p> <p>Maternal VL suppression is key for preventing breastfeeding transmission, so if VL suppression is not certain infant prophylaxis may serve as a “back up” to prevent MTCT - similar to “Option A”. Clinical providers should continue infant prophylaxis with NVP for these specific scenarios. Continuation of prophylaxis should be seen as an interim measure while maternal adherence is improved</p>
Risk reduction counseling and support	<ul style="list-style-type: none"><li>• Encourage consistent and correct condom use</li><li>• Encourage women to deliver at the health facilities</li><li>• For negative pregnant women, offer other prevention services like SMC to partner and mitigate or manage GBV</li></ul>

Service	Description	
Visit schedules for HIV-infected pregnant women	<p>HIV-positive pregnant woman/ girl already on ART and stable:</p> <p>Stable pregnant and breastfeeding mother</p> <ul style="list-style-type: none"> <li>• Viral suppression</li> <li>• Adherence above 95%</li> <li>• On ART for more than one-year Stage T1 and no active OIs</li> <li>• Not due for vital lab tests in the next two months, e.g., viral load</li> <li>• Has disclosed to significant other/ household member/ family member</li> </ul>	<p>HIV-positive pregnant woman/girl initiating ART in ANC (new clients):</p> <p>Unstable pregnant and breastfeeding women/ adolescent girl</p> <ul style="list-style-type: none"> <li>• Recently initiated on ART (less than one year on ART)</li> <li>• Poor viral suppression: most recent VL</li> <li>• Adherence less than 95%</li> <li>• Stage T3,4 and active OIs</li> <li>• Comorbidities/ co-infection</li> <li>• CD4 less than 500</li> <li>• Due for vital lab tests in the next two months, e.g., viral load</li> <li>• Has not disclosed to significant other/ household member/ family member</li> </ul>

Service	Description	
	<ul style="list-style-type: none"> <li>• 8 ANC visits</li> <li>• Synchronize ART refills and adherence support with the ANC visits</li> </ul>	<ul style="list-style-type: none"> <li>• Two weeks after initiating ART</li> <li>• After that, monthly until delivery</li> <li>• Follow routine MCH schedule after delivery together with the exposed infant visit schedule</li> </ul>

### 3.1.9.2 HIV-exposed infant care services

Service	Description
Identification of HIV-exposed infants	<ul style="list-style-type: none"> <li>• Identify all HIV-exposed infants; document the HIV status of the mother in the child card and mothers' passport. Infants whose HIV status is not documented or is unknown should be offered rapid HIV testing; including those whose mothers did not receive eMTCT services or have become newly infected after pregnancy. Rapid diagnostic tests for HIV serology can be used to assess HIV exposure among infants younger than four months of age. HIV-exposure status among infants and children 4–18 months of age should therefore be ascertained by HIV serological testing the mother. The mother should be tested every 3 months until end of breastfeeding. The entry points for identification of HIV-exposed infants include YCC, OPD pediatric/Nutrition/TB wards and outreaches. Special attention should be paid during immunization both at static and outreach areas to ensure that all children have their exposure status ascertained.</li> </ul>

Service	Description	
HIV testing for infants	<ul style="list-style-type: none"> <li>• 8 ANC visits</li> </ul> <p>Follow the infant testing algorithm in to test and interpret the test results:</p> <ul style="list-style-type: none"> <li>• Provide 1st PCR within 4-6 weeks or the earliest opportunity thereafter.</li> </ul>	Provide 1st PCR within 4-6 weeks or the earliest opportunity
	<p>Follow the infant testing algorithm in to test and interpret the test results:</p> <ul style="list-style-type: none"> <li>• Provide 1st PCR within 4-6 weeks or the earliest opportunity thereafter.</li> <li>• Provide 2nd PCR at 9months thereafter</li> <li>• Provide 3rdPCR 6 weeks after cessation of breastfeeding</li> <li>• Do DBS for confirmatory DNA PCR for all infants who test positive on the day they start ART</li> <li>• Do a DNA PCR test for all HEI who develop signs/symptoms suggestive of HIV during follow-up, irrespective of breastfeeding status.</li> <li>• Conduct rapid HIV test at 18 months for all infants who test negative at 1st, 2nd and 3rdPCR</li> <li>• *** Where available Point-of-care nucleic acid testing should be used to diagnose HIV among infants and children younger than 18 months of age</li> <li>• 8 ANC visits</li> </ul>	Provide 1st PCR within 4-6 weeks or the earliest opportunity

Service	Description	
HIV testing for infants	<p>Follow the infant testing algorithm in to test and interpret the test results:</p> <ul style="list-style-type: none"> <li>Provide 1st PCR within 4-6 weeks or the earliest opportunity thereafter.</li> </ul>	<p>Provide 1st PCR within 4-6 weeks or the earliest opportunity</p>
	<ul style="list-style-type: none"> <li>ART for mothers and ePNP causing low viral particles difficult to detect, sometimes below cycle threshold. An indeterminate range of viral copy equivalents should be used to improve the accuracy of all nucleic acid-based early infant diagnosis assays</li> <li>Indeterminate range: a range of viral copy equivalents that would be too low to be accurately diagnosed as HIV infected. The indeterminate range suggested is currently estimated to be approximately equivalent to a cycle threshold of 33 on the Roche COBAS® Ampliprep/COBAS® TaqMan® HIV-1 Qualitative Test v2.0 assay</li> <li>Indeterminate range: a range of viral copy equivalents that would be too low to be accurately diagnosed as HIV infected. The indeterminate range suggested is currently estimated to be approximately equivalent to a cycle threshold of 33 on the Roche COBAS® Ampliprep/COBAS® TaqMan® HIV-1 Qualitative Test v2.0 assay</li> </ul>	<p><b>Guidance for indeterminate test:</b></p> <p>Take off whole blood and test at CPHL and transport within 2 days</p> <p>Hold off ART until results of whole blood.</p> <p>Communicating results to caregiver</p> <p>Testing intervals for infants with repeated discordant results 4 weeks, 4 months, 8 months</p>

SERVICE	DESCRIPTION
Routine immunization	<ul style="list-style-type: none"><li>HIV-infected children are more susceptible to diseases preventable by immunization than their HIV-uninfected counterparts.</li><li>HIV-infected infants and children can safely receive most childhood vaccines if given at the right time. All HIV-infected and exposed children should be immunized as per EPI immunization schedule.</li><li>Health workers should review child immunization status at every visit</li><li>Some special considerations/modifications for HIV-exposed children:<ul style="list-style-type: none"><li>○ BCG: When considering BCG vaccination at a later age (re-vaccination for no scar or missed earlier vaccination), exclude symptomatic HIV infection. Children with symptomatic HIV infection should not receive BCG.</li><li>○ Measles: Although the measles vaccine is a live vaccine, it should be given at six and nine months even when the child has symptoms of HIV. The measles illness from the vaccine is milder than that from the wild measles virus, which is more severe and likely to cause death.</li><li>○ Yellow Fever: Do not give yellow fever vaccine to symptomatic HIV-infected children; asymptomatic children in endemic areas should receive the vaccine at nine months of age</li></ul></li></ul>

SERVICE	DESCRIPTION
Growth monitoring and nutritional assessment	<ul style="list-style-type: none"><li>▪ Growth and child nutrition should be monitored using weight, length/height, and MUAC at all encounters with a child, and recorded on the growth monitoring card</li><li>▪ MUAC should only be measured starting at six months of age.</li><li>▪ Failure to gain weight or height, slow weight or height gain, and loss of weight may be an indication of HIV infection in an infant/young child. Failure to thrive affects as many as 50% of HIV-infected infants and children. HIV-infected infants and children who are failing to thrive have a significantly increased risk of mortality.</li><li>▪ Counsel the mother/caregiver on the child's growth trend and take appropriate action where necessary.</li></ul>
Development monitoring	<ul style="list-style-type: none"><li>▪ At each visit assess the infant's age-specific developmental milestones.</li><li>▪ Infants are at high risk for HIV encephalopathy and severe neurologic disease</li><li>▪ Early identification of developmental delay can facilitate intervention and these children can improve with treatment.<ul style="list-style-type: none"><li>▪ Some forms of development delay are:</li></ul></li><li>▪ The child may reach some developmental milestones but not others.</li><li>▪ The child may reach some milestones but lose them after some time.</li><li>▪ The child may fail to reach any developmental milestones at all.</li><li>▪ Test children with developmental delay for HIV and, if infected, initiate on ART.</li><li>▪ Measure the infant's head circumference.</li></ul>

SERVICE	DESCRIPTION
Early Childhood Development	<ul style="list-style-type: none"><li>▪ The first two years of life are the most critical for brain development and influences during this period significantly contribute to longer-term developmental outcomes.</li><li>▪ ECD therefore comprises all the essential care and support a young child needs to survive and thrive in life and spans the period from prenatal to eight years of age across multiple domains consisting of physical, cognitive, language and communication, social and emotional and spiritual development. Years 0-8 most critical stage of life because the brain undergoes most dramatic growth</li><li>▪ It is well established that infants and young children exposed or affected by HIV have poorer health and developmental outcomes compared to their non-HIV affected peers. Prevention of mother-to-child transmission (PMTCT) services, which focus on mothers and infants throughout the exposure period provide an ideal platform during a period of life that affects both longer-term health and developmental potential, moreover, the services along the PMTCT cascade are well aligned with intervention points for ECD.</li><li>▪ ECD services and messages will therefore be well integrated into PMTCT/HEI services to improve outcomes of HEI.</li></ul>

SERVICE	DESCRIPTION
ARV prophylaxis	<ul style="list-style-type: none"><li>Provide NVP syrup to HEI from birth until six weeks of age.</li><li>For high-risk infants, give NVP syrup from birth until 12 weeks of age.</li><li>High-risk infants are breastfeeding infants whose mothers:<ul style="list-style-type: none"><li>Have received ART for four weeks or less before delivery; or</li><li>Have VL &gt;1000 copies in four weeks before delivery; or</li><li>Diagnosed with HIV during 3rd trimester or breastfeeding period (postnatal).</li></ul></li></ul>
	<p><b>What to do if baby presents after 6 weeks:</b></p> <ol style="list-style-type: none"><li>Do first PCR</li><li>Give ART (First Line Paed regimen; give weight appropriate dose) for 6 weeks</li><li>If PCR results are negative, give NVP for 6 weeks (after completing the 6 weeks of ART)</li><li>If PCR results are positive, continue with ART first line ART.</li></ol> <p>Irrespective of timing, the mother should be started on ART as soon as possible for her own health and to decrease risk of transmission to breastfeeding baby.</p>

SERVICE	DESCRIPTION
<b>Opportunistic infection prophylaxis</b>	<p>Cotrimoxazole prophylaxis</p> <p>Cotrimoxazole (CTX) prophylaxis significantly reduces the incidence and severity of Pneumocystis Jiroveci pneumonia. It also offers protection against common bacterial infections, Toxoplasmosis and Malaria.</p> <ul style="list-style-type: none"> <li>Provide CTX prophylaxis to all HIV-exposed infants from six weeks of age until they are proven to be uninfected.</li> <li>Infants who become HIV-infected should continue to receive CTX prophylaxis for life.</li> <li>If CTX is contraindicated, offer Dapsone at dose of 2mg/kg once daily (up to 100mg).</li> </ul> <p><b>TB Preventive Treatment (TPT)</b></p> <ul style="list-style-type: none"> <li>Give INH for six months to HEI who are exposed to TB after excluding TB disease.</li> <li>For newborn infants, if the mother has TB disease and has been on anti-TB drugs for at least two weeks before delivery, INH prophylaxis should not be given.</li> </ul> <p><b>Malaria prevention:</b></p> <ul style="list-style-type: none"> <li>All HEI and HIV-infected children should receive insecticide treated nets and CTX. Using both reduces risk of malaria by 97%.</li> </ul>
<b>Actively look for and treat infections early</b>	<p>HEI are susceptible to common infections and OIs.</p> <ul style="list-style-type: none"> <li>Counsel caregivers to seek care to receive timely treatment.</li> </ul>

SERVICE	DESCRIPTION
	<ul style="list-style-type: none"><li>At every visit, assess HEI for signs and symptoms of common childhood illnesses using the Integrated Maternal, New-born and Childhood Illnesses Guidelines and provide treatment.</li></ul>
Counseling and feeding advice	Provide infant feeding counseling and advice according to guidance.
Educate the caregiver and family	<ul style="list-style-type: none"><li>HEI depend on their caregivers to receive care.</li><li>Provide information to the caregivers and family about the care plan including what to expect and how to provide care for the infant.</li><li>Caregivers should participate in making decisions and planning care for the child, including decisions about therapy and where the child should receive care.</li><li>Empower caregivers to be partners with the health facility.</li><li>Provide key aspects of home-based care for the child, including:<ul style="list-style-type: none"><li>Dispensing prophylaxis and treatment</li><li>Maintaining adherence</li><li>Complying with the follow-up schedule</li><li>Ensuring good personal and food hygiene to prevent common infections</li><li>Seeking prompt treatment for any infections or other health-related problem</li></ul></li></ul>
	The most important thing for the child is to have a healthy mother. Ensure the mother/infected caregiver is receiving their care. If the mother is sick, the infant will not receive care.

SERVICE	DESCRIPTION
	<ul style="list-style-type: none"> <li>When members of the same family such as mother-baby pair are in care, their appointments should be on the same day.</li> </ul>
Referrals and Linkage	<ul style="list-style-type: none"> <li>Link the caregiver and HEI to appropriate services like OVC care, psychosocial support including FSG and other community support groups.</li> </ul>
ART for infected infants	Initiate ART in infants who become infected according to guidance

### 3.1.9.3 Care of HIV Exposed Infant

HIV-exposed infants should receive care at the mother-baby care point together with their mothers until they are 18 months of age. The goals of HIV-exposed infant care services are:

- To prevent the infant from being HIV infected
- Among those who get infected: to diagnose HIV infection early and treat
- Offer child survival interventions to prevent early death from preventable childhood illnesses

The HIV Exposed Infant and the mother should consistently visit the health facility at least nine times during that period.

The visits are synchronised with the child's immunisation schedule (i.e., at 6, 10 and 14 weeks, then at 5, 6, 9, 12, 15 and 18 months).



## Management

TREATMENT	LOC
<p><b>Nevirapine prophylaxis</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Provide NVP suspension from birth for 6 weeks</li> <li><input type="checkbox"/> Give NVP for 12 weeks for babies at high risk, that is breastfeeding infants who mothers:           <ul style="list-style-type: none"> <li>- Have received ART for 4 weeks or less before delivery; or</li> <li>- Have VL &gt;1000 copies in 4 weeks before delivery; or</li> <li>- Diagnosed with HIV during 3rd trimester or breastfeeding period (Postnatal)</li> </ul> </li> <li><input type="checkbox"/> Do PCR at 6 weeks (or at first encounter after this age) and start cotrimoxazole prophylaxis           <ul style="list-style-type: none"> <li>- If PCR positive, start treatment with ARVs and cotrimoxazole and repeat PCR (for confirmation)</li> <li>- If PCR negative and baby never breastfed, child is confirmed HIV negative. Stop cotrimoxazole,</li> <li>- continue clinical monitoring and do HIV serology test at 18 months.</li> <li>- If PCR negative but baby has breastfed/is breastfeeding, start/continue cotrimoxazole prophylaxis and repeat PCR 6 weeks after stopping breastfeeding</li> </ul> </li> <li><input type="checkbox"/> Follow up any exposed child and do PCR if they develop any clinical symptom suggestive of HIV at any time and independently of previously negative results</li> <li><input type="checkbox"/> For negative infants, do serology at 18 months before final discharge</li> </ul>	HC3

TREATMENT	LOC
<b>Dosages of nevirapine</b>	HC3
<ul style="list-style-type: none"> <li>- Child 0-6 weeks, 2-2.5 Kg: 10 mg once daily (1 ml of syrup 10 mg/ml)</li> <li>- Child 0-6 weeks, &gt;2.5 kg: 15 mg once daily (1.5 ml of syrup 10 mg/ml)</li> <li>- Child 6 weeks – 12 weeks: 20 mg once daily (2 ml)</li> </ul>	
<b>Cotrimoxazole prophylaxis</b>	HC2
<p><input type="checkbox"/> Provide cotrimoxazole prophylaxis to all HIV- exposed infants from 6 weeks of age until they are proven to be uninfected. Dosages:</p> <p>Child &lt;5 kg: 120 mg once daily</p> <p>Child 5-14.9 kg: 240 mg once daily</p> <p><input type="checkbox"/> Infants who become HIV infected should continue to receive cotrimoxazole prophylaxis for life</p> <p><input type="checkbox"/> If cotrimoxazole is contraindicated, offer dapsone at a dose of 2 mg/kg once daily ( up to 100 mg max)</p>	
<b>TB preventive therapy (TPT)</b>	HC3
<p><input type="checkbox"/> Give INH for six months to HIV-exposed infant who are exposed to TB (close contact with PTB case) after excluding TB disease (see section 5.3.2.3)</p> <p><input type="checkbox"/> Dose: Isoniazid 10 mg/kg + pyridoxine 25 mg daily</p> <p><input type="checkbox"/> For newborn infants, if the mother has TB disease and has been on anti-TB drugs for at least two weeks before delivery, INH prophylaxis is not required.</p>	



### Immunisation

- Immunise HIV exposed children as per national immunisation schedule
- In case of missed BCG at birth, do not give if child has symptomatic HIV
- Avoid yellow fever vaccine in symptomatic HIV
- Measles vaccine can be given even in symptomatic HIV

### Counselling on infant feeding choice

- Explain the risks of HIV transmission by breastfeeding (15%) and other risks of not breastfeeding (malnutrition, diarrhoea)
- Mixed feeding may also increase risk of HIV transmission and diarrhoea
- Tell her about options for feeding, advantages, and risks
- Help her to assess choices, decide on the best option, and then support her choice
- Feeding options
- Recommended option: Exclusive breastfeeding then complementary feeding after child is six months old
- Exclusive breastfeeding stopping at 3-6 months old if replacement feeding possible after this
- If replacement feeding introduced early, mother must stop breastfeeding
- Replacement feeding with home-prepared formula or commercial formula and then family foods (provided this is acceptable, feasible, safe, and sustainable/ affordable)

### If mother chooses breastfeeding

- The risk may be reduced by keeping the breasts healthy (mastitis and cracked nipples raise HIV infection risk)
- Advise exclusive breastfeeding for 3-6 months

### If mother chooses replacement feeding

- Counsel and teach her on safe preparation, hygiene, amounts, times to feed the baby etc.
- Follow up within a week from birth and at any visit to health facility.

## 3.1.10 OPPORTUNISTIC INFECTIONS IN HIV

### 3.1.10.1 Tuberculosis and HIV Co-Infection

Active TB may be present when ART needs to be initiated or it may develop during treatment.

TB and HIV care for co-infected patients should be provided in an integrated manner under one roof by one care team (one-stop-shop).

Co-management of TB and HIV is complicated by:

- Drug interactions between rifampicin and both the NNRTI and PI classes
- Immune reconstitution inflammatory syndrome (IRIS)
- Pill burden, overlapping toxicities and adherence issues.

### Management

ART should be initiated in all TB/HIV co-infected people irrespective of their clinical stage or CD4 count. However, the timing of initiation of treatment may differ based on whether the patient is diagnosed with TB before or after initiating ART.

SITUATION	RECOMMENDATIONS
TB patients diagnosed with HIV	Start anti-TB medicines immediately, THEN start ARVs 2 weeks later (see table below)
Patient already on ART, diagnosed with TB	Start anti-TB medicines immediately, adjust regimen as per guidelines below
ADULT TB patients diagnosed with TB	Start anti-TB medicines immediately, start ARVs before completing 2 weeks

ARV regimen in ART-naive patients on TB treatment

AGE GROUP	RECOMMENDED REGIMEN
Adults, Pregnant and Breast-feeding Women, and Adolescents	TDF+3TC+EFV
Children aged 3 - < 12 years	ABC+3TC+EFV
Children 0 - < 3 years	ABC+3TC+AZT

ARV regimen substitution for patients initiating TB treatment while on ART

Age Group	Regimen When Diagnosed With Tb	Recommended Action/ Substitution
Adults, Pregnant and Breastfeeding Women and Adolescents	If on EFV- based regimen	Continue the same regimen but double the dose of DTG (give DTG twice daily)
	If on NVP based regimen	Substitute NVP with EFV. If EFV is contraindicated, give DTG as above. If DTG not available, give a triple NRTI regimen (ABC+3TC+AZT).

## ARV regimen substitution for patients initiating TB treatment while on ART

Age Group	Regimen When Diagnosed With Tb	Recommended Action/ Substitution
Adults, Pregnant and Breastfeeding Women and Adolescents	If on LPV/r based regimen	Continue the same regimen but double the dose of DTG (give DTG twice daily)
	If on ATV/r based regimen	Continue the same regimen and give Rifabutin for TB treatment
Children aged 3 - <12 years	If on EFV- based regimen	Continue the same regimen
	If on NVP or based regimen	Substitute NVP with EFV. If EFV is contraindicated, give a triple NRTI regimen (ABC+3TC+AZT)
	LPV/r	Continue the same regimen and give Rifabutin for TB treatment
Children 0 - <3 years	If on LPV/r or NVP based regimen	Give triple NRTI regimen ABC+3TC+AZT

## Second line ART for patients with TB

- ⦿ There are significant drug interactions with PIs and rifampicin.
- ⦿ If rifabutin is available, it may be used in place of rifampicin with ATV/r or LPV/r, but it is contraindicated in patients with WBC counts below 1000/mm3.
- ⦿ Maintaining PI in second line regimens while switching from

Rifampicin to Rifabutin (if available) is ideal

## TB prevention

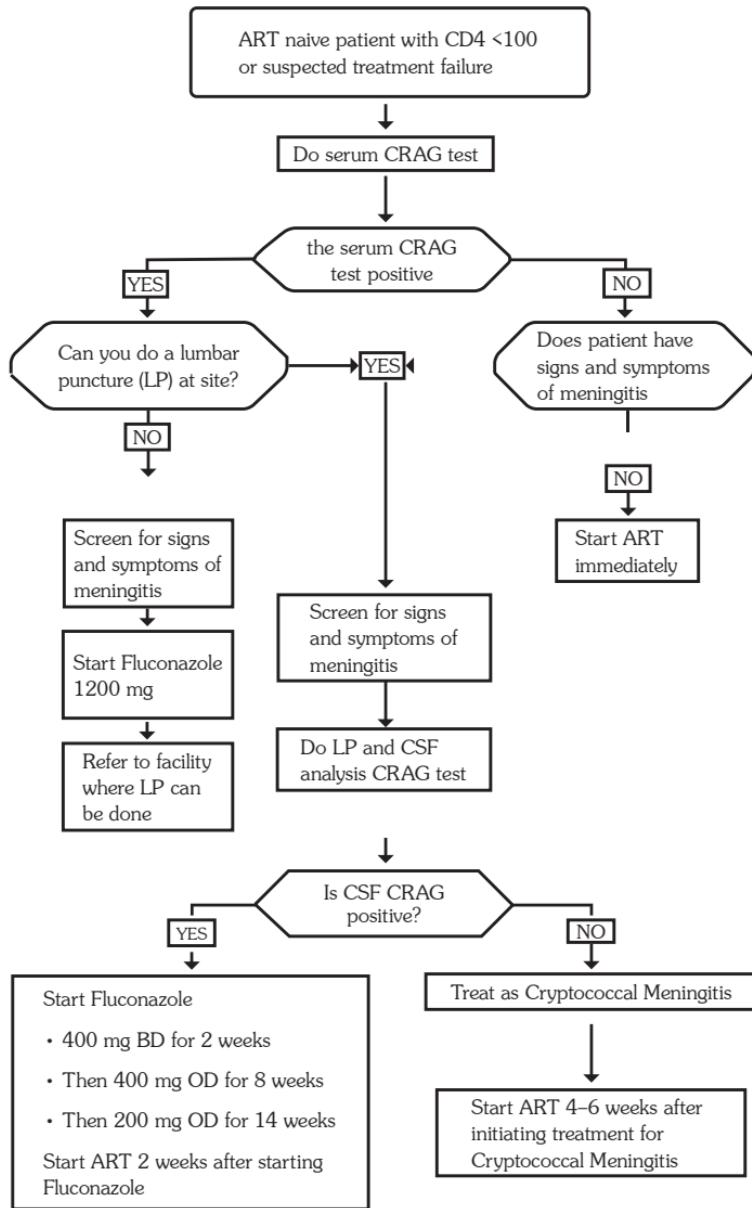
- ⦿ BCG immunisation: it protects children against severe forms of TB. It can be given at birth. If delayed, avoid in symptomatic HIV
- ⦿ IPT (Isoniazid Preventive Treatment) (see section 5.3.2.3)

### 3.1.10.2 Cryptococcal Meningitis

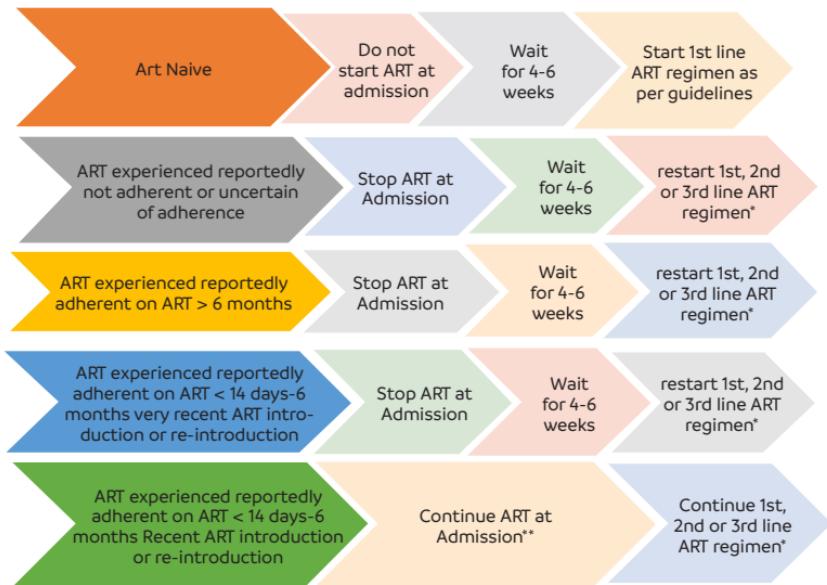
ICD10 CODE: B45

Cryptococcal meningitis is an opportunistic infection caused by a fungus *Cryptococcus neoformans*.

- ⦿ In Uganda, cryptococcal meningitis (CM) associated mortality is up to 39%. Patients with a CD4 cell count of <100 are at the highest risk, so early screening and management is critical.
- ⦿ Screening In ART-Naive Patients
- ⦿ Screen routinely for Cryptococcal Meningitis with the cryptococcal antigen (CrAg) test (a bedside finger prick test):
  - All ART naive individuals with CD4 <100 cells/ $\mu$ L
  - Patients on ART with viral load (VL >1000 copies/ml) or clinical (stage 3 or 4 disease) failure
- ⦿ If serum CrAg negative and no signs of meningitis: start ART immediately (or switch regimen)
- ⦿ If CrAg positive and/or signs or symptoms of meningitis (headache, presence of seizures, altered consciousness, photophobia, neck stiffness, and a positive Kernig's sign)
  - Perform lumbar puncture and test for CSF CrAg (culture if possible)
- ⦿ If CSF CrAg positive, diagnose and treat for Cryptococcal Meningitis
- ⦿ If CSF CrAg negative but blood CrAg positive, give pre-emptive treatment for asymptomatic cryptococcal disease or non CNS cryptococcal disease



## ART timing with CCM



Decision on which ART regimen to restart should be made according to patient's history, ART guidelines, HIV viral and genotypic resistance testing if possible. If it is considered likely that the patient has developed resistance to 1stline ARVs, then restart with 2ndline containing boosted PI or DTG is possible. \*\* Unless documented to have a suppressed viral load at time of admission or within the month prior to admission, in which case continue ART

## Management of CCM

Phase	Drug	Comments	LOC
<b>Newly Diagnosed Patient</b>			
Induction Phase (2 weeks)	<p>Recommended:</p> <ul style="list-style-type: none"> <li>• Amphotericin B liposomal single high dose (10mg/kg) + Flucytosine (100mg/kg/day in four divided doses) + Fluconazole 1200mg/ day for 14 days OR</li> <li>• Amphotericin B deoxycholate (1mg/kg/day) + Flucytosine (100mg/kg/day in four divided doses) for 1 week, followed by 1 week of fluconazole (1200 mg/day for adults, 12 mg/kg/day for children and adolescents). OR</li> </ul>	<p>Preventing Amphotericin toxicity:</p> <p>To prevent nephrotoxicity and hypokalemia, for patients on amphotericin deoxycholate do the following:</p> <ul style="list-style-type: none"> <li>• Pre-hydration with 1L normal saline before starting the daily Amphotericin B dose.</li> <li>• Monitor serum potassium and creatinine levels at initiation and at least twice weekly to detect changes in renal function.</li> <li>• Routine administration of 40 mEq/day (mixed in 500ml NS over 4 hours) of potassium chloride or 1 tablet of 600mg twice daily while on amphotericin B can decrease the incidence of Amphotericin B-related hypokalemia.</li> </ul>	H RR  H4  H RR

## Management of CCM

Phase	Drug	Comments	LOC
Induction Phase (2 weeks)	<ul style="list-style-type: none"> <li>Fluconazole (1200 mg daily for adults, 12 mg/kg/day for children and adolescents) + Flucytosine (100 mg/kg/day, divided into four doses per day. OR</li> <li>Amphotericin B deoxycholate (1mg/kg/day) + high-dose Fluconazole 1200mg/day.</li> </ul>	<ul style="list-style-type: none"> <li>For electrolyte supplementation, two tablets daily of Magnesium Chloride 310 mg or slow Magnesium Chloride 535mg or Magnesium trisilicate 250mg while on amphotericin B</li> <li>Consider alternate day Amphotericin B if creatinine is &gt;3mg/dl.</li> <li>To monitor for flucytosine (5FC) toxicity, CBC with differential counts at least twice weekly is recommended</li> </ul>	H4 H R
Consolidation phase (8 weeks)	Fluconazole 800mg/day (or 6-12mg/kg/day in children and adolescents)	Initiate ART 4-6 weeks after starting CM treatment and there is clinical response to antifungal therapy.	H4

Phase	Drug	Comments	LOC
Maintenance Phase (18 months)	Fluconazole 200mg/day (or 6 mg/kg/day up to 200mg in children and adolescents)	Criteria to stop after a minimum of 18 months of maintenance phase:  Adults: VL<1,000 copies/mm <sup>3</sup> & CD4 200 or CD4 200 (if viral load not available) after 12 and 18 months  Children: If CD4>25% or viral suppressed	H4
<b>Relapse disease</b>			
Presents with a recurrence of symptoms of Meningitis and have a positive cerebrospinal fluid culture following a prior confirmed diagnosis of Cryptococcal Meningitis.			
Evaluate for drug resistance: Send CSF to Central Public Health Laboratory (CPHL) for culture and sensitivity testing, if there are no drug resistance results, re-initiate the induction therapy for two weeks and complete other phases of treatment.			
<b>Adequate control of elevated CSF pressure</b>			
<ul style="list-style-type: none"> <li>Control of increased intracranial pressure improves survival by 25% in persons with Cryptococcal Meningitis.</li> <li>All patients with a CSF Pressure &gt;250mm H<sub>2</sub>O will need a therapeutic LP the following day to reduce the CSF pressure to &lt;200 mm.</li> <li>In the absence of a manometer, one may use an IV giving set to create an improvised manometer measuring the height with a meter stick.</li> </ul> <p>Removing 20-30mL of CSF (even in the absence of a manometer) may be adequate to decrease CSF pressure. Most patients will need 2-3LPs during the induction phase.</p>			

### 3.1.10.3 Hepatitis B and HIV Co-Infection ICD10 CODE: B18

- Ⓐ Hepatitis B virus (HBV) is the leading cause of chronic liver disease among HIV patients. In Uganda, the prevalence of Hepatitis B among HIV patients is estimated to be at 17%. (see section 6.5.2 for more details on hepatitis B infection)
- Ⓐ All HIV-infected patients initiating and those failing ART should be routinely screened for HBV infection using Hep B surface Antigen (HBsAg)
- Ⓐ People living with HIV with a positive HBsAg should have other complementary tests at baseline and repeated every 6 months and these include:
  - ☐ A complete blood count
  - ☐ Liver function tests: ALT, AST, albumin, bilirubin, PT-INR
  - ☐ Liver ultrasound scan: to assess stage of liver fibrosis
  - Ⓐ Repeat tests every 6 months since patients with chronic HBV infection are at increased risk for hepatocellular carcinoma

#### Management of HBV/HIV co-infection

The goal of HBV/HIV treatment is to prevent dual disease progression and to reduce HBV-related morbidity and mortality

TREATMENT	LOC
<p><b>Preferably ART regimen containing:</b></p> <ul style="list-style-type: none"><li>☐ TDF 300 mg + 3TC 300 mg PO once daily for life</li><li>☐ After 6 months of treatment, patients should be evaluated for HBV treatment failure</li></ul>	H

TREATMENT	LOC
<p><b>If jaundice, malaise and abdominal right upper quadrant pain are present or if liver function tests are abnormal</b></p> <p><input type="checkbox"/> Do HBV DNA (hepatitis viral load) if any of the above is present</p> <p><b>Treatment Failure</b></p> <p><input type="checkbox"/> Patients with HB VL &gt;2000 IU/ml at 24 weeks of therapy should be referred for further evaluation and management</p>	

### Prevention of HBV infection

- Counseling: emphasize sexual transmission as well as the risks associated with sharing needles and syringes, tattooing or body-piercing
- Advise patients with chronic HBV disease to avoid alcohol consumption
- All household members and sexual partners of people living with HIV with HBV should be screened for HBsAG
- HBV Vaccination is the most effective way to prevent HBV infection and its consequences
  - All HIV-infected patients who test negative on HBsAg should be vaccinated with HBV vaccine
  - All sexual partners and contacts should receive HBV vaccination regardless of whether they are HIV-infected or not

### 3.1.10.4 Pneumocystis Pneumonia

ICD10 CODE: B59

Interstitial pneumonitis caused by the parasite *Pneumocystis jirovecii* (formerly *carinii*). It is common in severely immunosuppressed patients (e.g. in HIV).

- Clinical features
- Fever
- Dry cough
- Shortness of breath (significant hypoxemia)
- 

#### Investigations

- Chest x-ray shows characteristic bilateral interstitial infiltrates

#### Management

Pre-emptive treatment for cryptococcal disease

TREATMENT	LOC
<b>Pneumocystis Jirovecii pneumonia</b>	HC4
<input checked="" type="checkbox"/> Give oxygen if SpO <sub>2</sub> <94% <input checked="" type="checkbox"/> Cotrimoxazole 120 mg/kg/daily in 2-4 divided doses for 21 days - For example cotrimoxazole 480 mg tablets: - If patient is < 60 kg: give 3 tablets If patient >60 kg: give 4 tablets <input checked="" type="checkbox"/> Plus prednisolone 2 mg/kg daily in 3 divided doses for 5 days, then reduce dose to complete 21 days of treatment	RR
<b>Or (in patients who cannot tolerate or do not respond to cotrimoxazole)</b>	H
<input checked="" type="checkbox"/> Pentamidine 4 mg/kg by IV infusion daily for 21 days - Reduce dose in renal impairment	

TREATMENT	LOC
<ul style="list-style-type: none"> <li>- Reduce dose in renal impairment</li> <li>- Avoid direct bolus injections whenever possible but if unavoidable, never give rapidly</li> </ul> <p><b>Alternative regimen (21-day course) if above not available/ tolerated</b></p> <ul style="list-style-type: none"> <li>- Clindamycin 600 mg every 8 hours</li> <li>- Plus dapsone 100 mg daily</li> </ul>	
<p><b>Prophylaxis</b></p> <p>Give to all patients with history of PCP infection and consider also for severely immunocompromised patients</p> <ul style="list-style-type: none"> <li>- Cotrimoxazole 960 mg daily or</li> <li>- Dapsone 100 mg daily</li> <li>- Continue until immunity recovers sufficiently</li> </ul>	

### 3.1.10.5 Other Diseases

**People living with HIV are at higher risk of acquiring any other infection and diseases, including non-communicable diseases, due to HIV itself and drug side effects.**

- Treat any other infection (e.g. malaria, STI) as per guidelines for the general population
- Screen regularly for NCD (diabetes, hypertension and depression)
- Screen women at enrolment in HIV care and then annually for cervical cancer using Visual Inspection with Acetic Acid (VIA) (see section 12.2.2)

### 3.1.11 Prevention of HIV

#### Behavioural change

- Always follow safe sex practices (e.g. use condoms; avoid multiple sexual partners)
- Never share used needles, syringes, razors, hair shavers, nail cutters, and other sharp objects



- ⦿ Avoid tattooing, body-piercing, and scarification unless carried out under strictly hygienic conditions in properly controlled premises
- ⦿ Delay start of sexual activity in adolescence
- ⦿ Discourage cross generational and transactional sex
- ⦿ Avoid violence and abuse

### Biomedical prevention interventions

- ⦿ PMTCT
- ⦿ Safe Male Circumcision
- ⦿ ART with viral suppression
- ⦿ PEP (Post Exposure Prophylaxis)
- ⦿ PrEP (Pre Exposure Prophylaxis)
- ⦿ Blood transfusion safety
- ⦿ STI screening and treatment
- ⦿ Safe infusion and injection practices
- ⦿ Adherence to infection control procedures

#### 3.1.11.1 Post-Exposure Prophylaxis

ICD10 CODE: Z20.6

Post-exposure prophylaxis (PEP) is the short-term use of ARVs to reduce the likelihood of acquiring HIV infection after potential occupational or non-occupational exposure.

#### Types of Exposure

- ⦿ Occupational exposures: Occur in health care settings and include sharps and needlestick injuries or splashes of body fluids to the skin and mucous membranes
- ⦿ Non-occupational exposures: Include unprotected sex, exposure following assault like in rape & defilement, road traffic accidents and injuries at construction sites where exposure to body fluids occur

## Steps in providing PEP

TREATMENT	LOC
<p><b>Step 1: Rapid assessment and first aid</b></p> <p>Conduct a rapid assessment of the client to assess exposure and risk and provide immediate care</p> <p>Occupation exposure:</p> <p>After a needle stick or sharp injury:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Do not squeeze or rub the injury site</li> <li><input type="checkbox"/> Wash the site immediately with soap or mild disinfectant (chlorhexidine gluconate solution) or, use antiseptic hand rub/ gel if no running water (do not use strong irritating antiseptics (like bleach or iodine)</li> </ul> <p>After a splash of blood or body fluids in contact with intact skin/broken:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Wash the area immediately or use antiseptic hand rub/ gel if no running water (don't use strong irritating antiseptics)</li> </ul> <p>After a splash of blood or body fluids contact with mucosae:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Wash abundantly with water</li> </ul>	HC2
<p><b>Step 2: Eligibility assessment</b></p> <p><b>Provide PEP when:</b></p> <ul style="list-style-type: none"> <li>- Exposure occurred within the past 72 hours; and</li> <li>- The exposed individual is not infected with HIV; and</li> <li>- The 'source' is HIV-infected or has unknown HIV status or high risk</li> </ul> <p><b>Do not provide PEP when:</b></p> <ul style="list-style-type: none"> <li>- The exposed individual is already HIV positive;</li> <li>- When the source is established to be HIV negative;</li> </ul>	

TREATMENT	LOC
<ul style="list-style-type: none"><li>- Exposure to bodily fluids that do not pose a significant risk: e.g. to tears, non-blood-stained saliva, urine, and sweat, or small splashes on intact skin</li><li>- Exposed people who decline an HIV test</li></ul>	
<b>Step 3: Counseling and support</b> <ul style="list-style-type: none"><li><input checked="" type="checkbox"/> Counsel on:<ul style="list-style-type: none"><li>- The risk of HIV from the exposure</li><li>- Risks and benefits of PEP</li><li>- Side effects of ARVs</li><li>- Provide enhanced adherence counseling if PEP is prescribed</li><li>- Link for further support for sexual assault cases (see below)</li></ul></li></ul>	
<b>Step 4: Prescription</b> <ul style="list-style-type: none"><li><input checked="" type="checkbox"/> PEP should be started as early as possible, and not beyond 72 hours from exposure</li><li><input checked="" type="checkbox"/> Recommended regimens:<ul style="list-style-type: none"><li>- Adults : TDF+3TC+ATV/r</li><li>- Children: ABC+3TC+LPV/r</li></ul></li><li><input checked="" type="checkbox"/> A complete course of PEP should run for 28 days</li><li><input checked="" type="checkbox"/> Do not delay the first doses because of lack of baseline HIV Test</li></ul>	
<b>Step 5: Follow up</b> <ul style="list-style-type: none"><li><input checked="" type="checkbox"/> To monitor adherence and manage side effects</li><li><input checked="" type="checkbox"/> Discontinue PEP after 28 days</li><li><input checked="" type="checkbox"/> Perform follow-up HIV testing 6-week, 3 and 6 months after exposure<ul style="list-style-type: none"><li>- If HIV infected, provide counseling and link to HIV clinic for care and treatment</li><li>- If HIV uninfected, provide HIV prevention education/risk reduction.</li></ul></li></ul>	

## Post-rape care (see also section 1.2.6)

Health facilities should provide the following clinical services as part of post-rape care:

- Initial assessment of the client
- Rapid HIV testing and referral to care and treatment if HIV-infected
- Post-exposure prophylaxis (PEP) for HIV
- STI screening/testing and treatment
- Forensic interviews and examinations
- Emergency contraception – if person reached within the first 72 hours
- Counselling

The health facility should also identify, refer and link clients to non-clinical services

- Some of the services include the following:
- Long-term psycho-social support
- Legal counseling
- Police investigations, restraining orders
- Child protection services (e.g. emergency out of family care, reintegration into family care or permanent options when reintegration into family is impossible)
- Economic empowerment
- Emergency shelters
- Long-term case management

**Reporting:** Health facilities should use HMIS 105 to report Gender Based Violence (GBV)

### 3.1.11.2 Pre-Exposure Prophylaxis (PrEP)

#### Oral Pre-Exposure Prophylaxis (PrEP)

Definition: PrEP is the use of ARV drugs by HIV uninfected persons to prevent the acquisition of HIV before exposure to HIV. Table below describes processes involved in offering PrEP.

#### The process of providing pre-exposure prophylaxis (PrEP)

Process	Description
Screening for risk of HIV	<p>PrEP provides an effective additional biomedical prevention option for HIV-negative people at substantial risk of acquiring HIV infection. These include people who:</p> <ul style="list-style-type: none"><li>a) Live in discordant sexual relationships</li><li>b) Have had unprotected vaginal sexual intercourse with more than one partner of unknown HIV status in the past six months</li><li>c) Have had anal sexual intercourse in the past six months</li><li>d) Have had sex in exchange for money, goods or a service in the last six months</li><li>e) Use or abuse of drugs especially injectable drugs in the last six months</li><li>f) Have had more than one episode of a STI within the last twelve months</li><li>g) Are part of a discordant couple, especially if the HIV-positive partner is not on ART or has been on ART for less than six months or not virally suppressed.</li><li>h) Recurrent post-exposure prophylaxis (PEP) users. (Recurrent implies PEP use more than 3 times a years).</li><li>i) Are members of key or priority populations who are unable or unwilling to achieve consistent use of condoms.</li></ul>

Process	Description
	<p>NB: Eligibility is likely to be more prevalent in populations such as discordant couple, sex workers, fisher folk, long-distance truck drivers, men who have sex with men (MSM), uniformed forces, and adolescents and young women including pregnant and lactating AGYW at substantial risk.</p>
<p>Screening for PrEP eligibility</p>	<p>After meeting the substantial risk for HIV criteria:</p> <ul style="list-style-type: none"> <li>▪ Confirm HIV-negative status using the national HTS algorithm</li> <li>▪ Rule out signs and symptoms of acute HIV infection</li> <li>▪ Assess for hepatitis B infection: if negative, patient is eligible for PrEP; if positive, refer patient for Hepatitis B management.</li> </ul> <p>Note:</p> <ul style="list-style-type: none"> <li>▪ HEP B positive test is not a contraindication for initiating PrEP, however precaution</li> </ul>
	<p>needs to be taken when making a decision to stop PrEP to avoid HEP B viral load flare.</p> <ul style="list-style-type: none"> <li>▪ Creatinine test and creatinine clearance calculation using GFR formula is done. Do not offer PrEP if Creatinine clearance is less than 1.2mg/dl.</li> </ul> <p>Note: Absence of this should not delay PrEP initiation in persons with no signs and symptoms of renal impairment. If available, creatinine test can be done at initiation and repeated every 6 months.</p> <p>I. Assess for contraindications to TDF/FTC or TDF/3TC.</p>

Process	Description
Steps to initiation of PrEP	<p>Provide risk-reduction and PrEP medication adherence counseling:</p> <ul style="list-style-type: none"><li>II. Provide condoms and education on their use</li><li>III. Initiate a medication adherence plan</li><li>IV. Prescribe a once-daily pill of TDF (300mg) and FTC (200mg) or TDF (300mg)/ 3TC (300mg)</li><li>V. Initially, provide a 1-month TDF/FTC or TDF/3TC prescription (1 tablet orally, daily) together with a 1-month follow-up date</li><li>VI. Counsel client on side effects of TDF/FTC or TDF/3TC</li></ul>
Follow-up/ monitoring clients on PrEP	<ul style="list-style-type: none"><li>VII. After the initial visit, the patient should be given a two-month follow-up appointment and thereafter quarterly appointments</li><li>VIII. Perform an HIV antibody test using the national HTS algorithm and every three months. Note: Blood based HIVST is an alternative for PrEP refill in case of absence of the national HTS standard recommended in patients on PrEP.</li><li>IX. For women, perform a pregnancy test if there is history of amenorrhea.</li><li>X. Review the patient's understanding of PrEP, any barriers to adherence, tolerance to the medication as well as any side effects.</li><li>XI. Review the patient's risk exposure profile and perform risk-reduction counseling.</li><li>XII. Evaluate and support PrEP adherence at each clinic visit.</li><li>XIII. Evaluate the patient for any symptoms of STIs at every visit and treat according to current STI treatment Guidelines.</li></ul>

Process	Description
Guidance on discontinuing PrEP	<ul style="list-style-type: none"> <li>Acquisition of HIV infection</li> <li>Suspected signs and symptoms of acute HIV infection following a recent exposure within 4 weeks</li> <li>Changed life situations resulting in lowered risk of HIV acquisition (no longer at substantial risk of HIV acquisition)</li> <li>Intolerable toxicities and side effects of ARVs</li> <li>Chronic non-adherence to the prescribed regimen despite efforts to improve daily pill-taking.</li> <li>Personal choice</li> <li>HIV-negative in a sero-discordant relationship when the positive partner on ART for &gt;6months has achieved sustained viral load suppression (condoms should still be used consistently). The HIV negative partner can be allowed to continue PrEP even if the positive partner is virally suppressed if they choose to.</li> </ul> <p>For detailed guidance on the provision of PrEP, please refer to the Technical Guidance on Pre-Exposure Prophylaxis for Persons at High Risk of HIV in Uganda, 2022.</p>

### The PrEP Ring

The PrEP ring is a long-acting HIV prevention method developed specifically for clients who are unable or do not want to take oral PrEP or when oral PrEP is not available. The ring is made of a flexible silicone material containing 25 mg of an ARV drug called dapivirine. It is inserted into the vagina and should remain in place for one month. Dapivirine belongs to a class of ARVs called non-nucleoside reverse transcriptase inhibitors (NNRTI) that reduce the ability of HIV to replicate itself inside a healthy cell. The ring delivers the drug directly to the site of potential infection over the course of one month, with low absorption elsewhere in the body, lowering the likelihood of systemic side effects.



## Possible Side Effects of the PrEP Ring

Possible side effects of the ring are typically mild and include urinary tract infections (UTIs – experienced by about 15% of users), vaginal discharge (experienced by about 7% of users), vulvar itching (experienced by about 6% of users), and pelvic and lower abdominal pain (experienced by about 6% of users).

## Contraindications for PrEP Ring Use

The ring should not be provided to people with:

- An HIV-positive test result according to the national HIV testing algorithm
- Known exposure to HIV in the past 72 hours (because such clients may derive more benefit from post-exposure prophylaxis (PEP) if the potential for HIV exposure was high)
- Signs of AHI (Box 1) AND potential exposure within the past 14 days
- Inability to commit to effectively using the ring and attend scheduled follow-up visits
- Allergy or hypersensitivity to active substance or other substances listed in the product information sheet

## Long acting injectable cabotegravir (CAB-LA)

The long acting injectable cabotegravir: Is a long acting injectable drug containing Cabotegravir, an integrase inhibitor, is effective in preventing HIV among people at high risk of acquiring HIV.

It is indicated in all HIV negative persons at high risk of HIV.

Before initiation, individuals must be screened for HIV using the national HTS algorithm and rule out signs of Acute HIV infection as for oral PrEP.

- Administration: Its administrated in the buttock once every 8 weeks
- Side effects: The injectable cabotegravir is safe and well-tolerated.
- Efficacy/Effectiveness: The injectable cabotegravir was found to be over 95% effective

- Safety: No safety concerns have been associated
- Acceptability and barriers: In a study setting it was highly acceptable
- Contraindications: Hypersensitivity to active substance

**Note:**

- For detailed guidance on the provision of CAB-LA, please refer to the Technical Guidance on Pre-Exposure Prophylaxis for Persons at High Risk of HIV in Uganda, 2022.

### 3.1.12 Psychosocial Support for HIV-Positive Persons

HIV-positive persons benefit greatly from the following support after the first impact of the test result is overcome:

- ⦿ Provide of emotional support
- ⦿ Help the person understand the social, medical, and psychological implications for him/herself, the unborn child (in the case of a pregnant woman), and any sexual partners
- ⦿ Connect the person with support services, including (religious) support groups, orphan care, income- generating activities, home care and others
- ⦿ Help the person find strategies to involve his/her partner and extended family in sharing responsibility
- ⦿ Help the person identify someone from the community to support and care for him/her
- ⦿ Discuss with HIV positive mothers how to provide for the other children in the family
- ⦿ Help him/her identify a person from the extended family or community who will provide support
- ⦿ As appropriate, confirm and support information given in HIV counselling and testing on mother-to-child transmission, possibility of ARV treatment, safer sex, infant feeding and FP advice



- ⑤ Help the person to understand and develop strategies to apply new information within daily life.

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- ⑥ Provide of emotional support
- ⑥ Help the person understand the social, medical, and psychological implications for him/herself, the unborn child (in the case of a pregnant woman), and any sexual partners
- ⑥ Connect the person with support services, including (religious) support groups, orphan care, income- generating activities, home care and others
- ⑥ Help the person find strategies to involve his/her partner and extended family in sharing responsibility
- ⑥ Help the person identify someone from the community to support and care for him/her
- ⑥ Discuss with HIV positive mothers how to provide for the other children in the family
- ⑥ Help him/her identify a person from the extended family or community who will provide support
- ⑥ As appropriate, confirm and support information given in HIV counselling and testing on mother-to-child transmission, possibility of ARV treatment, safer sex, infant feeding and FP advice
- ⑥ Help the person to understand and develop strategies to apply new information within daily life.

## 3.2 SEXUALLY TRANSMITTED INFECTIONS (STI)

STIs are a collection of disorders, several of which are better regarded as syndromes for more effective management using a syndromic approach.

### Prevention of STIs

- General preventive measures include:
- Give health education about STIs
- Provide specific education on the need for early reporting and compliance with treatment
- Ensure notification and treatment of sexual partners
- Counsel patient on risk reduction e.g. practice of safe sex by using condoms, remaining faithful to one sexual partner, personal hygiene
- Provide condoms
- If necessary and possible, schedule return visits

#### 3.2.1 Urethral Discharge Syndrome (Male)

ICD10 CODE: R36

It refers to urethral discharge in men with or without dysuria, caused by a number of diseases usually spread by sexual intercourse, which produce similar manifestations in males and may be difficult to distinguish clinically.

### Causes

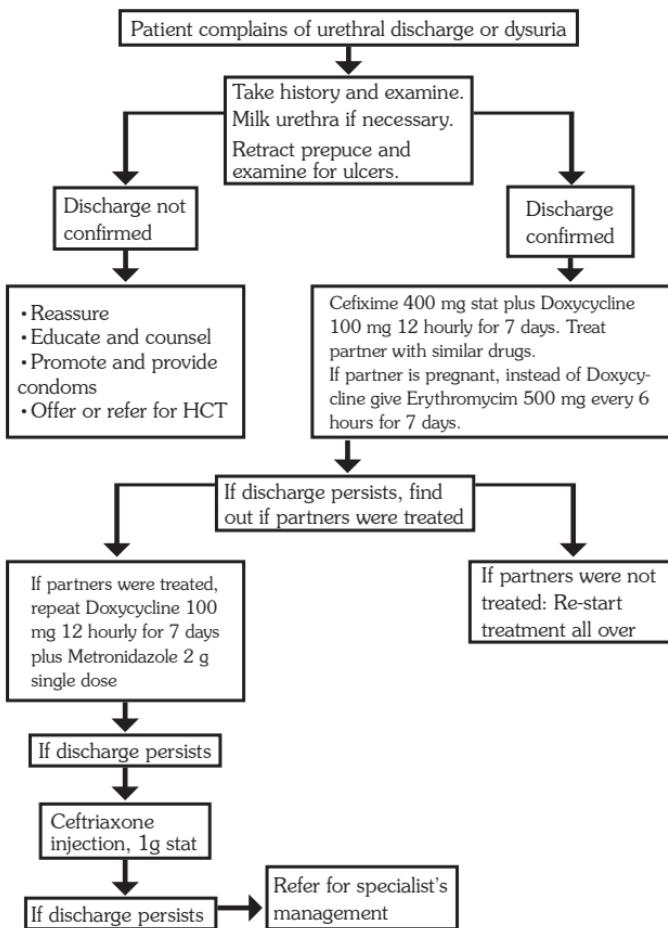
- Common: Neisseria gonorrhoea (causing gonorrhoea),
- Chlamydia trachomatis and Ureaplasma urealyticum
- Uncommon: Trichomonas vaginalis

## Clinical features

- Mucus or pus at the tip of the penis; staining underwear
- Burning pain on passing urine (dysuria), frequent urination

## Investigations

- Pus swab: Gram stain, culture and sensitivity
- Blood: Screen for syphilis and HIV
- Examine patient carefully to confirm discharge



TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Take history and examine the client. Milk urethra if discharge is not obvious</li> </ul> <p>Retract prepuce and examine for ulcers f Treat both patient and sexual partners f Advise abstinence or condom use</p> <p><b>Medicines</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Ceftriaxone 250 mg IM or Cefixime 400 mg single dose plus</li> <li><input type="checkbox"/> Doxycycline 100 mg every 12 hours for 7 days</li> </ul> <p>If partner is pregnant</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Substitute doxycycline with erythromycin 500 mg every 6 hours for 7 days</li> <li><input type="checkbox"/> or Azithromycin 1 g stat if available</li> </ul> <p><b>If discharge or dysuria persists and partners were treated:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Exclude presence of ulcers under prepuce</li> <li><input type="checkbox"/> Repeat doxycycline 100 mg every 12 hours for 7 days</li> <li><input type="checkbox"/> Also give metronidazole 2 g single dose</li> </ul> <p><b>If discharge or dysuria persists and partners were not treated:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Start the initial treatment all over again and treat partners</li> </ul> <p><b>If discharge persists still</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Ceftriaxone 1 g IM</li> <li><input type="checkbox"/> Refer for specialist management if not better</li> </ul>	HC2
	HC3

### 3.2.2 Abnormal Vaginal Discharge Syndrome

ICD10 CODE: N76

Often the first evidence of genital infection al, though absence of abnormal vaginal discharge does not mean absence

of infection. Normal discharge is small in quantity and white to colourless.  
Not all vaginal infections are sexually transmitted diseases.

#### Causes

- Ⓐ Can be a variety and often mixture of organisms
- Ⓐ Vaginitis: by Candida albicanis, Trichomonas vaginalis or bacterial vaginosis (by Gardnerella vaginalis, Mycoplasma hominis)
- Ⓐ Cervicitis: commonly due to gonorrhoea and chlamydia: usually asymptomatic and rarely a cause of abnormal vaginal discharge.
- Ⓐ Clinical features
- Ⓐ Increased quantity of discharge, abnormal colour and odour
- Ⓐ Lower abdominal pain, itching and pain at sexual intercourse may be present
- Ⓐ In Candida albicans vaginitis: very itchy thick or lumpy white discharge, red inflamed vulva
- Ⓐ Trichomonas vaginalis: itchy greenish-yellow frothy discharge with offensive smell
- Ⓐ Bacterial vaginosis: thin discharge with a fishy smell from the vagina

Candida vaginitis and bacterial vaginosis are NOT sexually transmitted diseases, even though sexual activity is a risk factor.

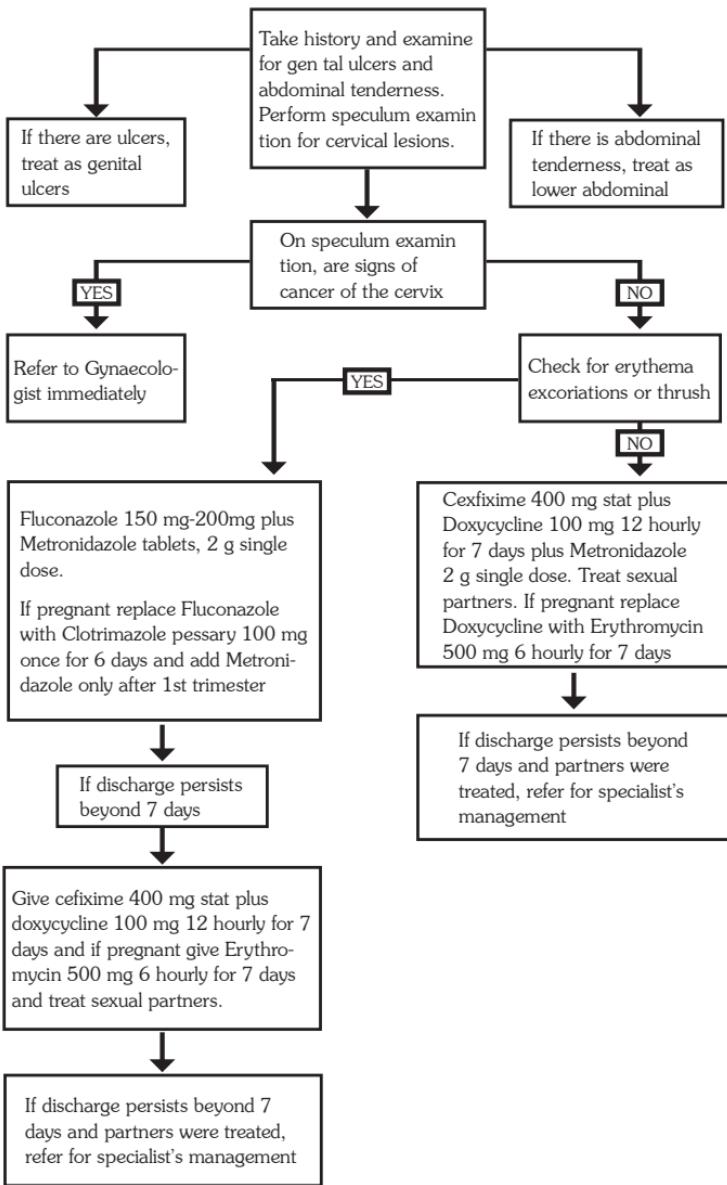
- Gonorrhoea causes cervicitis and rarely vaginitis. There is a purulent thin mucoid slightly yellow pus discharge with no smell and non-itchy
- Chlamydia causes cervicitis which may present with a non-itchy, thin, colourless discharge

### Differential diagnosis

- Cancer of the cervix (blood-stained smelly discharge)
- Intra-vaginal use of detergents, chemicals, physical agents and herbs, chronic tampon use, allergic vaginitis

### Investigations

- Speculum examination
- Pus swab: microscopy, Gram stain, C&S
- PH, KOH
- Blood: syphilis tests (RPR/VDRL)
- HIV Testing



## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Take history and examine for genital ulcers, abdominal tenderness</li> <li><input type="checkbox"/> Perform speculum examination for cervical lesions</li> <li><input type="checkbox"/> Assess risk for sexually transmitted disease</li> </ul> <p>If there is lower abdominal tenderness and sexually active:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Treat as in PID (see section 14.1.2)</li> </ul>	
<p>If no lower abdominal pain and discharge is thick and lumpy, vagina is itchy and erythema or excoriations are present: likely Candida</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Give clotrimazole pessaries 100 mg; insert high in vagina once daily before bedtime for 6 days or twice daily for 3 days</li> <li><input type="checkbox"/> Or fluconazole 200 mg tablets single dose, orally</li> <li><input type="checkbox"/> ± Metronidazole 2 g stat dose</li> </ul>	HC2
<p>If abundant/smelly discharge/vaginosis: possible trichomonas or vaginosis</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Metronidazole 2 g stat</li> </ul>	HC2
<p>If purulent discharge, or high risk of STD, or previous treatment non effective: treat for gonorrhea, and chlamydia, and trichomonas</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Give cefixime 400 mg stat or ceftriaxone 1g IV stat</li> <li><input type="checkbox"/> Plus doxycycline 100 mg 12 hourly for 7 days</li> </ul> <p>Plus metronidazole 2 g stat</p>	HC3

TREATMENT	LOC
<p><b>However if client is pregnant</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Replace doxycycline with erythromycin 500 mg 6 hourly for 7 days or           <ul style="list-style-type: none"> <li>- Azithromycin 1 g stat</li> </ul> </li> <li><input type="checkbox"/> Treat the partner</li> </ul> <p>If discharge or dysuria still persists and partners treated:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Refer for further management</li> </ul>	HC3

### 3.2.3 Pelvic Inflammatory Disease (PID)

See section 14.1.2

### 3.2.4 Genital Ulcer Disease (GUD) Syndrome ICD10 CODES:

N76.5-6, N48.5

Genital ulcer syndrome is one of the commonest syndromes that affect men and women. Single or multiple ulcers can be present.

#### Causes

Multiple organisms can cause genital sores, commonly:

- Ⓐ Treponema pallidum bacteria: syphilis
- Ⓐ Herpes simplex virus: genital herpes
- Ⓐ Haemophilus ducreyi: Chancroid
- Ⓐ Donovania granulomatis: Granuloma inguinale
- Ⓐ Chlamydia strains: lymphogranuloma venereum (LGV)

#### Clinical features

Mixed infections are common

- Ⓐ Primary syphilis: the ulcer is at first painless and may be between or on the labia or on the penis
- Ⓐ Secondary syphilis: multiple, painless ulcers on the penis or vulva
- Ⓐ Genital Herpes: small, multiple, usually painful blisters,

vesicles, or ulcers. Often recurrent

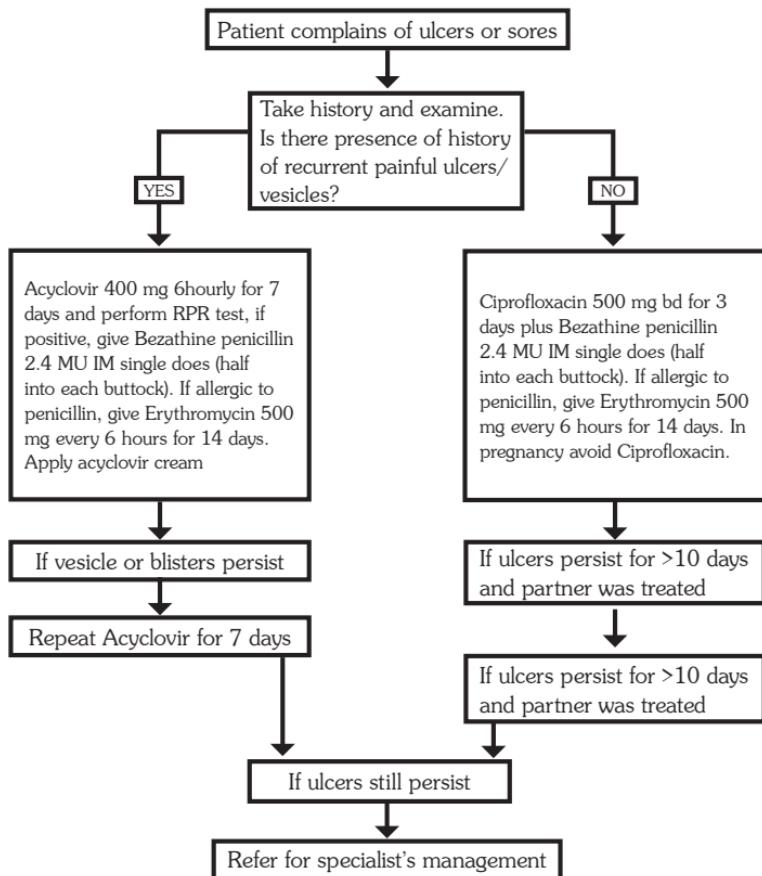
- Ⓐ Granuloma inguinale: an irregular ulcer which increases in size and may cover a large area
- Ⓐ Chancroid: multiple, large, irregular ulcers with enlarged painful suppurating lymph nodes

### Differential diagnosis

- Ⓐ Cancer of the penis in elderly men
- Ⓐ Cancer of the vulva in women >50 years

### Investigations

- Ⓐ Swab: for microscopy
- Ⓐ Blood: for VDRL/TPR





## Management

TREATMENT	LOC
<b>Multiple painful blisters or vesicles: likely herpes</b>	
<input type="checkbox"/> Aciclovir 400 mg every 6 hours for 7 days <input type="checkbox"/> If RPR positive add Benzathine penicillin 2.4 MU IM single dose (half in each buttock) <input type="checkbox"/> If lesions persist, repeat acyclovir for 7 days	HC4 HC3
<b>All other cases</b>	
<input type="checkbox"/> Ciprofloxacin 500 mg every 12 hours for 3 days plus Benzathine penicillin 2.4 MU IM single dose (half into each buttock) <input type="checkbox"/> In penicillin allergy, give Erythromycin 500 mg every 6 hours for 14 days	
<b>If ulcer persists &gt;10 days and partner was treated</b>	
<input type="checkbox"/> Add Erythromycin 500 mg every 6 hours for 7 days	
<b>If ulcer still persists</b>	
<input type="checkbox"/> Refer for specialist management	
<b>Note</b>	
<ul style="list-style-type: none"> <li>▪ Negative RPR does not exclude early syphilis</li> <li>▪ Genital ulcers may appear with enlarged and fluctuating inguinal lymph nodes (buboës). Do not incise buboës</li> </ul>	

### 3.2.5 Inguinal Swelling (Bubo)

ICD 10 CODE: A57

It is an STI syndrome presenting as localised swellings or enlarged lymph glands in the groin and femoral area.

#### Causes

- Chlamydia strains: lymphogranuloma venereum (LGV)
- *Heamophilus ducreyi*: chancroid
- *Treponema pallidum*: syphilis

#### Clinical features

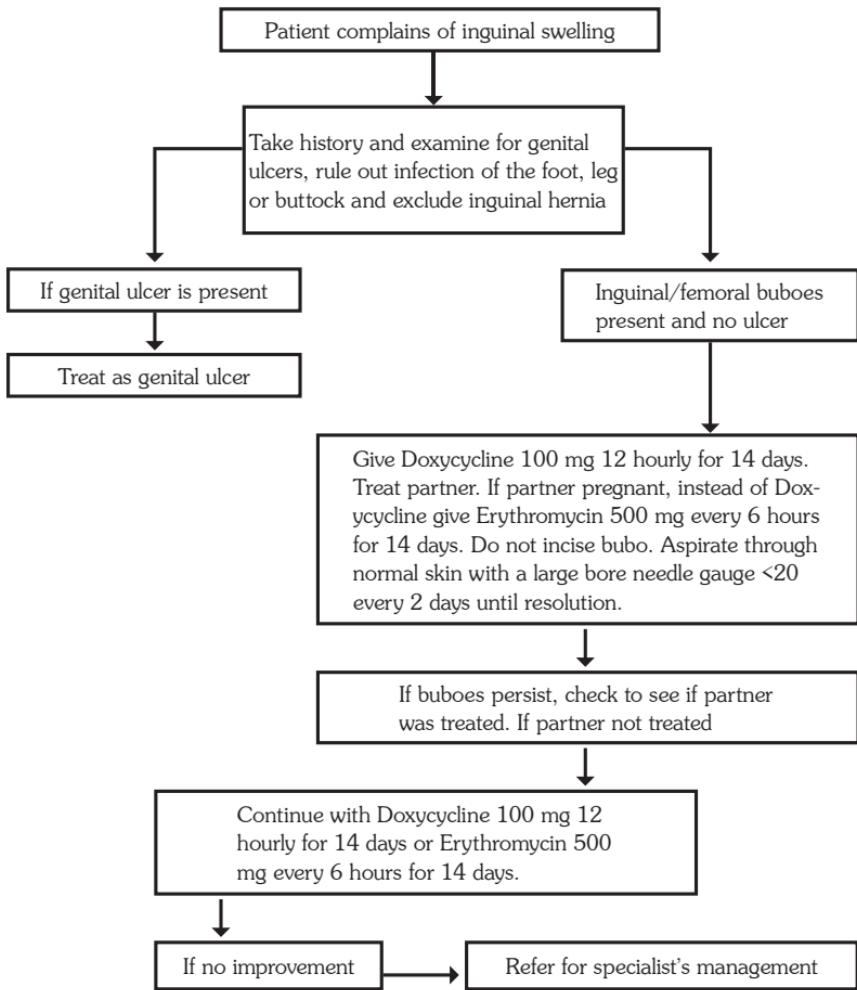
- Excessively swollen inguinal glands
- Pain, tenderness
- Swellings may become fluctuant if pus forms

#### Differential diagnosis

- Other causes of swollen inguinal lymph nodes, e.g. leg ulcer
- Obstructed inguinal hernia

#### Investigations

- As for Genital Ulcers
- C&S of pus



## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Examine for genital ulcers, rule out infection of the foot, leg or buttock and exclude inguinal hernia</li> <li><input type="checkbox"/> If genital ulcer is present, treat as per above protocol</li> <li><input type="checkbox"/> Give doxycycline 100 mg 12 hourly for 14 days</li> <li><input type="checkbox"/> Treat partner</li> </ul>	HC2 HC3
<b>If partner is pregnant</b>	
<ul style="list-style-type: none"> <li><input type="checkbox"/> Give erythromycin 500 mg every 6 hours for 14 days</li> </ul>	
If bubo persisting, and partner was not treated	
<ul style="list-style-type: none"> <li><input type="checkbox"/> Continue treatment for 14 days</li> </ul>	
<b>If not improving</b>	
<ul style="list-style-type: none"> <li><input type="checkbox"/> Refer for specialist management</li> </ul>	
<b>Caution</b>	
<ul style="list-style-type: none"> <li>▪ Do not incise bubo. Aspirate through normal skin with a large bore needle gauge &lt;20 every 2 days until resolution</li> <li>▪ Alternative to doxycycline: azithromycin 1 g single dose</li> </ul>	

### 3.2.6 Genital Warts

ICD10 CODE: A63.0

Superficial mucocutaneous infection

#### Causes

- Ⓐ Human papilloma virus (HPV): causes viral warts (condyloma acuminata)
- Ⓐ Treponema pallidum: causes syphilitic warts (condylomata lata)
- Ⓐ Molluscum contagiosum virus



## Clinical features

- Ⓐ Penis, foreskin, labia and vagina are the most common sites of the warts
- Ⓐ Warts can be variable in number and size, either few or multiple, small to very large
- Ⓐ HPV warts: soft fleshy growth on genitals
- Ⓐ Syphilitic warts: flat-topped and broad based growth
- Ⓐ Molluscum contagiosum: light coloured, umbilicated growths on the face and genital areas

## Differential diagnosis

- Ⓐ Rashes
- Ⓐ Eruptive skin lesions

## Management

TREATMENT	LOC
<input type="checkbox"/> Advise on personal hygiene <input type="checkbox"/> Treat underlying infection	HC4
<b>HPV viral warts</b> <input type="checkbox"/> Apply podophyllum resin paint 15% to the warts 1–3 times weekly until warts have resolved; may require multiple weekly treatments <ul style="list-style-type: none"> <li>- Protect normal skin with petroleum jelly before application</li> <li>- Apply precisely on the lesion avoiding normal skin</li> <li>- Wash off with water 4 hours after each application</li> <li>■ Do not use in pregnancy</li> </ul>	
<b>If no improvement after 3 applications</b> <input type="checkbox"/> Refer for specialist management	HC3
<b>Syphilitic Warts</b> <input type="checkbox"/> Give: benzathine penicillin injection 2.4 MU single dose (half into each buttock)	

TREATMENT	LOC
<b>Molluscum contagiosum</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Usually self limiting</li> <li><input type="checkbox"/> Treat underlying conditions that may be compromising the person's immunity</li> </ul>	

### 3.2.7 Syphilis

ICD10 CODE: A51-53

Complex chronic bacterial infection affecting a variety of organs and with multiple manifestations.

#### Cause

- Treponema pallidum*
- Transmitted sexually and from mother to foetus, rarely through blood transfusion or non sexual contact

#### Clinical features

The disease has several stages

- Primary syphilis: 10-90 days following inoculation, characterized by a painless genital ulcer with clean base and indurated margins, regional lymphadenopathy. It can heal spontaneously but the disease will progress to secondary lesions
- Secondary syphilis: few weeks to months (max 6 months) from primary lesions, characterised by:
  - Generalised maculopapular rash
  - Mucous membranes lesions (patches and ulcers)
  - Weeping papules (condyloma alata) in moist skin areas
  - Generalized non tender lymphadenopathy

- Fever, meningitis, hepatitis, osteitis, arthritis, iritis
- Early latent syphilis (<1 year in duration): clinically quiescent but possible relapse of secondary syphilis
- Late latent syphilis: clinically quiescent, not very infectious (but possible maternal foetal transmission)
- Late (tertiary) syphilis: at any time after secondary syphilis (even many years):
  - infiltrative tumour of skin, bones, liver
  - Aortitis, aneurysms, aortic regurgitation
  - Central nervous system disorders (neurosyphilis): meningo vascular syphilis, hemiparesis, seizures, progressive degeneration with paraesthesia, shooting pains, dementia, psychosis

### Investigations

- Non-treponemal antibody tests (VDRL and RPR)
  - Positive 4-6 weeks after infection
  - Used as screening test
  - Possibility of false positive
  - Remains positive 6-12 months after treatment
- Treponemal antibody tests (TPHA): very sensitive, used to confirm a positive non-treponemal test. Remains positive for long even after treatment so its positivity may not indicate active disease.

### Management

TREATMENT	LOC
<b>Primary, secondary and early latent syphilis</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Benzathine penicillin 2.4 million IU IM stat, half in each buttock</li> <li><input type="checkbox"/> or Doxycycline 100 mg every 12 hours for 14 days</li> </ul>	HC3

## Management

TREATMENT	LOC
<p><b>Late latent or uncertain duration, or tertiary without neurosyphilis</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Benzathine penicillin 2.4 million IU IM weekly for 3 weeks</li> <li><input type="checkbox"/> Or Doxycycline 100 mg every 12 hours for 28 days</li> </ul>	HC3
<p><b>Neurosyphilis</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Benzylpenicillin 4 million IU IV every 4 hours or</li> <li><input type="checkbox"/> Ceftriaxone 2 g IV or IM daily for 10-14 days</li> </ul>	HC2 HC3
<p><b>Followed by</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Benzathine penicillin 2.4 million IU IM weekly for 3 weeks</li> <li><input type="checkbox"/> Treat partner(s), abstain from sex during treatment and 10 days after</li> </ul>	HC3

### 3.2.8 Other Genital Infections

#### 3.2.8.1 Balanitis

ICD10 CODE: N48.1

Inflammation of the glans penis

##### Cause

- Usually caused by Candida, rarely by Trichomonas

##### Clinical features

- Discharge, erythema, erosions
- Prepuce is retractable



## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Fluconazole 200 mg stat</li> <li><input type="checkbox"/> Plus metronidazole 400 mg every 12 hours for 7 days</li> <li><input type="checkbox"/> Advise on hygiene and circumcision</li> </ul> <p>If not better:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Treat partner</li> </ul>	HC3

### 3.2.8.2 Painful Scrotal Swelling

ICD10 CODE: N45

- Inflammation of epididymis and testis

#### Causes

- Usually caused by N. gonorrhoea, Chlamydia
- Clinical features
- Acute painful and tender unilateral swelling of epididymus and testis, with or without urethral discharge

#### Differential diagnosis

- Acute testicular torsion
- Scrotal hernia, tumors

## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Treat as per urethral discharge protocol above (section 3.2.1)</li> </ul>	HC3

### 3.2.9 Congenital STI Syndromes

Congenital STIs in newborns occur as a result of infection of babies in utero or during delivery as a complication of untreated STIs among mothers. Syphilis, HIV, gonococcal, chlamydia and herpes simplex are the most serious congenital STIs.

#### 3.2.9.1 Neonatal Conjunctivitis (Ophthalmia Neonatorum)

ICD10 CODE: P39.1

Refers to conjunctival infection of neonates by STI organisms in the infected mother's birth canal. It is a very serious condition that can lead to corneal ulceration and ultimately to blindness. Blindness in children is associated with high infant morbidity and mortality.

##### Causes

- Ⓐ Commonly caused by *Neisseria gonorrhoeae* and
- Ⓐ Chlamydia trachomatis
- Ⓐ Other non-STI causes of neonatal conjunctivitis predisposed by difficult labour such as early rupture of membranes, vacuum extraction or other assisted vaginal delivery

##### Clinical features

- Ⓐ Purulent discharge from one or both eyes within 30 days from birth
- Ⓐ Inflamed and swollen eyelids
- Ⓐ Complications of untreated conjunctivitis: corneal ulceration, perforation, scarring and blindness

##### Investigations

- Ⓐ Pus swab: Gram stain, Culture & Sensitivity



## Management

TREATMENT	LOC
<p><b>Treatment should cover both gonorrhoea and chlamydia</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Start cleaning with normal saline and apply tetracycline ointment every hour while referring for systemic treatment</li> <li><input type="checkbox"/> Ceftriaxone 125 mg single dose IM plus azithromycin syrup 20 mg/kg orally, once daily for 3 days</li> <li><input type="checkbox"/> Irrigate the eyes with saline or sterile water</li> <li><input type="checkbox"/> Use gloves and wash hands thoroughly after handling the eyelids</li> <li><input type="checkbox"/> Cover the eye with gauze while opening the eyelid as pus may be under pressure</li> <li><input type="checkbox"/> Topical tetracycline eye ointment has NO added benefit in active disease</li> <li><input type="checkbox"/> Treat both parents for Gonorrhoea and Chlamydia and screen for HIV and syphilis</li> </ul>	HC2 HC3

## Prevention

- Screen and treat all infected mothers in antenatal care
- Apply prophylactic tetracycline eye ointment 1% to both eyes of ALL newborns at the time of delivery
- 

### 3.2.9.2 Congenital Syphilis

ICD10 CODE: A50

It is a serious debilitating and disfiguring condition that can be fatal. About one third of syphilis infected mothers have adverse pregnancy outcome, one third give birth to a healthy baby, while the remaining third may result into congenital syphilis infection.

## Cause

- *Treponema pallidum* bacteria

## Clinical features

- May be asymptomatic
- Early congenital syphilis: begins to show after 6-8 weeks of delivery
  - Snuffle, palmar/plantar bullae, hepatosplenomegaly, pallor, joint swelling with or without paralysis and cutaneous lesions. These signs are non-specific.
- Late congenital syphilis: begins to show at 2 years
  - Microcephaly, depressed nasal bridge, arched palate, perforated nasal septum, failure to thrive, mental subnormality and musculoskeletal abnormalities

## Investigations

Preferably perform the tests on mother:

- VDRL/RPR
- TPHA

## Management of congenital syphilis

TREATMENT	LOC
<ul style="list-style-type: none"> <li>□ Assume cerebrospinal involvement in all babies less than 2 years</li> <li>□ Aqueous benzylpenicillin 150,000 IU/kg body weight IV every 12 hours for a total of 10 days</li> <li>□ OR procaine penicillin, 50,000 IU/kg body weight, IM single dose daily for 10 days</li> <li>□ Treat both parents for syphilis with benzathine penicillin 2.4 MU single dose (half on each buttock)</li> </ul>	HC3
<b>Note</b> <ul style="list-style-type: none"> <li>▪ Assume that infants whose mothers had untreated syphilis or started treatment within 30 days of delivery have congenital syphilis</li> <li>▪ If mother is diagnosed with syphilis during</li> </ul>	

TREATMENT	LOC
<ul style="list-style-type: none"><li>■ pregnancy, use benzathine penicillin as first line since erythromycin does not cross the placental barrier and therefore does not effectively prevent in utero acquisition of congenital syphilis</li><li>■ Do not use doxycycline in pregnancy</li></ul>	

## Prevention

- ④ Routine screening and treatment of syphilis infected mothers in antenatal clinics

# 4 Cardiovascular Diseases

## 4.1.1 Deep Vein Thrombosis/Pulmonary Embolism (DVT/P) ICD10 CODE: I82.409

Clot formation within the deep venous system, usually of the calf, thigh, or pelvic veins. The clot can cause a local problem at site of formation or dislodge, leading to thromboembolism in various parts of the body, particularly the lungs (pulmonary embolism).

### Causes

- Venous stasis (slowing of blood flow)
- Increased coagulability states
- Endothelial injury

### Risk factors

- Immobilisation, prolonged bed rest, surgery, limb paralysis
- Heart failure, myocardial infarction
- Blunt trauma, venous injury including cannulation
- Oral contraceptive pills, pregnancy and postpartum
- Malignancies and some forms of chemotherapy
- Long distance airtravel
- Inherited thrombophilic states
- For PE: any other cause of dyspnoea and chest pain e.g. bronchopneumonia and myocardial infarction



## Clinical features

- ⦿ 50% of cases may be clinically silent
- ⦿ Pain, swelling and warmth of the calf, thigh, and groin
- ⦿ Dislodgement of the thrombus may lead to pulmonary embolism characterised by dyspnoea, tachycardia, chest pain, hypotension
- ⦿ Half of the cases of PE are associated with silent DVT

## Differential diagnosis

- ⦿ Cellulitis, myositis, phlebitis, contusion
- ⦿ For PE: any other cause of dyspnoea and chest pain

## Investigations

Compression ultrasound +/- doppler

- » In case of pulmonary embolism: chest CT angiogram
- » Other useful tests (not specific): blood D-dimer, ECG, Chest X ray, echo cardiogram

## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li>▶ Enoxaparin (Low molecular weight heparin- LMWH) 1 mg/kg every 12 hours for at least 5 days           <ul style="list-style-type: none"> <li>- No monitoring is required</li> </ul> </li> </ul>	H
<ul style="list-style-type: none"> <li>▶ Plus warfarin 5 mg single dose given in the evening, commencing on the same day as the heparin           <ul style="list-style-type: none"> <li>- Maintenance dose: 2.5-7.5 mg single dose daily,</li> <li>- adjusted according to the INR 2 -3</li> </ul> </li> </ul>	H
<b>If enoxaparin not available</b> <ul style="list-style-type: none"> <li>- Unfractionated heparin given as: 5000 units IV bolus and then 1000 units hourly or 17500 units subcutaneously 12 hourly for 5 days. Adjust dose according to activated partial thromboplastin time (APTT)</li> </ul>	H

## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li>- Or 333 units/kg SC as an initial dose followed by 250 units/kg SC every 12 hours</li> <li>- Plus warfarin as above</li> </ul>	H
<b>Notes</b>	
<ul style="list-style-type: none"> <li>▪ Monitor for bleeding complications</li> <li>▪ See section 1.3.10. for treatment of warfarin overdose and PGD 2015 monograph on protamine for excessive heparin dose</li> <li>▪ Do not start therapy with warfarin alone because it initially increases risk of thrombus progression</li> </ul>	

## Prevention

- Early mobilisation
- Prophylaxis with enoxaparin 40 mg SC daily in any acutely ill medical patient and in prolonged admission

### 4.1.2 Infective Endocarditis

ICD10 CODE: I33.0

An infection of the heart valves and lining of the heart chambers by microorganisms, usually bacterial, rarely fungal.

## Management

TREATMENT	LOC
<input type="checkbox"/> Low molecular weight heparin- <ul style="list-style-type: none"> <li>- (LMWH) e.g., Enoxaparin given as 1 mg/kg</li> <li>- every 12 hours or 1.5mg/kg once a day, for at least 5 days</li> </ul>	H
<input type="checkbox"/> Plus warfarin 5 mg single dose given in the evening, commencing on the same day as the heparin. Overlap treatment of warfarin and heparin. Heparin is stopped when the warfarin dose leads to an optimal INR of 2-3.	H



## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li>❑ Low molecular weight heparin-           <ul style="list-style-type: none"> <li>- (LMWH) e.g., Enoxaparin given as 1 mg/kg</li> <li>- every 12 hours or 1.5mg/kg once a day, for at least 5 days</li> </ul> </li> </ul>	H
<ul style="list-style-type: none"> <li>❑ Plus warfarin 5 mg single dose given in the evening, commencing on the same day as the heparin. Overlap treatment of warfarin and heparin. Heparin is stopped when the warfarin dose leads to an optimal INR of 2-3.</li> </ul>	H
<ul style="list-style-type: none"> <li>■ Maintenance dose: single dose daily, that need a higher maintenance dose than others especially when there are drugs that may interact with warfarin. Typical dose may range between 2.5 – 10mg daily. adjusted according to the INR 2 -3</li> </ul>	H

## Causes

It is classified into 3 types:

- Sub-acute endocarditis: caused by low virulence organisms such as *Streptococcus viridans*
- Acute endocarditis: caused by common pyogenic organisms such as *Staphylococcus aureus*
- Post-operative endocarditis: following cardiac surgery and prosthetic heart valve placement. The most common organism involved is *Staphylococcus aureus*

## Clinical features

- Disease may present as acute or chronic depending on the microorganism involved and patient's condition
- Fatigue, weight loss
- Low grade fever and chills or acute severe septicaemia
- Embolic phenomena affecting various body organs (e.g. brain)



- Heart failure, prominent and changing heart murmurs
- Splenomegaly, hepatomegaly
- Anaemia
- Splinter haemorrhages (nail bed and retina)
- Finger clubbing
- Diagnostic triad: persistent fever, emboli, changing murmur

## Risk factors

- Rheumatic heart disease, congenital heart disease
- Prosthetic valve
- Invasive dental/diagnostic/surgical procedures (including cardiac catheterization)
- Immunosuppression
- IV drug use/abuse

**Note:** Any unexplained fever in a patient with a heart valve problem should be regarded as endocarditis

## Differential diagnosis

- Cardiac failure with heart murmurs
- Febrile conditions associated with anaemia

## Investigations

- Blood cultures: These are usually positive and all efforts should be made to identify the responsible pathogen and obtain sensitivity data
- At least 3 sets of blood cultures (8 ml) each should be obtained (each from a separate venipuncture) at least one hour apart
- Blood: Complete blood count, ESR
- Urinalysis for microscopic haematuria, proteinuria
- Echocardiography
- ECG



## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li>▶ Bed rest</li> <li>▶ Treat complications e.g. heart failure Initial empirical antibiotic therapy</li> <li>▶ Benzylpenicillin 5 MU IV every 6 hours for 4 weeks</li> </ul> <p>Child: Benzylpenicillin 50,000 IU/kg every 6 hours for 4 weeks</p> <ul style="list-style-type: none"> <li>▶ Plus gentamicin 1 mg/kg IV every 8 hours for 2 weeks</li> <li>If staphylococcus suspected, (acute onset) add:</li> <li>▶ Cloxacillin IV 3 g every 6 hours</li> </ul> <p>Child: 50 mg/kg every 6 hours for 4 weeks</p> <p>If MRSA (Multi-Resistant Staphylococcus aureus)</p> <ul style="list-style-type: none"> <li>▶ Vancomycin 500 mg IV every 6 hours</li> <li>▶ Child: 10 mg/kg (infused over 1 hour) 6 hourly for 6 weeks</li> </ul> <p>Once a pathogen has been identified</p> <ul style="list-style-type: none"> <li>▶ Amend treatment to correspond with the sensitivity results</li> </ul>	H
	RR

## Prevention

- Prophylaxis in case of dental procedures and tonsillectomy in patients at risk (valvular defects, congenital heart disease, prosthetic valve). Give amoxicillin 2 g (50 mg/kg for children) as a single dose, 1 hour before the procedure.

### 4.1.3 Heart Failure

ICD10 CODE: I50

Clinical syndrome caused by inadequate cardiac output for the body's needs, despite adequate venous return.

For management purposes, it can be classified into:

- Congestive/acute heart failure

- Chronic heart failure
- Acute pulmonary oedema (see section 4.1.4)

## Causes

- Hypertension
- Valvular heart disease, e.g. rheumatic heart disease
- Myocardial infarction
- Myocarditis
- Prolonged rapid irregular heartbeat (arrhythmias)
- Congenital heart disease
- Severe anaemia, thyroid disease

## Clinical features

### Infants and young children

- Respiratory distress with rapid respiration, cyanosis, wheezing, subcostal, intercostal, and sternal recession
- Rapid pulse, gallop rhythm, excessive sweating
- Tender hepatomegaly
- Difficulty with feeding
- Cardiomegaly

### Older children and adults

- Palpitations, shortness of breath, exercise intolerance
- Fatigue, orthopnoea, exertional dyspnoea, wheezing
- Rapid pulse, gallop rhythm
- Raised jugular venous pressure (JVP)
- Dependent oedema, enlarged tender liver
- Basal crepitations

## Differential diagnosis

- Severe anaemia, severe acute malnutrition
- Nephrotic syndrome, cirrhosis
- Severe pneumonia
- Any severe sickness in infants

## Investigations

- Chest X-ray
- Blood: Haemogram (for ESR, anaemia)
- Urea and electrolytes
- Echocardiogram, ECG

## Management

TREATMENT	LOC
▶ Bed rest with head of bed elevated ▶ Prop up patient in sitting position ▶ Reduce salt intake and limit fluid intake (1-1.5 L/ day) ▶ Furosemide 20-40 mg oral or IV daily for every 12 hours increasing as required to 80-160 mg according to response  Child: 1 mg/kg oral or IV daily or every 12 hours according to response (max: 8 mg/kg daily)	HC4
▶ ACE inhibitors: start with low dose Enalapril 2.5 mg once daily, increase gradually over 2 weeks to 10-20 mg (max 40 mg) if tolerated (or Lisinopril 5mg increase gradually over 2 weeks to 40mg)	HC4
▶ Child: Enalapril 0.1-1 mg/kg daily in 1-2 doses Or ▶ Captopril 6.25-12.5 mg 8 -12 hourly, increase over 2-4 weeks to max 150 mg daily in divided doses ▶ Child: Captopril 0.1-0.3 mg/kg daily every 8-12 hours	H
<b>If available and when patient stable add:</b>  ▶ Adults: Carvedilol 3.125 mg every 12 hours, increase gradually every 2 weeks to max 25 mg 12 hourly (or Bisoprolol 1.25mg once daily increase gradually to max 10mg) ▶ Child: Carvedilol 0.05 mg/kg every 12 hours, increase gradually to max 0.35 mg/kg every 12 hours	H

TREATMENT	LOC
Additional medicines (second/third line)	H
▶ Spironolactone 25-50 mg once a day Child: Initially 1.5-3 mg/kg daily in divided doses	HC4
▶ Digoxin 125-250 micrograms/daily Child maintenance dose: 15 micrograms/kg daily	
<b>Caution</b>	
<ul style="list-style-type: none"> <li>△ Use ACE inhibitors and beta blockers with caution if systolic BP is less than 90 mmHg: monitor renal function</li> <li>△ Use digoxin with caution in elderly and renal disease</li> </ul>	

## Prevention

- Management of risk factors
- Early diagnosis and treatment of the cause (e.g. hypertension)
- Treatment adherence

## Chronic heart failure

Patients with chronic heart failure need continuous treatment to control symptoms and prevent disease progression and complications

## Management

TREATMENT	LOC
▶ Periodic monitoring of body weight, blood pressure, heart rate, respiratory rate and oxygen saturation ▶ Salt and fluid restriction ▶ Limit alcohol intake ▶ Regular exercise within limits of symptoms ▶ Continued treatment with the medicines listed above, with doses progressively increased to achieve control	HC2 HC4

## 4.1.4 Pulmonary Oedema ICD10 CODE: I50.21

Congestion of the lung tissue with fluid, usually due to heart failure.

### Cause

- Cardiogenic
- Severe fluid overload e.g. in renal failure or iatrogenic
- Non-cardiogenic pulmonary oedema: severe pneumonia, altitude sickness, inhalation of toxic gases, acute respiratory distress syndrome

### Clinical features

- Severe dyspnoea, rapid breathing, breathlessness
- Tachycardia, wheezing
- Cough with frothy blood stained sputum

### Differential diagnosis

- Pneumonia, pleural effusion
- Foreign body
- Trauma (pneumothorax, pulmonary contusion)

### Investigations

- Chest X-ray
- ECG
- Renal function, electrolytes
- Echocardiography

### Management

TREATMENT	LOC
Acute <ul style="list-style-type: none"><li>▶ Prop up patient in sitting position</li><li>▶ High concentration oxygen : start with 5 L/min, aim at SpO<sub>2</sub> &gt;95%</li></ul>	HC4

TREATMENT	LOC
▶ Furosemide 40-80 mg IM or slow IV - Repeat prn up to 2 hourly according to response Child: 0.5-1.5 mg/kg every 8-12 hours (max: 6 mg/kg) daily	HC4
▶ Glyceryl trinitrate 500 microgram sublingually every 4-6 hours	H
▶ Give morphine 5-15 mg IM or 2-4 mg slow IV Child: 0.1 mg/kg slow IV single dose	HC4
▶ Repeat these every 4-6 hours till there is improvement <b>Consider also</b>	H
▶ Digoxin loading dose IV 250 micrograms 3-4 times in the first 24 hours then maintenance dose of 125-250 micrograms daily Child: 10 mg/Kg per dose as above then maintenance dose of 15 microgram/kg/day	
<b>Caution</b> △ Do not give loading dose if patient has had digoxin within the past 14 days but give maintenance dose	

## Prevention

- Early diagnosis and treatment of cardiac conditions
- Compliance with treatment for chronic cardiac conditions
- Avoid fluid overload

### 4.1.5 Atrial Fibrillation ICD10 CODE: I48

Common cardiac arrhythmia characterised by irregular pulse due to the loss of the regular atrial electrical activity. Its onset can be acute or chronic, and it can be symptomatic or asymptomatic.



## Risk factors

- Heart disease (heart failure, valvular heart diseases, ischaemic heart disease)
- Thyroid disease (hyperthyroidism)

## Clinical features

- Irregular pulse (frequency and volume), heart rate can be either normal or very high
- Acute onset (often with high heart rate): palpitations, dizziness, fainting, chest pain, shortness of breath
- Chronic (with normal or almost normal heart rate): often asymptomatic, discovered at routine checks
- It can precipitate heart failure or pulmonary oedema
- It can cause embolic stroke if clots form in the heart and are then dislodged to the brain circulation

## Investigations

- ECG

## Objectives

- Control heart rate
- Restore normal rhythm if possible (specialist only)
- Prevent or treat complications
- Treat underlying conditions

## Management

TREATMENT	LOC
If acute onset, high heart rate or patient in congestive heart failure and/or pulmonary oedema: <ul style="list-style-type: none"> <li>▶ Treat heart failure as per guidelines (section 4.1.3), use digoxin and or Carvedilol (or Bisoprolol) to reduce heart rate</li> </ul>	HC4
If acute onset and high heart rate but no signs of heart failure: <ul style="list-style-type: none"> <li>▶ Use atenolol 50 mg to control heart rate</li> </ul>	HC4



## Management

TREATMENT	LOC
If chronic but normal heart rate: <ul style="list-style-type: none"> <li>▶ Only treat underlying conditions</li> <li>▶ Refer to regional level to assess indication for anticoagulation with aspirin or warfarin to prevent stroke</li> </ul>	H

### 4.1.6 Hypertension ICD10 code: I10

Persistently high resting blood pressure ( $>140/90$  mmHg for at least two measurements five minutes apart with patient seated) on at least 2 or 3 occasions 1 week apart.

#### Classification of blood pressure (BP)

Category	Sbp Mmhg		Dbp Mmhg
Normal	$<120$	and	$<80$
Pre-hypertension	120-139	or	80-89
Hypertension, stage 1	140-159	or	90-99
Hypertension, stage 2	$>160$	or	$>100$

SBP=systolic blood pressure; DBP=diastolic blood pressure

## Causes

- In the majority of cases, the cause is not known (essential hypertension)



## Secondary hypertension is associated with:

- Kidney diseases
- Endocrine diseases
- Eclampsia/pre-eclampsia
- Medicines (steroids and decongestants containing caffeine and pseudoephedrine)

## Risk factors

- Family history, race
- Obesity, physical inactivity
- Excessive intake of salt and alcohol
- Diabetes and dyslipidaemia

## Clinical features

The majority of cases are symptomless and are only discovered on routine examination or screening.

## General symptoms include:

- Headache
- Palpitations, dizziness

## Hypertension may present as a complication affecting:

- Brain (stroke)
- Heart (heart failure)
- Kidney (renal failure)
- Eyes (impairment of vision)

## Differential diagnosis

- Anxiety

## Investigations

To identify complications and possible cases of secondary hypertension:

- » Urine analysis
- » Blood sugar
- » Plasma urea and electrolytes
- Chest X-ray
- ECG

## Management of hypertension

Target: blood pressure below 140/90 mmHg

TREATMENT	LOC
<p>Hypertension, stage 1</p> <p><b>Step 1: Lifestyle adjustments</b></p> <ul style="list-style-type: none"> <li>▶ Do not add extra salt to cooked food, increase physical activity/exercise, reduce body weight</li> <li>▶ Stop smoking</li> <li>▶ Decrease alcohol intake</li> </ul> <p>If all the above fail (within 3 months), initiate medicine therapy</p> <p><b>Step 2:</b></p> <ul style="list-style-type: none"> <li>▶ Emphasize lifestyle changes with medicines</li> <li>▶ Give amlodipine 5 mg once daily</li> <li>▶ If not controlled after 1 month, treat as in stage 2</li> </ul>	HC3
<b>Hypertension, stage 2</b>	
<p><b>Step3</b></p> <p>Give Amlodipine 5 mg once daily Plus</p> <ul style="list-style-type: none"> <li>▶ Angiotensin II receptor blocker (ARB) e.g. Losartan 50mg (or Valsartan 80mg or Telmisartan 40mg) once daily</li> </ul> <p>△ Note: Instead of ARBs, you can use angiotensin converting enzyme inhibitors (ACEI) like Lisinopril 20mg or Enalapril 5mg once daily.</p>	HC3

TREATMENT	LOC
<p><b>Step4</b></p> <p>If blood pressure 140/90 mmHg after 1 month</p> <ul style="list-style-type: none"> <li>▶ Give Amlodipine 10 mg once daily</li> </ul> <p><b>Plus</b></p> <ul style="list-style-type: none"> <li>▶ Losartan 50mg (or Valsartan 80mg or Telmisartan 40mg) once daily</li> </ul>	HC3
<p><b>Step5</b></p> <p>If blood pressure 140/90 mmHg after 1 month</p> <ul style="list-style-type: none"> <li>▶ Give Amlodipine 10 mg once daily</li> </ul> <p><b>Plus</b></p> <ul style="list-style-type: none"> <li>▶ Losartan 100mg (or Valsartan 160mg or Telmisartan 80mg) once daily</li> </ul> <p><b>Plus</b></p> <ul style="list-style-type: none"> <li>▶ Thiazide diuretic like Hydrochlorothiazide 12.5mg (or Bendroflumethiazide 5mg) once in the morning</li> </ul>	HC3
<p><b>Step6</b></p> <p>If blood pressure 140/90 mmHg after 1 month</p> <ul style="list-style-type: none"> <li>▶ Give Amlodipine 10 mg once daily</li> </ul> <p><b>Plus</b></p> <ul style="list-style-type: none"> <li>▶ Losartan 100mg (or Valsartan 160mg or Telmisartan 80mg) once daily</li> </ul> <p><b>Plus</b></p> <ul style="list-style-type: none"> <li>▶ Thiazide diuretic like Hydrochlorothiazide 12.5mg (or Bendroflumethiazide 5mg) once in the morning</li> </ul>	HC3

TREATMENT	LOC
<b>Step7</b> If BP is 140/90mmHg, refer for further management to a higher level of care.	
<ul style="list-style-type: none"> <li>□ Provision for specific patients</li> <li>□ Assess the cardiovascular disease (CVD) risk in all patients with hypertension.</li> <li>□ Patients with diabetes, coronary heart disease, stroke or chronic kidney disease are considered having a high CVD risk.</li> <li>□ The target BP is &lt;130/80 mmHg in people with high CVD risk.</li> <li>□ Start statin (atorvastatin 20-40 mg once daily or simvastatin 20-40 mg once daily) and aspirin 75mg in people with prior heart attack or ischemic stroke. Consider statin in people at high risk.</li> <li>□ Start beta blocker (Atenolol 50mg or Bisoprolol 5mg or Nebivolol 5mg once daily) in people with heart attack in past 3 years.</li> <li>□ A combination of ACEI or ARB and a CCB or a diuretic is recommended as initial therapy in patients with chronic kidney disease.</li> <li>□ For hypertension secondary to thyroid disease consider adding Propranolol 40mg twice daily</li> </ul>	
<b>Caution</b> <ul style="list-style-type: none"> <li>△ In pregnancy, do NOT use ACEI or ARBs and diuretics. Methyldopa and calcium channel blockers are safe to use</li> <li>△ Don't use both an ACEI and ARB due to increased risk of side effects</li> </ul>	

### Choice of antihypertensive medicine

Choice of medicine may depend on concomitant risk factors/ other conditions: the table below indicates the suitable medicines for such patients.

Risk Factor	Diuretic	Beta Blocker	Ace Inhibitor /Arbs	Ccb	Aldosteron Antagonist
Heart failure	✓	✓	✓		✓
Post myocardial infarction		✓	✓		
Angina		✓			✓
Diabetes			✓	✓	
Mild/moderate kidney disease	✓		✓		
Advanced chronic kidney disease	✓	✓		✓	
Stroke	✓			✓	
Carvedilol or Bisoprolol only					

## Prevention

- Regular physical exercise
- Reduce salt intake
- Healthy diet, stop smoking
- Periodic screening of blood pressure

### 4.1.6.1 Hypertensive Emergencies and urgency

ICD10 CODE: I16.2

#### Hypertensive emergency

BP >180/110 mmHg with symptoms and acute life threatening complications:

- Hypertensive encephalopathy (severe headache, confusion, seizures, visual disturbances)
- Acute angina or acute myocardial infarction (AMI)
- Pulmonary oedema
- Acute kidney failure
- Acute aortic dissection
- Eclampsia or pre-eclampsia (section 16.3.7 and 16.3.8)

## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li>▶ Admit and give parenteral medicines. Aim at lowering the blood pressure over 24 hours (not too rapidly except if absolutely necessary)</li> <li>Treatment depends also on the presenting complications <ul style="list-style-type: none"> <li>- In acute ischaemic stroke, do not lower below 220/120 mmHg</li> <li>- In acute aortic dissection, lower BP rapidly</li> <li>- In pulmonary oedema, AMI: treat the complication</li> </ul> </li> <li>▶ Give IV furosemide 40-80 mg</li> <li>▶ If aggressive BP lowering is needed, use IV hydralazine 5-10 mg slowly over 20 minutes. Check blood pressure regularly, repeat dose after 20-30 minutes if necessary</li> </ul>	HC4

## Hypertensive urgency

BP > 180/110 mmHg without evidence of target organ damage, such as pulmonary edema, cardiac ischemia, neurologic deficits, or acute renal failure.

## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li>▶ Admit</li> <li>▶ Treat with combination of oral antihypertensive therapy (ACEI/ARB inhibitor + calcium channel blocker ± diuretics)</li> <li>▶ Aim at lowering blood pressure over the next 48- 72 hours</li> </ul>	HC4

### 4.1.7 Ischaemic Heart Disease (Coronary Heart Disease)

ICD10 CODE: I20, I21, I25

A condition in which there is insufficient blood flow through the coronary arteries of the heart, thus leading to ischaemia and/or infarction.

## Cause

- Deposition of fatty material (cholesterol plaques) and platelet aggregation inside the coronary arteries causing partial or total obstruction of blood flow

## Risk factors

- Hypertension, diabetes mellitus
- Smoking
- Obesity, unhealthy diet, physical inactivity
- Hyperlipidemia
- Family history of heart disease

## Clinical features

- Acute coronary syndrome (including acute myocardial infarction): prolonged chest pain, which may be localised on the left or central part of the chest, ranging from mild to severe, at times radiating to the left arm, neck and back,
- and associated with sweating, dyspnoea, vomiting, anxiety, low BP, tachycardia
- Stable angina: tightness in the chest or a sense of oppression worsening on exertion, relieved by rest and lasting only a few minutes
- Sudden cardiac death: usually due to fatal arrhythmias

## Differential diagnosis

- Indigestion, hiatus hernia, peptic ulcer
- Pleurisy, pericarditis, pulmonary embolism
- Dissecting aneurysm

## Investigations

- Cardiac enzymes (CPK, troponin)
- ECG (at rest and stress ECG)
- Echocardiogram

## Management of acute coronary syndrome

TREATMENT	LOC
<ul style="list-style-type: none"> <li>▶ Give acetylsalicylic acid 300 mg single dose (to be chewed)</li> </ul> <p><b>Refer immediately to hospital</b></p> <ul style="list-style-type: none"> <li>▶ Glyceryl trinitrate 500 micrograms sublingually Repeat after 5 min if no response</li> <li>▶ Oxygen therapy if SpO<sub>2</sub> &lt; 94%</li> <li>▶ Morphine 2.5-5 mg IV if persisting pain</li> <li>▶ Simvastatin 40 mg or atorvastatin 40 mg</li> <li>▶ Enoxaparin 1 mg/kg SC every 12 hours</li> <li>▶ Treat complications accordingly (pulmonary oedema, arrhythmias)</li> </ul>	HC2 H
<p><b>Consider adding:</b></p> <ul style="list-style-type: none"> <li>▶ Beta blockers if no contraindications (SBP &lt;90 mmHg, HR &lt;60 bpm) e.g. Atenolol 25-50 mg daily           <ul style="list-style-type: none"> <li>– Ensure close observation of the pulse rate and circulatory status</li> </ul> </li> <li>▶ ACE inhibitor e.g. Enalapril 2.5-10 mg/daily</li> <li>▶ Refer for further management to higher level of care if unstable</li> </ul> <p><b>When patient is stable, continue with:</b></p> <ul style="list-style-type: none"> <li>▶ Acetylsalicylic acid 75 mg once daily,</li> <li>▶ Atorvastatin 40 mg daily</li> <li>▶ Beta blocker (Atenolol or Carvedilol or Bisoprolol) and ACE inhibitor if tolerated</li> <li>▶ Emphasize life changes (healthy diet, no smoking, regular exercise, control of other risk factors)</li> </ul>	H

## Management of stable angina

TREATMENT	LOC
<ul style="list-style-type: none"> <li>▶ Aggressive control of risk factors (hypertension, diabetes, smoking, obesity)</li> <li>▶ Acetylsalicylic acid 75-150 mg once a day</li> <li>▶ Atorvastatin 40 mg once a day</li> <li>▶ Beta blockers (e.g. Atenolol 25-100 mg) if not diabetic</li> <li>▶ Refer to higher level if still uncontrolled</li> </ul>	HC2     H

## Prevention

- Low fat, low cholesterol diet
- Stop smoking
- Effective control of hypertension and diabetes mellitus
- Consider treatment with acetylsalicylic acid and statin in patients with multiple risk factors

### 4.1.8 Pericarditis

ICD10 CODE: I30

Inflammation of the heart membrane (pericardium), which may be:

- Acute and self-limiting, sub-acute or chronic
- Fibrinous, serous, haemorrhagic or purulent

## Causes

- Idiopathic or viral (most common causes) e.g. CoxsackieA & B, influenza A & B, varicella
- Bacterial e.g. mycobacterium, staphylococcus, meningococcus, streptococcus, pneumococcus, gonococcus, mycoplasma
- Fungal: Histoplasmosis
- Severe kidney failure (less common)
- Hypersensitivity such as acute rheumatic fever
- Myocardial infarction
- Radiation, trauma, neoplasms

## Clinical features

- Ⓐ Pericarditis without effusion: retrosternal pain radiating to shoulder, which worsens on deep breathing, movement, change of position or exercise; pericardial rub is a diagnostic sign
- Ⓐ Pericardial effusion: reduced cardiac impulses, muffled heart sounds, cardiomegaly
- Ⓐ Cardiac tamponade (compression) in case of massive effusion or constrictive pericarditis: dyspnoea, restlessness, rising pulmonary and systemic venous pressure, rapid heart rate, pulsus paradoxus, low BP, and low output cardiac failure

## Differential diagnosis

- Ⓐ Other causes of chest pain
- Ⓐ Other cause of heart failure

## Investigations

- ECG, chest X-ray
- Echo-cardiography

## Management of stable angina

TREATMENT	LOC
If viral or idiopathic <ul style="list-style-type: none"> <li><input type="checkbox"/> Rest</li> <li><input type="checkbox"/> Ibuprofen 600 mg every 8 hours</li> <li><input type="checkbox"/> If there is fluid, perform tapping</li> </ul>	H
If other causes, treat accordingly	

## Prevention

- Ⓐ Early detection and treatment of potential (treatable) causes



## 4.1.9 Rheumatic Fever

ICD10 CODE: I00, I01

A systemic connective tissue disease which follows a streptococcal upper respiratory tract infection. It may involve the heart, joints, skin, subcutaneous tissue, and CNS. The first attack usually occurs between ages of 3–15 years.

### Causes

- ⦿ Hypersensitivity reaction to group A streptococcal throat infection

### Clinical features

- ⦿ Arthritis (migrating asymmetric polyarthritis)
- ⦿ Acute rheumatic carditis, signs of cardiac failure, murmurs and pericarditis
- ⦿ Subcutaneous nodules
- ⦿ Chorea (involuntary movements of limbs)
- ⦿ Skin rash
- ⦿ Other minor signs/symptoms: fever, arthralgia, laboratory findings

### Differential diagnosis

- ⦿ Any form of arthralgia/arthritis including sickle cell disease, haemophilia
- ⦿ Pyrexia with cardiac failure

### Investigations

- ⦿ Blood: Haemogram (raised ESR)
- ⦿ Chest X-ray
- ⦿ ECG
- ⦿ Echocardiography
- ⦿ Antistreptolysin O titre (ASOT)

### Diagnostic criteria (revised Jones criteria)

- ⦿ Evidence of recent streptococcal infection

- Elevated ASO-titer or other streptococcal Ab titres or positive throat swab for group A beta-hemolyticus streptococcus

## PLUS

- Two major manifestations or one major and two minor manifestations

MAJOR MANIFESTATIONS	MINOR MANIFESTATIONS
<input checked="" type="radio"/> Polyarthritis	<input checked="" type="radio"/> Polyarthralgia
<input checked="" type="radio"/> Carditis	<input checked="" type="radio"/> Fever
<input checked="" type="radio"/> Erythema marginatum	<input checked="" type="radio"/> Acute phase reactants (increased ESR/CRP)
<input checked="" type="radio"/> Subcutaneous nodules	<input checked="" type="radio"/> ECG: prolonged PR in
<input checked="" type="radio"/> Sydenham's chorea	

## Management of stable angina

TREATMENT	LOC
<input type="checkbox"/> Bed rest	HC4
<b>To eradicate any streptococci:</b>	
<input type="checkbox"/> Phenoxymethylpenicillin (Pen V) 250 mg every 6 hours for 10 days	
Child: 125 mg per dose	
<input type="checkbox"/> Or Benzathine benzylpenicillin dose 1.2 MU IM stat	
Child < 30 kg: 0.6 MU	
Child > 30 kg: 1.2 MU	
<b>To treat the inflammation</b>	
<input type="checkbox"/> Acetylsalicylic acid 4-8 g/day until signs of inflammation subside (usually 4-8 weeks)	
Child: 80-100 mg/kg/day in 3 doses	
<input type="checkbox"/> Plus magnesium trisilicate compound 2-4 tablets every 8 hours	



## Management of stable angina

TREATMENT	LOC
<p>Taken 30 minutes after the acetylsalicylic acid tablets</p> <p>If allergic to aspirin</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Low dose steroid</li> </ul>	HC4
<p>If carditis/heart failure symptoms</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Treat as per heart failure guidelines (section 4.1.3)</li> <li><input type="checkbox"/> Consider high dose steroids (specialist only)</li> </ul> <p>If chorea:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Valproate 10-20 mg/kg/day</li> </ul>	H
<p>Prophylaxis</p> <p>To prevent further episodes</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Pen V 500 mg 12 hourly Child: 125-250 mg 12 hourly</li> <li><input type="checkbox"/> Or Benzathine benzylpenicillin 1.2 MU IM every 4 weeks Child &lt;30 kg: 0.6 MU</li> </ul> <p>If allergic to penicillin:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Erythromycin 250 mg 12 hourly</li> <li><input type="checkbox"/> Child: 10 mg/kg twice a day</li> </ul> <p>Duration of prophylaxis depends on severity of disease:</p> <ul style="list-style-type: none"> <li>- Rheumatic fever without carditis: for 5 years or until age 18 or 21 years old</li> <li>- Carditis but no residual heart disease: for 10 years or until age 25 years old</li> <li>- Carditis with residual heart disease: until age 40-45 years or for life</li> </ul>	HC3

## Prevention

- Early diagnosis and treatment of group A Streptococcus throat infection
- Avoid overcrowding, good housing
- Good nutrition

### 4.1.10 Rheumatic Heart Disease ICD10 CODE: I05-I09

Disease of the heart valves following an episode of rheumatic fever. The valves commonly involved are:

- Mitral valve, leading to stenosis, incompetence, or both
- Aortic valve, leading to stenosis and incompetence or both

## Clinical features

- Heart failure
- Arrhythmias, palpitations
- Thromboembolic problems e.g. stroke
- Heart murmurs depending on valves affected and nature of effect caused
- The patient may be asymptomatic and the valvular lesion discovered as an incidental finding
- Increased cardiac demand as in pregnancy and anaemia may present as congestive cardiac failure

## Differential diagnosis

- Other causes of cardiac failure

## Investigations

- Chest X-ray
- ECG where available
- Echocardiography

## Management of stable angina

TREATMENT	LOC
<input type="checkbox"/> Treat heart failure if present	HC4
<input type="checkbox"/> Prophylaxis for life as in rheumatic fever above	NR
<input type="checkbox"/> Cardiac surgery if necessary (only at national referral hospital)	

### 4.1.11 Stroke

ICD10 CODE: I63

A cerebral neurological dysfunction due to a problem in blood circulation: a clot (ischaemic stroke) or bleeding (haemorrhagic stroke).

#### Causes

- Ⓐ Clot (a thrombus in a brain vessel or an embolus from a clot somewhere else) – most common
- Ⓐ Haemorrhage (from trauma or spontaneous)

#### Clinical features

- Ⓐ Focal neurological deficits as one-sided weakness (face, arm, leg. Note that eyes are not affected) – hemiparesis or hemiplegia
- Ⓐ Difficulty in speaking/swallowing
- Ⓐ Severe headache (especially in haemorrhage)
- Ⓐ Alteration of consciousness
- Ⓐ Convulsions

#### Investigations

- Ⓐ CT scan of the brain

In the absence of neuroimaging, the following clinical features may help to distinguish the stroke subtypes:

Type	Clinical Course	Risk Factors	Other Clues
Intracerebral haemorrhage	Gradual progression over minutes/hours	Hypertension, trauma, bleeding disorders, illicit drugs	Patients may have reduced alertness and severe headache
Subarachnoid haemorrhage	Abrupt onset of very severe headache, focal symptoms less common	Smoking, hypertension, illicit drugs, but at times none (due to rupture of congenital aneurysms)	Patients may have reduced alertness It may happen in young people
Ischaemic (thrombotic)	Gradual development of focal deficits over hours or days	Age, smoking, diabetes, dyslipidemia	Symptoms can improve and worsen in the following days
Ischaemic (embolic)	Sudden onset of focal deficits	As above plus valvular heart disease and arrhythmias	Often improves slowly

### Management of stable angina

TREATMENT	LOC
<b>General care</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Ensure airways and respiration if unconscious</li> <li><input type="checkbox"/> Do not give anything by mouth before assessing the ability to swallow, to avoid risk of inhalation</li> <li><input type="checkbox"/> IV or NGT for hydration and nutrition if unable to swallow</li> <li><input type="checkbox"/> Control blood sugar with insulin if diabetic</li> </ul>	H

## Management of stable angina

TREATMENT	LOC
<b>If ischaemic stroke</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Aspirin 150-300 mg every 24 hours</li> <li><input type="checkbox"/> In the acute phase, treat hypertension only if extreme (more than 220/120) or if there are other complications (pulmonary oedema, angina, etc), otherwise re-start antihypertensive 24 hours after the event and reduce blood pressure slowly</li> <li><input type="checkbox"/> Consider DVT prophylaxis with enoxaparin 40 mg SC daily</li> </ul>	H
<b>If stroke clinically haemorrhagic</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Supportive care as above</li> <li><input type="checkbox"/> Refer for CT scan and neurosurgical evaluation</li> </ul>	
<b>Chronic care of ischaemic stroke</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Early mobilization and physiotherapy f Aspirin 75-100 mg once daily for life f Atorvastatin 40 mg daily for life</li> <li><input type="checkbox"/> Control of risk factors</li> </ul>	

# 5 Respiratory Diseases

## 5.1 NON-INFECTIOUS RESPIRATORY DISEASES

### 5.1.1 Asthma ICD10 CODE: J45

A chronic inflammatory disease of the airways which leads to muscle spasm, mucus plugging and oedema. It results in recurrent wheezing, cough, breathlessness and chest tightness.

Acute attacks may be precipitated by upper respiratory tract infections (e.g., flu) and exposure to irritant substances (e.g. dust, exercise, and cold).

#### Causes

- ⌚ Not known but associated with allergies, inherited and environmental factors

#### Clinical features

- ⌚ No fever (if fever present, refer to pneumonia)
- ⌚ Difficulty in breathing (usually recurrent attacks) with chest tightness, with or without use of accessory muscles. Patients may not appear very distressed despite a severe attack
- ⌚ Wheezing, rhonchi
- ⌚ Cough – usually dry, may be intermittent, persistent, or acute, especially at night

Severe forms: failure to complete sentences, darkening of lips, oral mucosa and extremities (cyanosis)

## Differential diagnosis

- Ⓐ Heart failure
- Ⓐ Other causes of chronic cough
- Ⓐ Bronchiolitis
- Ⓐ Bronchiectasis

## Investigations

- Ⓑ Diagnosis is mainly by clinical features

### Specialised investigations

- Ⓑ Peak flow rate: the peak flow rate increases to about 200 ml following administration of a bronchodilator
- Ⓑ Spirometry (an increase in Forced Expiratory Volume (FEV) of >12% after bronchodilation)
- Ⓑ Sputum: for eosinophilia

### If evidence of bacterial infection

- Ⓑ Chest X-ray
- Ⓑ Blood: complete blood count

### General principles of management

The four essential components of Asthma Management: Patient education, control of asthma triggers, monitoring for changes in symptoms or lung function, and pharmacologic therapy.

- Ⓐ Inhalation route is always preferred as it delivers the medicines directly to the airways; the dose required is smaller, the side-effects are reduced
- ▢ E.g., nebuliser solutions for acute severe asthma are given over 5-10 minutes, usually driven by oxygen in hospital

- In children having acute attacks, use spacers to administer inhaler puffs
- Oral route may be used if inhalation is not possible but systemic side-effects occur more frequently, onset of action is slower and dose required is higher
- Parenteral route is used only in very severe cases when nebulisation is not adequate.

### 5.1.1.1 Acute Asthma

Asthma attack is a substantial worsening of asthma symptoms. The severity and duration of attacks are variable and unpredictable. Most attacks are triggered by viral infections. Assess severity using the following table:

Not all features may be present. If the patient says they feel very unwell, listen to them!

Assessment of Severity

Children Below 12 Years	Adults And Children >12 Yrs
<b>Mild to moderate</b>	
<ul style="list-style-type: none"> <li><input checked="" type="radio"/> Able to talk in sentences</li> <li><input checked="" type="radio"/> Peak flow is <math>\geq 50\%</math> of predicted or best</li> <li><input checked="" type="radio"/> Pulse (beats/minute) Child <math>&gt; 5</math> years: <math>\leq 125</math> bpm Child <math>&lt; 5</math> years: <math>\leq 140</math> bpm</li> <li><input checked="" type="radio"/> Respiratory rate</li> <li><input checked="" type="radio"/> Child <math>&gt; 5</math> years: <math>\leq 30</math></li> <li><input checked="" type="radio"/> Child <math>&lt; 5</math> years: <math>\leq 40</math></li> <li><input checked="" type="radio"/> SpO<sub>2</sub> <math>\geq 92\%</math></li> </ul>	<ul style="list-style-type: none"> <li><input checked="" type="radio"/> Able to talk</li> <li><input checked="" type="radio"/> Pulse <math>&lt; 110</math> bpm</li> <li><input checked="" type="radio"/> Respiratory rate <math>&lt; 25</math></li> <li><input checked="" type="radio"/> Peak flow <math>&gt;50\%</math> of predicted or best</li> <li><input checked="" type="radio"/> SpO<sub>2</sub> <math>\geq 92\%</math></li> </ul>

Children Below 12 Years	Adults And Children >12 Yrs
<b>Severe</b>	
<ul style="list-style-type: none"> <li>● Cannot complete sentences in one breath or, too breathless to talk or feed</li> <li>● Peak flow &lt; 50% of predicted or best</li> <li>● Pulse (beats/minute) Child &gt; 5 years: &gt; 125 bpm Child &lt; 5 years: &gt; 140 bpm</li> <li>● Respiratory rate</li> <li>● Child &gt; 5 years: &gt; 30</li> <li>● Child &lt; 5 years: &gt;40</li> <li>● Use of accessory muscles for breathing (young children)</li> <li>● SpO<sub>2</sub> &lt; 92%</li> </ul>	<ul style="list-style-type: none"> <li>● Cannot complete sentences in one breath</li> <li>● Pulse ≥ 110 bpm</li> <li>● Respiratory rate &gt;25</li> <li>● Peak flow &lt;50% of predicted or best</li> <li>● SpO<sub>2</sub> ≥ 92%</li> </ul>

Life threatening (Adults and Children)
<ul style="list-style-type: none"> <li>● Silent chest, feeble respiratory effort, cyanosis</li> <li>● Hypotension, bradycardia or exhaustion, agitation</li> <li>● Reduced level of consciousness</li> <li>● Peak flow &lt; 33% of predicted or best</li> <li>● Arterial oxygen saturation &lt; 92%</li> </ul>

### Management of asthma attacks

TREATMENT	LOC
Mild to moderate	HC3
<ul style="list-style-type: none"> <li>❑ Treat as an out-patient</li> <li>❑ Reassure patient; place him in a ½ sitting position</li> <li>❑ Give salbutamol <ul style="list-style-type: none"> <li>- Inhaler 2-10 puffs via a large volume spacer</li> </ul> </li> </ul>	HC3
	HC3

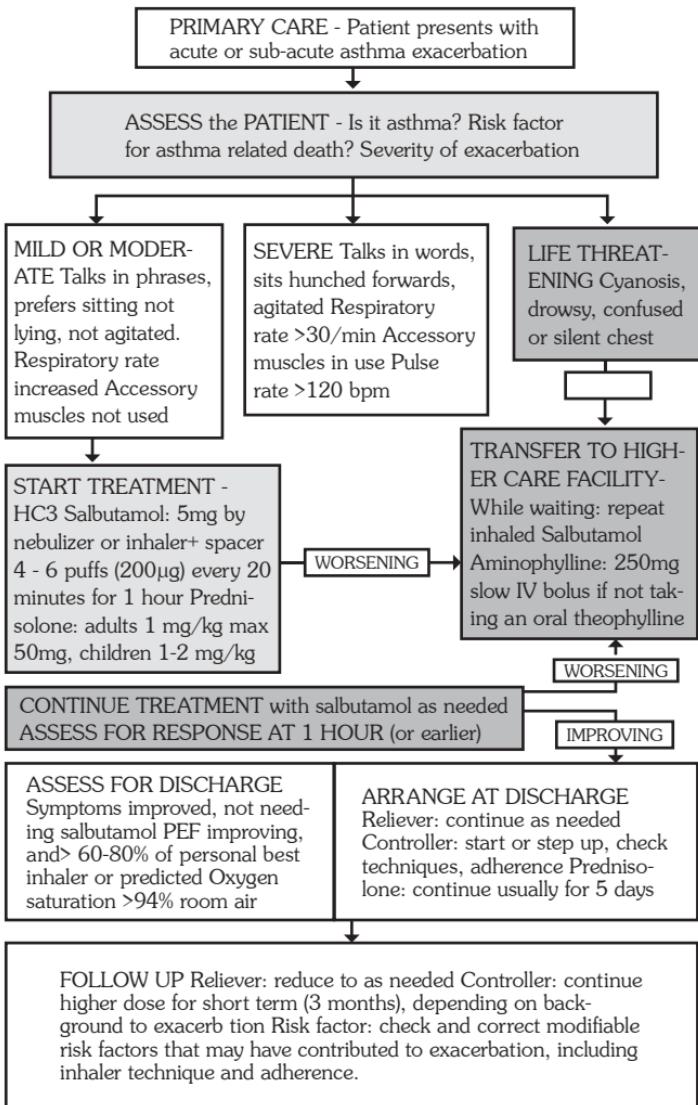
## Management of asthma attacks

TREATMENT	LOC
Mild to moderate	HC3
<ul style="list-style-type: none"> <li>- Or 5 mg (2.5 mg in children) nebulisation</li> <li>- Repeat every 20-30 min if necessary</li> </ul> <p><input type="checkbox"/> Prednisolone 50 mg (1 mg/kg for children)</p> <p><b>Monitor response for 30-60 min. If not improving or relapse in 3-4 hours</b></p> <p><input type="checkbox"/> Refer to higher level</p>	HC3
If improving, send home with	HC3
<p><input type="checkbox"/> Prednisolone 50 mg (1 mg/kg for children) once a day for 5 days (3 days for children)</p> <p><input type="checkbox"/> Institute or step up chronic treatment (see section 5.1.1.2)</p> <ul style="list-style-type: none"> <li>▪ Follow up after 1-2 weeks</li> </ul> <p><input type="checkbox"/> Instruct the patients on self-treatment and when to come back</p> <p><input type="checkbox"/> Review in 48 hours</p> <ul style="list-style-type: none"> <li>▪ Do not give routine antibiotics unless there are clear signs of bacterial infection</li> </ul>	HC3
Severe	HC4
<p><b>Patients with severe asthma need to be referred to HC4 or hospital after initial treatment</b></p> <p><input type="checkbox"/> Admit patient; place him in a ½ sitting position</p> <p><input type="checkbox"/> Give high flow oxygen continuously, at least 5 litres/minute, to maintain the SpO<sub>2</sub> ≥ 94% if available</p> <p><input type="checkbox"/> Give salbutamol</p> <ul style="list-style-type: none"> <li>- Inhaler 2-10 puffs via a large volume spacer</li> <li>- Or 5 mg (2.5 mg in children) nebulisation</li> <li>- Repeat every 20-30 min if necessary during the 1st hour</li> </ul>	HC4
	HC4

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Prednisolone 50 mg (1 mg/kg for children) or f Or hydrocortisone 100 mg (children 4 mg/kg max 100 mg) IV every 6 hours until patient can take oral prednisolone</li> <li><input type="checkbox"/> Monitor response after nebulisation</li> </ul> <p>If response poor</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Ipratropium bromide nebuliser 500 micrograms (250 microgram in children below 12) every 20- 30 min for the first 2 hours then every 4-6 hours</li> <li><input type="checkbox"/> Or aminophylline 250 mg slow IV bolus (child 5 mg/kg) if patient is not taking an oral theophylline</li> </ul> <p>Alternatively, if symptoms have improved, respiration and pulse settling, and peak flow &gt;50%</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Step up the usual treatment</li> <li><input type="checkbox"/> And continue with prednisolone to complete 5 days of treatment</li> <li><input type="checkbox"/> Review within 24 hours <ul style="list-style-type: none"> <li>- Monitor symptoms and peak flow</li> <li>- Arrange self-management plan</li> </ul> </li> </ul>	HC4
Life threatening	HC4
<ul style="list-style-type: none"> <li><input type="checkbox"/> Arrange for immediate hospital referral and admission</li> </ul> <p>First aid</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Admit patient; place him in a ½ sitting position</li> <li><input type="checkbox"/> Give high flow oxygen continuously, at least 5 litres/ minute, to maintain the SpO<sub>2</sub> ≥ 94% if available</li> <li><input type="checkbox"/> Give salbutamol <ul style="list-style-type: none"> <li>- Inhaler 2-10 puffs via a large volume spacer</li> <li>- Or 5 mg (2.5 mg in children) nebulisation</li> <li>- Repeat every 20 min for 1 hour</li> </ul> </li> </ul>	HC4
	HC4



Life threatening	HC4
<ul style="list-style-type: none"><li><input type="checkbox"/> Hydrocortisone 100 mg (children 4 mg/kg max 100 mg) IV stat or prednisolone 50 mg (1 mg/kg for children)</li><li><input type="checkbox"/> Ipratropium bromide nebuliser 500 micrograms (250 microgram in children below 12) every 20- 30 minutes for the first 2 hours then every 4-6 hours</li><li><input type="checkbox"/> Monitor response for 15-30 minutes</li></ul> <p>If response is poor</p> <ul style="list-style-type: none"><li><input type="checkbox"/> Aminophylline 250 mg slow IV bolus (child 5 mg/kg) if patient is not taking an oral theophylline</li></ul>	HC4
<b>Note</b> <ul style="list-style-type: none"><li>The use of aminophylline and theophylline in the management of asthma exacerbations is discouraged because of their poor efficacy and poor safety profile</li></ul>	HC4



Adapted with modification GINA Pocket Guide for Health Professionals 2016

### 5.1.1.2 Chronic Asthma

#### General principles of management

- Follow a stepped approach
- Before initiating a new drug, check that diagnosis is correct, compliance and inhaler technique are correct and eliminate trigger factors for acute exacerbations
- Start at the step most appropriate to initial severity
- Rescue course
- Give a 3-5 days “rescue course” of prednisolone at any step and at any time as required to control acute exacerbations of asthma at a dose of:

Child < 1 year: 1-2 mg/kg daily; 1-5 years: up to 20 mg daily; 5-15 years: Up to 40 mg daily; adult: 40-60 mg daily for up to 3-5 days.

- Stepping down
- Review treatment every 3-6 months
- If control is achieved, stepwise reduction may be possible
- If treatment started recently at Step 4 (or contained corticosteroid tablets, see below), reduction may take place after a short interval; in other patients 1-3 months or longer of stability may be needed before stepwise reduction can be done

TREATMENT	LOC
<b>STEP 1: Intermittent asthma</b> <ul style="list-style-type: none"> <li><input checked="" type="radio"/> Intermittent symptoms (&lt; once/week)</li> <li><input checked="" type="radio"/> Night time symptoms &lt; twice/month</li> <li><input checked="" type="radio"/> Normal physical activity</li> </ul> <b>Occasional relief bronchodilator</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Inhaled short-acting beta<sub>2</sub> agonist e.g. salbutamol inhaler 1-2 puffs (100-200 micrograms)</li> </ul>	HC3

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> 1-2 puffs (100-200 micrograms)           <ul style="list-style-type: none"> <li>- Use with spacer for children</li> </ul> </li> <li><input type="checkbox"/> Move to Step 2 if use of salbutamol needed more than twice a week or if there are night-time symptoms at least once a week</li> </ul>	HC3
<p><b>STEP 2: Mild persistent asthma</b></p> <ul style="list-style-type: none"> <li><input checked="" type="radio"/> Symptoms &gt; once/week, but &lt; once/day</li> <li><input checked="" type="radio"/> Night time symptoms &gt; twice/month</li> <li><input checked="" type="radio"/> Symptoms may affect activity</li> </ul> <p>Regular inhaled preventer therapy</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Salbutamol inhaler 1-2 puffs prn</li> <li><input type="checkbox"/> Plus regular standard-dose inhaled corticosteroid, e.g. beclomethasone 100-400 micrograms every 12 hours (children: 100-200 micrograms every 12 hours)</li> </ul> <ul style="list-style-type: none"> <li>- Assess after 1 month and adjust the dose prn</li> <li>- Higher dose may be needed initially to gain control</li> <li>- Doubling of the regular dose may be useful to cover exacerbations</li> </ul>	HC3 HC4
<p><b>STEP 3: Moderate persistent asthma</b></p> <ul style="list-style-type: none"> <li><input checked="" type="radio"/> Daily symptoms</li> <li><input checked="" type="radio"/> Symptoms affect activity</li> <li><input checked="" type="radio"/> Night time symptoms &gt; once/week</li> <li><input checked="" type="radio"/> Daily use of salbutamol</li> </ul> <p>Children below 5 years: refer to specialist</p> <p>Regular high-dose inhaled corticosteroids</p>	HC4

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Salbutamol inhaler 1-2 puffs prn up to 2-3 hourly Usually 4-12 hourly</li> <li><input type="checkbox"/> PLUS beclomethasone inhaler 400-1000 micrograms every 12 hours (In child 5-12 years: 100-400 micrograms every 12 hours)</li> </ul> <p>In adults, also consider 6-week trial with</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Aminophylline 200 mg every 12 hours</li> </ul>	
<p>STEP 4: Severe persistent asthma</p> <ul style="list-style-type: none"> <li><input checked="" type="radio"/> Daily symptoms</li> <li><input checked="" type="radio"/> Frequent night time symptoms</li> <li><input checked="" type="radio"/> Daily use of salbutamol</li> </ul>	
<p>Refer to specialist clinic especially children &lt;12 years</p> <p>Regular corticosteroid tablets plus</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Regular high-dose beclomethasone (as in Step 3)</li> <li><input type="checkbox"/> Plus regular prednisolone 10-20 mg daily after breakfast</li> </ul>	RR
<p><b>Note</b></p> <ul style="list-style-type: none"> <li>▪ If inhaler not available, consider salbutamol tablets 4 mg every 8 hours</li> </ul> <p>Child &lt; 2 years: 100 micrograms/kg per dose</p> <p>Child 2-5 years: 1-2 mg per dose</p>	
<p><b>Caution</b></p> <ul style="list-style-type: none"> <li>▪ Do not give medicines such as morphine, propranolol, or other B-blockers to patients with asthma as they worsen respiratory problems</li> <li>▪ Do not give sedatives to children with asthma, even if they are restless</li> </ul>	

## Prevention

- Avoid precipitating factors e.g.
- Cigarette smoking
- Acetylsalicylic acid
- Known allergens such as dust, pollens, animal skins
- Exposure to cold air
- Exercise can precipitate asthma in children, advise them to keep an inhaler handy during sports and play
- Effectively treat respiratory infections

### 5.1.2 Chronic Obstructive Pulmonary Disease (COPD)

ICD10 CODE: J42-44

Chronic obstructive pulmonary disease (COPD) is a lung disease characterized by chronic obstruction of lung airflow that interferes with normal breathing and is not fully reversible.

- The more familiar terms ‘chronic bronchitis’ and ‘emphysema’ are no longer used, but are now included within the COPD diagnosis.
- Such a diagnosis should be considered in any patient who
  - has symptoms of cough, sputum production, or dyspnea (difficult or labored breathing), and/or a history of exposure to risk factors for the disease.

A COPD exacerbation is an acute worsening of the patient’s respiratory symptoms needing a change in medications.

#### Causes and predisposing factors

- Tobacco smoking is the commonest cause
- Indoor air pollution: Biomass fuel smoke (firewood, charcoal and cow dung) exposure in poorly ventilated kitchens
- Exposure to occupational dust and chemicals (cement, paint, saw dust, fumes) without adequate protection
- It may frequently follow TB disease (residual symptoms)

## Clinical features

- Chronic cough in a current or previous smoker who is over 40 years
- Breathlessness: persistent, progressive and worse with exercise +/- tight chest and wheezing
- Chronic sputum (mucous) production and 'bronchitis' for at least 3 months in 2 successive years
- On examination, there may be a barrel chest (increased antero-posterior diameter)
- Rapid breathing, reduced chest expansion, with or without increased use of accessory muscles of respiration, rhonchi, cyanosis
- Decreased breath sounds, ankle swelling and other signs of right heart failure

## Differential diagnosis

- Asthma
- Congestive heart failure
- Pulmonary embolism
- Pulmonary TB

## Investigation

- Spirometry: gold standard for diagnosis but if not available use all available tools (history of exposure to risk factors + clinical symptoms + any available investigations).
- History of exposure to risk factors
- Chest X-ray (Hyper-inflated lungs)
- Peak flowmetry
- Echocardiography – when one suspects right-sided heart failure secondary to COPD

## Management

- Ⓐ Treatment aims at:
  - ☐ Removing risk factors and preventing further damage
  - ☐ Relief of symptoms and prevention of the severity and frequency of COPD exacerbations
  - ☐ Improving the patients exercise tolerance and maintaining
    - Ⓐ good health
- Ⓐ Inhalers are the preferred formulation for the treatment of COPD.

TREATMENT	LOC
<ul style="list-style-type: none"> <li>☐ Explain to the patient that:           <ul style="list-style-type: none"> <li>- COPD is chronic lung damage and there is no cure</li> <li>- Treatment is to prevent exacerbations, further damage, and infections</li> </ul> </li> </ul> <p><b>Non-pharmacological management</b></p> <ul style="list-style-type: none"> <li>☐ Advise the patient that:           <ul style="list-style-type: none"> <li>- They must stop smoking – it is the only way to stop it from getting worse</li> <li>- Reduce exposure to charcoal and wood/dung cooking smoke. Keep cooking areas well-ventilated by opening windows and doors. Use alternative clean energy sources like Biogas, improved cooking stoves etc.</li> <li>- Use masks for respiratory protection or stop working in areas with occupational dust or pollution</li> <li>- Physical exercise to train lung capacity (pulmonary rehabilitation) under supervision</li> <li>- Get treatment quickly in case of increased breathlessness, cough or sputum</li> </ul> </li> <li>☐ Physiotherapy is beneficial to improve exercise tolerance</li> </ul>	HC2

TREATMENT	LOC
<b>Step 1: Mild</b>	HC3
<input type="checkbox"/> Inhaled salbutamol 2 puffs 2-4 times a day, may be used periodically for short periods. The main purpose of this treatment is to reduce or prevent symptoms.	HC4
<b>If inhalers not available, consider:</b>	
<input type="checkbox"/> Aminophylline 200 mg twice daily	HC4
<b>Step 2: Moderate</b>	HC4
<input type="checkbox"/> Inhaled salbutamol 2 puffs 2-4 times a day	
<input type="checkbox"/> Plus inhaled steroid beclomethasone 100-400 micrograms 2-4 times a day	
<b>Step 3: Severe</b>	H
<input type="checkbox"/> As in step 2 plus ipratropium inhaler 2 puff 2-4 times a day	
<b>Note</b>	RR
<ul style="list-style-type: none"> <li>■ If available, long acting bronchodilators salmeterol and formeterol can be used in moderate and severe COPD in combination with inhaled steroids</li> </ul>	
<b>COPD exacerbations</b>	
<ul style="list-style-type: none"> <li>● If more sputum, changed to more yellow/green coloured, and/or breathlessness, temp &gt;38 C and or rapid breathing ("bronchitis"), then</li> </ul>	
<ul style="list-style-type: none"> <li><input type="checkbox"/> Treat with antibiotic e.g. amoxicillin 500 mg every 8 hours for 7-10 days or doxycycline 100 mg every 12 hours for 7-10 days</li> </ul>	
<ul style="list-style-type: none"> <li><input type="checkbox"/> Oral Prednisolone 40 mg once daily in the morning for 5 days. Do NOT use oral steroids for extended periods in patients with COPD           <ul style="list-style-type: none"> <li>- Refer urgently to hospital if:</li> <li>- Rapid pulse (&gt;100 beats per minute) or breathing (&gt;30 breaths per minute)</li> </ul> </li> </ul>	

<ul style="list-style-type: none"><li>- Tongue or lips are “blue” (central cyanosis)</li><li>- Confused</li><li>- Failure to improve</li></ul> <p><input checked="" type="checkbox"/> Give oxygen by nasal cannula (1-3 litres/min) if available, target SpO<sub>2</sub> 88-92%</p>	
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**Note**

- Give oxygen with care (minimum flow required to reach the target SpO<sub>2</sub>) because COPD patients are at risk of hypercapnia (CO<sub>2</sub> retention) which cause respiratory depression and coma

## 5.2 INFECTIOUS RESPIRATORY DISEASES

### 5.2.1 Bronchiolitis

ICD10 CODE: J21

Acute inflammatory obstructive disease of small airways (bronchioles) common in children less than 2 years.

#### Causes

- Ⓐ Mainly viral (often respiratory syncitial virus, RSV)
- Ⓐ Mycoplasma

#### Clinical features

- Ⓐ First 24-72 hours: rhinopharyngitis with dry cough
- Ⓐ Later tachypnoea, difficulty in breathing, wheezing (poorly responsive to bronchodilators)
- Ⓐ Cough (profuse, frothy, obstructive secretions)
- Ⓐ Mucoid nasal discharge
- Ⓐ Moderate or no fever
- Ⓐ Criteria for severity: child < 3 months, worsening of general condition, pallor, cyanosis, respiratory distress, anxiety, respiratory rate >60/minute, difficulty feeding, SpO<sub>2</sub> < 92%

#### Differential diagnosis

- Ⓐ Asthma

- Pneumonia, whooping cough
- Foreign body inhalation
- Heart failure

### Investigations

- Clinical diagnosis
- X-ray: Chest (to exclude pneumonia)
- Blood: Haemogram

TREATMENT	LOC
<p><b>Mild-moderate bronchiolitis</b></p> <p><b>Wheezing, 50-60 breaths/minute, no cyanosis, able to drink/feed</b></p> <p><input checked="" type="checkbox"/> Treat the symptoms (possibly as an out-patient)           <ul style="list-style-type: none"> <li>- Nasal irrigation with normal saline</li> <li>- Small, frequent feeds</li> <li>- Increased fluids and nutrition</li> <li>- Treat fever (paracetamol)</li> </ul> </p> <p><b>Severe bronchiolitis</b></p> <p><b>Wheezing, fast breathing &gt; 60 breaths/min, cyanosis</b></p> <p><input checked="" type="checkbox"/> Admit and give supportive treatment as above f Give humidified nasal oxygen (1-2 litres/min) f Salbutamol inhaler 100 micrograms/puff: 2 puffs with spacer, every 30 minutes or nebulisation salbutamol 2.5 mg in 4 ml normal saline.           <ul style="list-style-type: none"> <li>- If symptoms improve, continue salbutamol every 6 hours</li> <li>- If symptoms non-responsive, stop the salbutamol</li> </ul> </p> <p><input checked="" type="checkbox"/> Nebulise Adrenaline 1:1000, 1 ml diluted in 2-4 ml normal saline every 2-4 hours</p> <p><input checked="" type="checkbox"/> Give as much oral fluids as the child will take: e.g. ORS. Use NGT or IV line if child cannot take orally           <ul style="list-style-type: none"> <li>- Give basic total fluid requirement of 150 ml/kg in 24 hours plus extra to cover increased losses due to illness</li> </ul> </p>	

TREATMENT	LOC
<p><b>Note</b></p> <ul style="list-style-type: none"> <li>▪ Antibiotics are usually not needed for bronchiolitis since it is viral.</li> <li>▪ Steroids are not recommended</li> </ul>	

## Prevention

- Avoid exposure to cold and viral infections
- Proper handwashing after contact with patients

### 5.2.2 Acute Bronchitis ICD10 CODE: J20

Acute inflammatory disease of the bronchi.

#### Causes

- Ⓐ Mostly viral
- Ⓐ In older children, can be caused by Mycoplasma pneumoniae
- Ⓐ Secondary Bacterial infection: Streptococcus pneumoniae, Haemophilus influenzae

#### Predisposing factors

- Ⓐ Exposure to cold, dust, smoke
- Ⓐ Cigarette smoking

#### Clinical features

- Ⓐ Often starts with rhinopharyngitis, descend progressively to larynx, pharynx, tracheitis
- Ⓐ Irritating, productive cough sometimes with scanty mucoid, blood streaked sputum
- Ⓐ Chest tightness, sometimes with wheezing
- Ⓐ Fever may be present
- Ⓐ No tachypnoea or dyspnoea
- Ⓐ Secondary bacterial infection: fever > 38.5 C, dyspnoea, purulent expectorations

## Differential diagnosis

- Bronchial asthma, emphysema
- Pneumonia, tuberculosis

## Investigations

- Diagnosis based on clinical features
- Chest X-ray

TREATMENT	LOC
<p><input type="checkbox"/> Most cases are viral and mild</p> <p><input type="checkbox"/> Paracetamol 1 g every 4-6 hours (max: 4 g daily)</p> <p><input type="checkbox"/> Child: 10 mg/kg (max: 500 mg) per dose f Plenty of oral fluids</p> <p><input type="checkbox"/> Children: nasal irrigation with normal saline to clear the airway</p> <p><input type="checkbox"/> Local remedies for cough (honey, ginger, lemon)</p> <p>If there is suspicion of bacterial infection, especially if patient is in general poor conditions (malnutrition, measles, rickets, severe anaemia, elderly, cardiac disease)</p> <p><input type="checkbox"/> Give Amoxicillin 500 mg every 8 hours</p> <p>Child: 40 mg/kg dispersible tablets every 12 hours</p> <p><input type="checkbox"/> Or Doxycycline 100 mg every 12 hours</p> <p>Child &gt;8 years: 2 mg/kg per dose</p>	HC2

## Prevention

- Avoid predisposing factors above.

### 5.2.3 Coryza (Common Cold)

ICD10 CODE: J00

Acute inflammation of the upper respiratory tract; rhinitis (nasal mucosa) and rhinopharyngitis (nasal and pharyngitis).

## Cause

- Viruses - several types, often rhinoviruses



## Clinical features

- Ⓐ Onset usually sudden
- Ⓐ Tickling sensation in nose and sneezing
- Ⓐ Throat dry and sore
- Ⓐ Profuse nasal watery or purulent discharge, tearing

## Complications

- Ⓐ Sinusitis
- Ⓐ Lower respiratory tract infection (pneumonia)
- Ⓐ Ear ache, deafness, otitis media
- Ⓐ Headache

## Differential diagnosis

- Ⓐ Nasal allergy

## Management

Common cold is a viral disease and so does NOT require any antibiotics. Antibiotics do not promote recovery or prevent complications and cause patients unnecessary side effects

TREATMENT	LOC
<b>No antibiotics, give only symptomatic treatment</b> <ul style="list-style-type: none"> <li>☐ Increase fluid intake, preferably warm drinks f Give paracetamol for 2-3 days</li> <li>☐ Home remedies (steam, honey)</li> <li>☐ Xylometazoline 0.05 - 0.1% nasal drops 2-3 drops into each nostril 3 times daily (max: 5 days)</li> </ul>	HC2
<b>For breastfeeding children</b> <ul style="list-style-type: none"> <li>☐ Continue breastfeeding</li> <li>☐ Clear the nose with normal saline to ease breathing or feeding</li> <li>☐ Keep the child warm</li> </ul>	HC4

TREATMENT	LOC
<p><b>Note</b></p> <ul style="list-style-type: none"> <li>▪ Avoid cough syrups in children below 6 years</li> </ul>	

## Prevention

- Ⓐ Avoid contact with infected persons
- Ⓑ Include adequate fresh fruits and vegetables in the diet

### 5.2.4 Acute Epiglottitis ICD10 CODE: J05.1

An acute inflammation of the epiglottis, a rare but serious disease of young children. Airway obstruction is always severe, and intubation or tracheostomy is often needed. It is rare since routine childhood immunization with Hib vaccine was introduced.

## Cause

- Ⓐ Bacterial infection, commonly Haemophilus influenzae

## Clinical features

- Ⓐ Rapid onset of high fever
- Ⓐ Typical: “tripod or sniffing” position, preferring to sit, leaning forward with an open mouth, appears anxious
- Ⓐ Sore throat, difficulty swallowing, drooling, respiratory distress
- Ⓐ Stridor and maybe cough
- Ⓐ Appears critically ill (weak, grunting, crying, drowsy, does not smile, anxious gaze, pallor, cyanosis)
- Ⓐ Asphyxia leading to quick death

## Differential diagnosis

- Ⓐ Laryngeal cause of stridor e.g., laryngotracheobronchitis

## Caution

- Avoid tongue depression examination as this may cause complete airway blockage and sudden death
- Do not force child to lie down as it may precipitate airway obstruction

TREATMENT	LOC
<input type="checkbox"/> Admit and treat as an emergency – intubation or tracheostomy may often be needed	H
<input type="checkbox"/> Avoid examination or procedures that agitate child as this may worsen symptoms. Avoid IM medication	
<input type="checkbox"/> Insert IV line and provide IV hydration	
<input type="checkbox"/> Ceftriaxone 50 mg/kg once daily for 7-10 days	

## Prevention

- Ⓐ Hib vaccine is part of the pentavalent DPT/HepB/Hib vaccine used in routine immunisation of children

### 5.2.5 Influenza ("Flu")

ICD10 CODE: J9-11

A specific acute respiratory tract illness occurring in epidemics and occasionally pandemics. Influenza virus strains can be transmitted to humans from animals (pigs, birds) and can occasionally mutate and spread from person to person (e.g., swine flu, or H1N1).

#### Cause

- Ⓐ Influenza viruses of several types and strains
- Ⓐ Spread by droplet inhalation

#### Clinical features

- Ⓐ Sudden onset
- Ⓐ Headache, pain in back and limbs
- Ⓐ Anorexia, sometimes nausea and vomiting
- Ⓐ Fever for 2-3 days with shivering
- Ⓐ Inflamed throat
- Ⓐ Harsh unproductive cough

## Complications

- Ⓐ Secondary bacterial infection: bronchopneumonia
- Ⓐ Toxic cardiomyopathy and sudden death

## Differential diagnosis

- Ⓐ Other respiratory viral infections

## Investigations

- Ⓑ Isolation of virus
- Ⓑ Viral serology to identify virus

TREATMENT	LOC
If no complications, treat symptoms	HC2
<input type="checkbox"/> Paracetamol 1 g every 4-6 hours (max: 4 g/ day) Child: 10 mg/kg per dose	
For nasal congestion	HC4
<input type="checkbox"/> Use steam inhalation prn <input type="checkbox"/> Or xylometazoline nose drops 0.05 -0.1% 2-3 drops into each nostril 3 times daily (max: 5 days)	
In the breastfeeding child	
<input type="checkbox"/> If blockage interferes with breastfeeding, clean/ clear nose with normal saline <input type="checkbox"/> Keep child warm <input type="checkbox"/> Breastfeed more frequently	
For troublesome cough	
<input type="checkbox"/> Frequent warm drinks, home remedies (honey, ginger)	

## Prevention

- Ⓐ Avoid contact with infected persons
- Ⓐ Inactivated Influenza vaccine yearly (for vulnerable populations)



## 5.2.6 Laryngitis

ICD10 CODE: J04

Inflammation of the larynx which may involve surrounding structures, e.g., pharynx and trachea

### Cause

- Ⓐ Viruses: Para-influenza group, influenza by far the most common cause. Usually acute (up to 3 weeks)
- Ⓐ Excessive use of the voice, allergic reactions, inhalation of irritating substances, e.g., cigarette smoke, gastroesophageal reflux. Often chronic symptoms (>3 weeks)

### Clinical features

- Ⓐ Onset similar to any upper respiratory tract infection
- Ⓐ Fever usually mild
- Ⓐ Hoarseness

### Differential diagnosis

- Ⓐ Diphtheria, whooping cough
- Ⓐ Laryngotracheobronchitis, epiglottitis
- Ⓐ Bacterial tracheitis
- Ⓐ Foreign body aspiration
- Ⓐ Asthma
- Ⓐ Airway compression by extrinsic mass (e.g., tumours, haemangioma, cysts)

### Investigations

- Ⓐ Blood: Complete blood count
- Ⓐ X-ray: Chest
- Ⓐ Laryngeal swab for C&S

TREATMENT	LOC
<p>The cause is usually viral for which there is no specific treatment and no need for antibiotics f Give analgesics</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Use steam inhalations 2-3 times daily</li> <li><input type="checkbox"/> Rest the voice</li> <li><input type="checkbox"/> For chronic laryngitis: identify and treat the cause</li> </ul>	HC2

### 5.2.7 Acute Laryngotracheobronchitis (Croup)

ICD10 CODE: J05.0

An acute inflammation of larynx, trachea and bronchi primarily in children < 3 years, usually viral.

#### Cause

- Measles virus
- Influenza and Parainfluenza type 1 viruses
- Rarely - superinfection with bacteria e.g. H. influenzae

**Note:** Secondary bacterial infection is rare, therefore antibiotics are rarely needed

#### Clinical features

##### Early phase (mild croup)

- Barking cough, hoarse voice or cry
- Inspiratory stridor (abnormal high-pitched sound)
- Common cold

##### Late phase (severe croup)

- Severe dyspnoea and stridor at rest
- Cyanosis (blue colour of child - especially extremities and mouth)
- Asphyxia (suffocation)

## Caution

- Avoid throat examination. Gagging can cause acute obstruction

TREATMENT	LOC
<b>Mild croup</b>	HC2
<input type="checkbox"/> Isolate patient, ensure plenty of rest <input type="checkbox"/> Keep well hydrated with oral fluids <input type="checkbox"/> - Use oral rehydration solution <input type="checkbox"/> Give analgesics <input type="checkbox"/> Single dose steroid: - Prednisolone 1-2 mg/kg single dose - or Dexamethasone 0.15 mg/kg single dose	HC3 HC4
<b>If condition is severe</b>	H
<input type="checkbox"/> Admit the patient f Ensure close supervision <input type="checkbox"/> Give humidified oxygen 30-40% <input type="checkbox"/> Keep well hydrated with IV fluids <input type="checkbox"/> Use Darrow's solution ½ strength in glucose 2.5% <input type="checkbox"/> Steroids: hydrocortisone slow IV or IM Child <1 year: 25 mg Child 1-5 years: 50 mg Child 6-12 years: 100 mg <input type="checkbox"/> Or dexamethasone 300 micrograms/kg IM <input type="checkbox"/> Repeat steroid dose after 6 hours if necessary <input type="checkbox"/> If not controlled, nebulise adrenaline 0.4 mg/kg (max 5 mg) diluted with normal saline, repeat after 30 min if necessary	

TREATMENT	LOC
If severe respiratory distress develops <ul style="list-style-type: none"> <li><input type="checkbox"/> Carry out nasotracheal intubation or tracheostomy if necessary</li> <li><input type="checkbox"/> Admit to ICU or HDU</li> </ul>	RR
Suspect bacterial infection if child does not improve or appears critically ill <ul style="list-style-type: none"> <li><input type="checkbox"/> Treat as epiglottitis (see section 5.2.4)</li> </ul>	
<b>Note</b> <ul style="list-style-type: none"> <li>▪ Avoid cough mixtures in children &lt; 6 years</li> </ul>	

## Prevention

- Ⓐ Avoid contact with infected persons
- Ⓐ Isolate infected persons

### 5.2.8 Pertussis (Whooping Cough)

ICD10 CODE: A37

An acute bacterial respiratory infection characterised by an inspiratory whoop following paroxysmal cough. It is highly contagious with an incubation period of 7-10 days. It is a notifiable disease.

## Cause

- Ⓐ Bordetella pertussis, spread by droplet infection

## Clinical features

### Stage 1: Coryzal (catarrhal: 1-2 weeks)

- Ⓐ Most infectious stage
- Ⓐ Running nose, mild cough, slight fever

### Stage 2: Paroxysmal (1-6 weeks)

- Ⓐ More severe and frequent repetitive cough ending in a whoop, vomiting, conjunctival haemorrhage
- Ⓐ Fever may be present; patient becomes increasingly tired

- ⦿ In infants <6 months: paroxysms lead to apnoea, cyanosis (coughing bouts and whoops may be absent)

### Stage 3: Convalescent

- ⦿ Paroxysmal symptoms reduce over weeks or months
- ⦿ Cough may persist

### Complications may include

- ⦿ Respiratory: pneumonia (new onset fever a symptom), atelectasis, emphysema, bronchiectasis, otitis media
- ⦿ Nervous system: convulsions, coma, intracranial haemorrhage
- ⦿ Others: malnutrition, dehydration, inguinal hernia, rectal prolapse

### Differential diagnosis

- ⦿ Chlamydial and bacterial respiratory tract infection
- ⦿ Foreign body in the trachea

### Investigations

- ⦿ Clinical diagnosis
- ⦿ Blood: complete blood count
- ⦿ Chest X-ray

### Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Maintain nutrition and fluids</li> <li><input type="checkbox"/> Give oxygen and perform suction if the child is cyanotic</li> <li><input type="checkbox"/> For the unimmunised or partly immunised, give DPT (three doses) as per routine immunisation schedule</li> <li><input type="checkbox"/> Isolate the patient (avoid contact with other infants) until after 5 days of antibiotic treatment</li> <li><input type="checkbox"/> Treatment should be initiated within 3 weeks from onset of cough: Erythromycin 500 mg every 6 hours for 7 days Child: 10-15 mg/kg every 6 hours</li> </ul>	HC4

TREATMENT	LOC
<p><b>Note</b></p> <ul style="list-style-type: none"> <li>▪ Cough mixtures, sedatives, mucolytics, and antihistamines are USELESS in pertussis and should NOT be given</li> </ul>	

## Prevention

- Ⓐ Educate parents on the importance of following the routine childhood immunisation schedule:
- Ⓐ Ensure good nutrition
- Ⓐ Avoid overcrowding
- Ⓐ Booster doses of vaccine in exposed infants

### 5.2.9 Pneumonia

ICD10 CODE: J13-18

Acute infection and inflammation of the lungs alveoli. There are two major types:

- Ⓐ Bronchopneumonia: involves both the lung parenchyma and the bronchi. Common in children and the elderly
- Ⓐ Lobar pneumonia: involves one or more lobes of the lung. Common in young people

## Causes

Causative agents can be viral, bacterial or parasitic. Pathogens vary according to age, patient's condition and whether infection was acquired in the community or hospital (Gram negative are more common in hospital).

- Ⓐ Neonates: group B streptococcus, Klebsiella, E.coli, Chlamydia and S. aureus
- Ⓐ Children <5 years: Pneumococcus, Haemophilus influenzae, less frequently: S. aureus, M. catarrhalis, M. Pneumoniae, viruses (RSV, influenza, measles)
- Ⓐ Adults and children >5 years: most commonly S.pneumo-

niae, followed by atypical bacteria, e.g. Mycoplasma pneumoniae, viruses

- Ⓐ Immunosuppressed: Pneumocystis (in HIV infected)

### Predisposing factors

- Ⓐ Malnutrition
- Ⓐ Old age
- Ⓐ Immunosuppression (HIV, cancer, alcohol dependence)
- Ⓐ Measles, pertussis
- Ⓐ Pre-existing lung or heart diseases, diabetes

### Investigations

If facilities are available

- Do a chest X-ray and look for complications, e.g.
  - Pneumothorax, pyothorax
  - Pneumonitis suggestive of pneumocystis jiroveci pneumonia (PCP)
  - Pneumatoceles (cavities filled with air) suggestive of staphylococcal pneumonia
- Ⓐ Sputum: For Gram stain, Ziehl-Neelsen (ZN) stain, culture for AFB
- Ⓐ Blood: Complete blood count

#### 5.2.9.1 Pneumonia in an Infant (up to 2 months)

In infants, not all respiratory distress is due to infection. But as pneumonia may be rapidly fatal in this age group,

suspected cases should be treated promptly and referred for parenteral treatment with antimicrobials. Consider all children < 2 months with pneumonia as SEVERE disease.

### Clinical features

- Ⓐ Rapid breathing ( $\geq 60$  breaths/minute)

- Severe chest in drawing, grunting respiration
- Inability to breastfeed
- Convulsions
- Drowsiness
- Stridor in a calm child, wheezing
- Fever may or may not be present
- Cyanosis and apnoeic attacks ( $\text{SpO}_2$  less than 90%)

### Management

Infants with suspected pneumonia should be referred to hospital after pre-referral dose of antibiotics.

#### Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Admit</li> <li><input type="checkbox"/> Keep baby warm</li> <li><input type="checkbox"/> Prevent hypoglycaemia by breastfeeding/giving expressed breast milk/NGT</li> <li><input type="checkbox"/> If child is lethargic, do not give oral feeds. Use IV fluids with care (see section 1.1.4)</li> <li><input type="checkbox"/> Give oxygen to keep <math>\text{SpO}_2 &gt;94\%</math> f Ampicillin 50 mg/kg IV every 6 hours f Plus gentamicin 7.5 mg/kg IV once daily</li> <li><input type="checkbox"/> Neonates &lt; 7 days old: 5 mg/kg IV once daily</li> <li><input type="checkbox"/> In premature babies, the doses may need to be reduced (specialist only)</li> </ul>	H

#### In severely ill infants

- Ceftriaxone 100 mg/kg IV once daily

#### Alternative (only use if above not available)

- Chloramphenicol 25 mg/kg IV every 6 hours (contraindicated in premature babies and neonates < 7 days old)

## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Continue treatment for at least 5 days, and for 3 days after the child is well</li> <li><input type="checkbox"/> If meningitis is suspected, continue for 21 days</li> <li><input type="checkbox"/> If septicaemia is suspected, continue for 10 days</li> </ul>	H

### 5.2.9.2 Pneumonia in a Child of 2 months-5 years

#### Clinical features

- Ⓐ Fever - may be high, low grade or absent (in severe illness)

#### Pneumonia

- Ⓐ Cough
- Ⓐ Fast breathing (2-12 months:  $\geq 50$  bpm, 1-5 years:  $\geq 40$  bpm)
- Ⓐ Mild chest wall in-drawing

#### Severe pneumonia

- Ⓐ As above plus at least one of the following
- Ⓐ Central cyanosis (blue lips, oral mucosa, finger nails or oxygen saturation  $< 90\%$  using a pulse oximeter)
- Ⓐ Inability to feed, vomiting everything
- Ⓐ Convulsions, lethargy, decreased level of consciousness
- Ⓐ Severe respiratory distress (severe chest indrawing, grunting, nasal flaring)
- Ⓐ Extrapulmonary features, e.g. confusion or disorientation, may predominate and may be the only signs of pneumonia in malnourished or immunosuppressed children

## Management of pneumonia

TREATMENT	LOC
<b>Non-severe pneumonia</b>	HC2
<ul style="list-style-type: none"> <li><input type="checkbox"/> Give oral amoxicillin dispersible tabs (DT) 40 mg/kg every 12 hours for 5 days           <ul style="list-style-type: none"> <li>- 2-12 months 250 mg (1 tab) every 12 hours for 5 days</li> <li>- 1-3 years 500 mg (2 tabs) every 12 hours for 5 days</li> <li>- 3-5 years 750 mg (3 tabs) every 12 hours for 5 days</li> </ul> </li> </ul>	HC3
<b>If wheezing present</b>	
<ul style="list-style-type: none"> <li><input type="checkbox"/> Salbutamol inhaler 1-2 puffs every 4-6 hours until wheezing stops</li> <li><input type="checkbox"/> Reassess child for progress after 3 days</li> </ul>	
<b>Severe pneumonia</b>	HC4
<ul style="list-style-type: none"> <li><input type="checkbox"/> Refer to hospital after 1st dose of antibiotic</li> <li><input type="checkbox"/> Admit</li> <li><input type="checkbox"/> Give Oxygen if SpO<sub>2</sub> &lt; 90% with nasal prongs and monitor through pulse oximetry</li> <li><input type="checkbox"/> Give ampicillin 50 mg/kg IV every 6 hours or</li> <li><input type="checkbox"/> benzyl penicillin 50,000 IU/kg IM or IV</li> <li><input type="checkbox"/> Plus gentamicin 7.5 mg/kg IM or IV once daily           <ul style="list-style-type: none"> <li>- Continue treatment for at least 5 days, up to 10 days</li> </ul> </li> <li><input type="checkbox"/> If not better after 48 hours, use second line f Ceftriaxone 80 mg/kg IM or IV once daily f If staphylococcus is suspected (empyema, pneumatocele at X ray) , give gentamicin 7.5 mg/ kg once daily plus cloxacillin 50 mg/kg IM or IV every 6 hours</li> </ul>	HC4

TREATMENT	LOC
<p>Once the patient improves</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Switch to oral amoxicillin 40 mg/kg every 12 hours for 5 days to complete a total of at least 5 days of antibiotics</li> </ul> <p>Alternative (if above not available/not working)</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Chloramphenicol 25 mg/kg IV every 6 hours</li> </ul>	
<p><b>Other treatments</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Give Paracetamol 10 mg/kg every 4-6 hours for fever</li> <li><input type="checkbox"/> If wheezing, give salbutamol 1-2 puffs every 4-6 hours</li> <li><input type="checkbox"/> Gentle suction of thick secretions from upper airway</li> <li><input type="checkbox"/> Daily maintenance fluids – careful to avoid overload especially in small and malnourished children (see section 1.1.4)</li> <li><input type="checkbox"/> If convulsions, give diazepam 0.5 mg/kg rectally or 0.2 mg/kg IV</li> </ul>	
<p><b>If convulsions are continuous</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Give a long-acting anticonvulsant, e.g., phenobarbital 10-15 mg/kg IM as a loading dose. Depending on response, repeat this dose after 12 hours or switch to oral maintenance dose of 3-5 mg/kg every 8-12 hours</li> </ul>	
<ul style="list-style-type: none"> <li>- Monitor and record</li> <li>- Respiratory rate (every 2 hours)</li> <li>- Body temperature (every 6 hours)</li> <li>- Oxygen saturation (every 12 hours)</li> <li>- Improvement in appetite and playing</li> <li>- Use of accessory muscles of respiration</li> <li>- Ability to breastfeed, drink and eat</li> </ul>	

## 5.2.9.3 Pneumonia in Children > 5 years and adults

### Clinical features

#### Moderate

- Ⓐ Fever, chest pain, cough (with or without sputum), rapid breathing ( $> 30$  bpm), no chest indrawing

#### Severe

- Ⓐ As above plus
- Ⓐ Chest indrawing
- Ⓐ Pulse  $> 120$ /minute
- Ⓐ Temperature  $> 39.5$  o C
- Ⓐ Low BP  $< 90/60$  mmHg
- Ⓐ Oxygen saturation less than 90%

#### Note

- Extrapulmonary features, e.g. confusion or disorientation, may predominate and may be the only signs of pneumonia in elderly or immunosuppressed patients

### Management of pneumonia

TREATMENT	LOC
<p><b>Moderate pneumonia (ambulatory patients)</b></p> <ul style="list-style-type: none"> <li>☐ Amoxicillin 500 mg-1 g every 8 hours for 5 days</li> <li>☐ Children: 40 mg/kg every 12 hours for 5 days.</li> <li>☐ Preferably use dispersible tablets in younger children</li> </ul> <p>If penicillin allergy or poor response after 48 hours (possible atypical pneumonia), give:</p> <ul style="list-style-type: none"> <li>☐ Doxycycline 100 mg every 12 hours for 7-10 days</li> <li>☐ Child <math>&gt; 8</math> years only: 2 mg/kg per dose</li> <li>☐ Or Erythromycin 500 mg every 6 hours for 5 days</li> </ul>	

TREATMENT	LOC
<p>– 14 days in cases of atypical pneumonia Child: 10-15 mg/kg per dose</p> <p><b>Severe pneumonia (hospitalised patients)</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Give oxygen and monitor SpO<sub>2</sub> saturation with pulse oximeter</li> <li><input type="checkbox"/> Benzylpenicillin 2 MU IV or IM daily every 4-6 hours Child: 50,000-100,000 IU/kg per dose</li> </ul> <p>If not better in 48 hours:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Ceftriaxone 1 g IV or IM every 24 hours Child: 50 mg/kg per dose (max: 1 g)</li> </ul> <p>If S. Aureus is suspected</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Cloxacillin 500 mg IV every 6 hours</li> </ul> <p>If other options are not available</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Chloramphenicol 1 g IV every 6 hours for 7 days Child: 25 mg/kg per dose (max: 750 mg)</li> </ul>	HC3

#### 5.2.9.4 Pneumonia by Specific Organisms

Management of pneumonia

TREATMENT	LOC
<p><b>Staphylococcus pneumonia</b></p> <p>This form is especially common following a recent influenza infection. It can cause empyema and pneumatocele.</p> <p><b>Adults and children &gt;5 years:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Cloxacillin 1-2 g IV or IM every 6 hours for 10-14 days Child &gt;5 years: 50 mg/kg per dose (max: 2 g) Child 2 months-5 years</li> </ul>	

## Management of pneumonia

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Cloxacillin 25-50 mg/kg IV or IM every 6 hours</li> <li><input type="checkbox"/> Plus gentamicin 7.5 mg/kg IV in 1-3 divided doses daily           <ul style="list-style-type: none"> <li>- Continue both medicines for at least 21 days</li> </ul> </li> </ul>	
<b>Mycoplasma pneumoniae</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Doxycycline 100 mg every 12 hours for 7-10 days           <ul style="list-style-type: none"> <li>Child &gt;8 years: 2 mg/kg per dose</li> </ul> </li> <li><input type="checkbox"/> Contraindicated in pregnancy</li> <li><input type="checkbox"/> Or erythromycin 500 mg every 6 hours for 5 days           <ul style="list-style-type: none"> <li>Child: 10-15 mg/kg per dose</li> </ul> </li> </ul>	H
<b>Klebsiella pneumonia</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Gentamicin 5-7 mg/kg IV daily in divided doses</li> <li><input type="checkbox"/> Or ciprofloxacin 500 mg every 12 hours           <ul style="list-style-type: none"> <li>Child: chloramphenicol 25 mg/kg every 6 hours               <ul style="list-style-type: none"> <li>- Give a 5-day course</li> <li>- Amend therapy as guided by C&amp;S results</li> </ul> </li> </ul> </li> </ul>	H
<b>Pneumococcal pneumonia</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Benzylpenicillin 50,000 IU/kg IV or IM every 6 hours for 2-3 days then switch to oral Amoxicillin 500 mg-1 g every 8 hours for 5 days Children: 40 mg/kg every 12 hours for 5 days.</li> </ul> <p>Preferably use dispersible tablets in younger children</p>	H

### 5.2.9.5 *Pneumocystis jirovecii* Pneumonia

Refer to section 3.1.10.2

## 5.2.9.6 Lung Abscess

ICD10 CODE: J85.0-1

Localised inflammation and necrosis (destruction) of lung tissue leading to pus formation. It is most commonly

caused by aspiration of oral secretions by patients who have impaired consciousness.

### Cause

- Ⓐ Infection of lungs with pus forming organisms: e.g.  
Klebsiella pneumoniae, Staphylococcus aureus

### Clinical features

- Ⓐ Onset is acute or gradual
- Ⓐ Malaise, loss of appetite, sweating with chills and fever
- Ⓐ Cough with purulent sputum, foul-smelling breath (halitosis)
- Ⓐ Chest pain indicates pleurisy
- Ⓐ Finger clubbing

### Complications

- Ⓐ Pus in the pleural cavity (empyema)
- Ⓐ Coughing out blood (haemoptysis)
- Ⓐ Septic emboli to various parts of the body, e.g. brain (causing brain abscess)
- Ⓐ Bronchiectasis (pus in the bronchi)

### Differential diagnosis

- Ⓐ Bronchogenic carcinoma
- Ⓐ Bronchiectasis
- Ⓐ Primary empyema communicating with a bronchus
- Ⓐ TB of the lungs
- Ⓐ Liver abscess communicating into the lung

## Investigations

- Chest X-ray
- Early stages: Signs of consolidation
- Later stages: A cavity with a fluid level
- Sputum: For microscopy and culture and sensitivity

## Management of pneumonia

TREATMENT	LOC
<p><input type="checkbox"/> Benzylpenicillin 1-2 MU IV or IM every 4-6 hours</p> <p><input type="checkbox"/> Child: 50,000-100,000 IU/kg per dose (max: 2 MU)</p> <p><input type="checkbox"/> Plus metronidazole 500 mg IV every 8-12 hours</p> <p>Child: 12.5 mg/kg per dose</p> <p>Once improvement occurs, change to oral medication and continue for 4-8 weeks f Metronidazole 400 mg every 12 hours</p> <p>Child: 10 mg/kg per dose</p> <p>Plus Amoxicillin 500 mg-1 g 8 hourly</p> <p>Child: 25-50 mg/kg per dose for 4-6 weeks</p> <p>Postural drainage/physiotherapy</p> <p>Surgical drainage may be necessary</p>	HC4

## Prevention

- Early detection and treatment of pneumonia

## 5.3 TUBERCULOSIS (TB)

ICD11 CODE: A15-A19

### 5.3.1 Definition, Clinical Features and Diagnosis of TB

A chronic infection caused by Mycobacterium tuberculosis complex. It commonly affects lungs but can affect any organ (lymph nodes, bones, meninges, abdomen, kidney).

## For more information on the management of TB see:

- Manual of the National TB/Leprosy Programme (NTLP) in Uganda 4th Edition, 2022
- NTLP desk guide
- Latent TB guidelines
- National drug resistant TB guidelines

## Causes

- Mycobacterium tuberculosis complex (e.g. M. tuberculosis, M. bovis, M. avium, M. africanum and M. Microti)
- M. tuberculosis is the commonest cause of tuberculosis
- Transmission by droplet inhalation (cough from a patient with open pulmonary TB); can also be through drinking unpasteurised milk, especially M.bovis

## Clinical features

### General symptoms

- Fevers especially in the evening,
- excessive night sweats
- Weight loss and loss of appetite

### Pulmonary TB

- Chronic cough of >2 weeks (however, in HIV settings, cough of any duration)
- Chest pain, purulent sputum occasionally blood-stained, shortness of breath

### Extrapulmonary TB

- Lymphnode TB: Localized enlargement of lymph nodes depending on the site affected (commonly neck)

- Pleural or pericardial effusion
- Abdominal TB: ascites and abdominal pain
- TB meningitis: subacute meningitis (headache, alteration of consciousness)
- Bone or joint TB: swelling and deformity

### Complications

- Massive haemoptysis - coughing up >250 mL blood per episode
- Spontaneous pneumothorax and pleural effusion
- TB pericarditis, TB meningitis, TB peritonitis
- Bone TB: can be TB spine with gibbus, TB joints with deformity)
- Respiratory failure

### TB Case Definitions

CASE DEFINITION	DESCRIPTION
Presumptive TB patient	Any patient who presents with symptoms and signs suggestive of TB or found to have chest X-ray suggestive of active TB disease
Bacteriologically confirmed TB patient	Patient in whom biological specimen is positive by smear microscopy, culture or molecular WHO Recommended Diagnostic (mWRD) test like GeneXpert Truenat or TB LAMP. All such cases should be notified (registered in the unit TB register)
Clinically diagnosed TB patient	Patient who does not fulfil the criteria for bacteriological confirmation but has been diagnosed with active TB by a clinician on the basis of clinical signs and symptoms supported by relevant investigations

## Classification of TB Disease

CASE DEFINITION	DESCRIPTION
<b>Site of the disease</b>	<p><b>Pulmonary TB:</b> bacteriologically confirmed or clinically diagnosed case, affecting lung parenchyma or tracheobronchial tree.</p> <p><b>Extrapulmonary TB:</b> Any other case of TB.</p> <p>Isolated TB pleural effusion and mediastinal lymphadenopathy without lung tissue involvement is considered extrapulmonary TB</p> <p>If the patient has pulmonary and extrapulmonary involvement, he/she will be classified as pulmonary TB</p>
<b>History of treatment</b>	<p><b>New:</b> no previous TB treatment (or treatment less &lt; 1 month)</p> <p><b>Relapse:</b> patient who completed a previous course of treatment, was declared cured or treatment completed, and is now diagnosed with a recurrent episode of TB</p> <p><b>Treatment after failure:</b> those who have previously been treated for TB and whose treatment failed at the end of their most recent course of treatment</p> <p><b>Treatment after loss to follow-up:</b> Patient has been previously treated for TB and were declared lost to follow-up at the end of their most recent course of treatment.</p>

CASE DEFINITION	DESCRIPTION
	Treatment history unknown: Those who have previously been treated for TB but whose Outcome after their most recent course of treatment is unknown or undocumented
Drug susceptibility status (based on drug susceptibility Tests)	<p><b>Drug Sensitive TB (DS-TB):</b> These are sensitive to 1st line anti-TB drugs</p> <p><b>Drug resistant TB (DR-TB):</b> Resistant to any anti-TB drug. Can be classified as follows.</p> <p><b>Rifampicin resistant:</b> any case of rifampicin resistance (isolated or in combination with other resistance) (RR-TB)</p> <p><b>Monoresistant:</b> resistant to only one first line anti-TB drug</p> <p><b>Poly drug resistant:</b> resistant to more than one first line anti TB other than both rifampicin and isoniazid</p>
	<b>Multi drug resistant:</b> resistant to rifampicin and isoniazid (MDR -TB)
	<b>Extensive drug resistance (XDR-TB):</b> resistant to rifampicin, isoniazid (MDR TB) and any fluoroquinolone and at least one of either bedaquiline or Linezolid )
HIV status	<b>Positive:</b> patients who tested HIV-positive at time of diagnosis or already enrolled in HIV care

CASE DEFINITION	DESCRIPTION
HIV status	<b>Negative:</b> patients who tested negative at the moment of diagnosis  <b>Unknown:</b> If testing is then performed at any moment during treatment, patient should be re classified

### Differential diagnosis

- Histoplasma pneumonia, trypanosomiasis, brucellosis
- Pneumonia
- COVID-19
- HIV/AIDS
- Malignancy
- COPD, asthma, bronchiectasis, emphysema etc.
- Post TB lung disease
- Fungal infection of the lungs e.g. Aspergillosis

### Screening and diagnosis of TB disease

**TB screening:** is defined as the systematic identification of people at risk for TB disease, in a predetermined target group, by assessing using tests, examinations or other procedures that can be applied rapidly

#### TB screening approaches:

- Symptom screening or CXR
- All individuals seeking health care should be screened for TB at each visit

#### Investigations for TB

- Obtain sputum sample or other relevant samples from presumptive TB patients for diagnosis
- Xpert MTB/RIF is the recommended diagnostic test for TB diagnosis

- Where Xpert MTB/RIF test is not available, do

Sputum smear microscopy for AAFBs (ZN stain) but send the sample for Xpert MTB/RIF test.

GeneXpert MTB/Rif: automated DNA test on body samples (sputum, lymphonodes tissue, pleural fluid, CSF etc) which can diagnose pulmonary TB and determine susceptibility to Rifampicin. It is superior to microscopy.

### Other investigations

- X-ray, abdominal ultrasound, biopsies etc. can be used for sputum and GeneXpert negative patients or in case of extrapulmonary TB according to clinical judgement
  - TST can be used as a supportive test to guide decision to treat for TB in children
- putum culture and Drug susceptibility test:** is a confirmatory test for TB and also provides resistance pattern to TB medicines.  
Do this test for:
- Patients with Rifampicin resistance reported with GeneXpert
  - Also patients on first-line treatment who remain positive at 2 months and are reported Rifampicin sensitive on GeneXpert
  - Patients suspected to be failing on first-line treatment

**Note:** All presumed and diagnosed TB patients should be offered an HIV test

#### 5.3.1.1 Tuberculosis in Children and adolescents

TB may present at any age in children though the risk is highest below the age of two years. When compared to adults, children are more prone to TB infection, TB disease, and severe forms of TB disease.

##### Risk factors

- Contact with infectious (pulmonary) case of TB
- Age < 5 years



- ⦿ Immunosuppression (HIV, malnutrition, diabetes, etc).
- ⦿ Age < 1 year and lack of BCG vaccination are risk factors for severe disease

## Clinical features

- ⦿ Suspect TB in all children with
  - Fever > 2 weeks
  - Cough > 2 weeks
  - Poor weight gain for one month
  - Close (home) contact of pulmonary TB case.
  - In young children, reduced playfulness, poor feeding, decreased activity
  - Other signs include swollen lymph nodes in the neck, groin region etc.

## Investigations

- ⦿ Bacteriological confirmation of TB is more difficult in children. The diagnosis of TB in children is dependent on conducting a detailed clinical assessment combined with available tests
- ⦿ Whenever possible, geneXpert should be performed

## Management

The principles and objectives of TB treatment are similar to those of adults. In addition, effective treatment of TB in children promotes growth and development.

### 5.3.1.2 Drug-Resistant TB

Drug resistance is said to occur when TB organisms continue to grow in the presence of one or more anti-TB medicines.

- ⦿ Although several factors can contribute to the development of drug-resistant TB, inadequate anti-TB treatment is probably the most important. Inadequate anti-TB treatment leads to mutation in drug-susceptibility bacilli making them drug resistant.

## Who is at risk for drug-resistant TB:

- Contact with known drug-resistant tuberculosis
- Retreatments (relapses, treatment after failures, return after loss to follow-up)
- History of frequent interruption of drug treatment
- Patients who remain sputum smear-positive at month 2 or 3 of first-line anti-TB treatment
- Patients presumed to have DR-TB should be screened using rapid drug susceptibility testing (DST) of rifampicin (Xpert MTB/RIF, Truenat)
- All patients who are drug-resistant TB suspects should therefore have sputum/other specimens taken for culture and DST.
- Patients with drug-resistant TB should be linked to designated MDR TB treatment initiation centers in the respective regions

DRUG RESISTANT TB IS A MAJOR PUBLIC HEALTH PROBLEM. INADEQUATE TB TREATMENT IS THE MAJOR CONTRIBUTING FACTOR

### 5.3.1.3 Post-TB patient management

A post-TB patient is one who was successfully treated for TB but presents with respiratory symptoms (chest pain, shortness of breath, cough).

- Re-do standard TB diagnostic evaluation (sputum geneXpert and Chest X ray)
- If negative, evaluate for post-TB lung disease e.g., bronchiectasias, COPD, pulmonary hypertension.
- In most cases these patients have residual lung damage on Chest X-ray from previous TB, BUT they do not need retreatment if bacteriologically negative
- Counsel the patient and give supportive treatment e.g., Pulmonary rehabilitation, etc.

### 5.3.2 Management of TB

#### General principles

- ⦿ The country has adopted patient centered care. It is recommended that all TB medicines are taken under direct observation by a treatment supporter (DOT). Digital Adherence Technologies (DAT) have been introduced to support treatment adherence.
- ⦿ Anti-TB drugs are given in fixed dose combination (FDC) regimens according to the patient's TB classification
  - Treatment is divided into two phases: an initial (intensive) phase of 2 months and a continuation phase of 4 months (longer in severe forms of TB particularly TB meningitis and osteoarticular TB)TB treatment regimens are expressed in a standard format, e.g. 2RHZE/4RH where:
    - Letters represent abbreviated drug names
    - Numbers show the duration in months
    - shows the division between treatment phases
- ⦿ Other shorter term (4-months) treatment regimen recently adopted
  - 2 HRE(Z)/2RH for children 2 months to 16 years
  - 2 HPMZ/2HPM for adults
- ⦿ Anti-TB drugs have side effects and they should be managed appropriately (see section 5.3.2.1)
- ⦿ TB treatment monitoring should be done by clinical, sputum and where possible radiological
- ⦿ A conclusion of “treatment outcome” status should be done for every patient treated for TB.

## First line anti-TB medication

Drug	Adult Dose	Children Dose	Contraindications (C) / Interactions (I)
Isoniazid (H) oral	5 mg/kg (max 300 mg)	10 mg/kg (range 7–15 mg/kg)	C: Liver disease, known hypersensitivity I: carbamazepine, phenytoin
Rifampicin (R) oral	10 mg/kg (max 600 mg)	15 mg/kg (range 10–20 mg/kg)	C: Liver disease, known hypersensitivity I: Oral contraceptives, nevirapine, warfarin, phenytoin, glibenclamide
Pyrazina-mide (Z) oral	30-40 mg/kg (max 2500 mg)	35 mg/kg (range 30–40 mg/kg)	C: Liver disease, known Hypersensitivity
Ethambutol (E) oral	15 mg/kg	20 mg/kg (range 15–25 mg/kg)	C: Pre existing optic neuritis, established kidney failure
Moxifloxacin (M) oral	10-15mg / Kg		Resistance to a fluoroquinolone

**Note**

- Rifampicin interacts with oestrogen-containing contraceptives and reduces the protective efficacy of the contraceptives. Use high dose contraceptive or use an additional barrier method.

**Important:** The choice of regimen now depends on rifampicin sensitivity and not on the previous history of treatment:

- All patients without rifampicin resistance (either new or re-treatments) are treated with 1st line regimen.
- Patients with rifampicin resistance (either new or re- treatments) are treated with second line medication in a designated MDR-TB treatment facility.

### Susceptible TB: 1st line treatment regimens

For patients without rifampicin resistance to Gene Xpert MTB/Rif (both new and re-treatment cases).

New cases not belonging to priority (risk) groups and in which diagnosis was done by sputum examination will also be treated with this regimen.

Type Of TB Disease	Regimen For Susceptible TB		LOC
	Intensive Phase	Continuation Phase	
All forms of TB in adults and children of all ages but excluding TB meningitis and Bone TB)	2RHZE	4RH	HC3
TB meningitis Bone (Osteo-articular) TB	2RHZE	10RH	H C 4 a n d above
<b>Alternative 1st-line treatment regimen</b>			
All forms of TB in children (2 months to 16 years) with non-severe disease	2 HRE(Z)	2RH	General Hospital and above
All forms of TB in adults above 12 years, weight >40 Kgs, if HIV positive CD4>100 cells/L	2 HPMZ	2HPM	

## Drug-resistant TB

Patients with drug-resistant TB should undergo culture and Drug Sensitivity testing, and be treated with second line regimens according to national guidelines.

Notify the relevant TB focal persons and organize referral to MDR-TB treatment initiation center for appropriate management.

Type Of TB Disease	Regimen For Drug Resistant TB	LOC
INH mono-resistance	6(H)REZ-levofloxacin)	DTUS
RR/MDR TB	Treatment at designated MDR TB treatment initiation centers as per the national guidelines	Hospital and above
Pre XDR, XDR	Treatment at designated MDR TB treatment initiation centers as per the national guidelines	Hospital and above in consultation with national panel

### Adjunctive treatment

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Vitamin B6 (pyridoxine): 25 mg per day; given concomitantly with isoniazid for the duration of therapy, to prevent peripheral neuropathy</li> <li><input type="checkbox"/> Prednisolone in TB patients in whom complications of fibrosis are anticipated because of severe inflammation such as TB meningitis.           <ul style="list-style-type: none"> <li>- Prednisolone is given in a dose of 1-2 mg/kg body weight (not more than 60 mg/day) as a single dose for 4 weeks, and then tapered off over 2 weeks</li> </ul> </li> </ul>	HC3H

## Laboratory Monitoring (For Pulmonary Tb)

### At the end of the initial 2 months:

- Sputum smear-negative; start continuation phase
- Sputum smear-positive; do GeneXpert to rule out rifampicin resistance, start continuation phase and Xpert MTB/XDR where accessible, to rule out resistance to other drugs
- If Rifampicin-resistant, refer for MDR-TB treatment and
- If Rifampicin-sensitive, continue with first-line treatment, explore adherence issues but repeat smear at

### At the beginning of 5 months:

- Sputum smear-negative, continue with continuation treatment
- Sputum smear-positive, diagnose Treatment Failure
- Take sputum for GeneXpert to rule out Rifampicin Resistance and Xpert MTB/XDR where accessible, to rule out resistance to other drugs
- If Rifampicin Resistant, refer for DR treatment
- If INH resistant manage as INH mono-resistant TB as above
- If TB detected but not Rifampicin Resistant, restart first line regimen but explore adherence issues

## Monitoring of susceptible TB

### During the 6th month:

- Sputum smear-negative, complete treatment and declare cured or treatment completed
- Sputum smear-positive, diagnose treatment failure
- Take sputum for GeneXpert to rule out rifampicin resistance and Xpert MTB/XDR where accessible, to rule out resistance to other drugs
- If Rifampicin-resistant, refer for MDR-TB treatment
- If Rifampicin-sensitive, restart first-line treatment, explore adherence issues

Clinical Monitoring (For All Tb Cases)
<ul style="list-style-type: none"> <li>- Monitor wellbeing and weight gain</li> <li>- Assess and reinforce treatment adherence</li> <li>- Assess and manage side effects</li> </ul>
<b>Note</b> <ul style="list-style-type: none"> <li>▪ Radiological monitoring- this method should not be used as the sole monitoring tool.</li> </ul>

### Management of treatment interruptions

#### Refer to NTLP manual

#### Treatment outcomes

A conclusion should be made regarding treatment outcome of EVERY TB patient who has been started on anti-TB treatment.

OUTCOME	DESCRIPTION
<b>Cure</b>	A pulmonary TB patient with bacteriologically confirmed TB at the beginning of treatment who was smear- or culture-negative in the last month of treatment and on at least one previous occasion
<b>Treatment completed</b>	A TB patient who completed treatment without evidence of failure BUT with no record to show that sputum smear or culture results in the last month of treatment and on at least one previous occasion were negative, either because tests were not done or because results are unavailable
<b>Lost to follow-up</b>	A TB patient who did not start treatment, or completed more than one month of treatment and whose treatment was interrupted for two or more consecutive months



OUTCOME	DESCRIPTION
Died	A TB patient who dies for any reason before starting or during the course of treatment
Treatment failure	A TB patient whose sputum smear or culture is positive at month five or later during treatment
Not evaluated	A patient for whom no treatment outcome is assigned. This includes cases “transferred out” to another treatment unit as well as cases for whom the treatment outcome is unknown to the reporting unit
Treatment success	The sum of cured and treatment completed

### 5.3.2.1 Anti-TB Drugs Side Effects

Common side effects

Drug	Side-Effects
Isoniazid	Hepatitis, peripheral neuropathy
Rifampicin	Flu-like syndrome, dermatitis, hepatitis, reddish-brown colouration of urine
Pyrazinamide	Joint pains, hepatitis
Ethambutol	Impaired visual acuity and colour vision
Moxifloacin	Tendonitis, arthralgia, GI disturbance, haematuria
Treatment completed	A TB patient who completed treatment without evidence of failure BUT with no record to show that sputum smear or culture results in the last month of treatment and on at least one previous occasion were negative, either because tests were not done or because results are unavailable

## Management of side effects

Side-Effects	Drug(S) Likely To Cause	Management
<b>Low appetite, nausea, abdominal pain</b>	Pyrazinamide, Rifampicin	Give drugs with small meal or just before going to bed
<b>Joint pains</b>	Pyrazinamide	Give an analgesic e.g. ibuprofen or Paracetamol
<b>Burning sensation in the feet</b>	Isoniazid	Pyridoxine 25-100 mg daily
<b>Orange/red urine</b>	Rifampicin	Reassure the patient that it is not harmful
<b>Skin rash (hyper-sensitivity reaction)</b>	Any anti-TB drug	Depending on degree, see guidelines below
<b>Deafness (no wax on auroscopy) Dizziness, vertigo, and nystagmus</b>	Streptomycin	Stop streptomycin. Use Ethambutol
<b>Jaundice (other causes excluded)</b>	Pyrazinamide, Rifampicin and Isoniazid	Stop anti-TB drugs see guidelines below
<b>Mental confusion</b>	Isoniazid, Rifampicin and Pyrazinamide	<ol style="list-style-type: none"> <li>If jaundiced, suspect liver failure, stop drugs (see below)</li> <li>If no jaundice, suspect Isoniazid, increase dose of pyridoxine</li> </ol>



Side-Effects	Drug(S) Likely To Cause	Management
<b>Visual impairment (other causes excluded)</b>	Ethambutol	Stop Ethambutol. Use streptomycin

### Hypersensitivity reaction

Most anti-TB drugs can cause hypersensitisation between week 3 and week 8 of treatment in order of frequency: ethambutol, pyrazinamide, rifampicin and isoniazid.

If mild (simple itchy rash), give antihistamine (e.g. chlorpheniramine) and moisturizer and continue treatment.

Severe reactions are characterised by

- Fever, headache, vomiting
- Macular dark erythematous rash which can progress to a Steven Johnson-Toxic Epidermal Necrolysis syndrome

### Adjunctive treatment

TREATMENT	LOC
<input type="checkbox"/> Stop all drugs immediately	H
<input type="checkbox"/> Manage supportively	RR
<input type="checkbox"/> Refer for specialised management	

### Drug-induced hepatitis

Severe hepatic damage, presenting with jaundice, vomiting, severe malaise. In order of frequency, the implicated drugs are Isoniazid, Pyrazinamide, Rifampicin and Ethambutol.

### Adjunctive treatment

TREATMENT	LOC
<input type="checkbox"/> Stop all drugs immediately	H
<input type="checkbox"/> Manage supportively	RR
<input type="checkbox"/> When jaundice has resolved, re-introduce single drugs at 3-7 days interval, starting from the least likely involved	

## Adjunctive treatment

TREATMENT	LOC
<input type="checkbox"/> If reaction very severe, do not try to restart pyrazinamide. If RH tolerated, do not try pyrazinamide	H
<input type="checkbox"/> Use alternative regimen avoiding the causative drug	RR

### 5.3.2.2 Prevention and Infection Control of TB

#### Case diagnosis and management

A TB patient is more infectious before they start TB treatment.

- Ⓐ Provide PPE to sputum-positive patients
- Ⓐ Early detection of cases and initiation of appropriate TB treatment
- Ⓐ Treatment under directly observed treatment (DOT) and follow up to ensure adherence and cure

#### Contact tracing

- Ⓐ Tracing of contacts of TB patients
- Ⓐ Routine screening of health workers for latent & active TB

#### High Priority Patients For Contact Tracing

- Ⓐ Bacteriologically confirmed PTB (Smear positive or Xpert positive or Culture positive)
- Ⓐ Cavitation of chest x-ray
- Ⓐ Age < 5 years
- Ⓐ MDR TB • PLHIV

#### Other preventive measures

- Ⓐ BCG vaccination at birth to prevent severe forms of TB
- Ⓐ TB Preventive Treatment for categories at risk

#### General hygiene

- Ⓐ Avoidance of overcrowding
- Ⓐ Avoid drinking unboiled milk

- ⑤ Cough hygiene (cover cough with pieces of cloth, washing hands with soap, proper disposal of sputum)
- ⑥ Good nutrition
- ⑦ Promote good ventilation in housing & transport
- Open ventilators, windows & doors that allow air exchange

### **5.3.2.3 Tuberculosis Preventive Treatment**

Tuberculosis preventive treatment is recommended to prevent the development of active TB disease in an individual who has latent TB infection (LTBI).

Uganda guidelines for programmatic management of Latent TB infection recommend TB preventive treatment (TPT) in the following categories of people:

- Persons living with HIV
- Child & adult contacts of pulmonary TB patients

Do not use TPT in cases of active TB

Do not use TPT in contacts of MDR-TB

TREATMENT	LOC
<input type="checkbox"/> Exclude active TB <ul style="list-style-type: none"> <li>- Assess for cough, fever, weight loss and nights sweats (Children: cough, fever, poor weight gain)</li> <li>- If any of the TB symptoms are present, do clinical evaluation for TB</li> <li>- If none is present, TB is unlikely, then rule out contra-indications for TPT medicines. If none, then give</li> </ul> <input type="checkbox"/> Give TPT as per dosing chart below.	Hc3

#### **Note**

- HIV-positive children < 1 year should receive TPT only if they have history of contact with TB case and active TB has been excluded

### 5.3.2.5 TB Preventive Treatment Dosing Chart

Medicine frequency & duration	Formulation	Dose of TPT medicine (mgs)	Dose/ weight	Recom
3HP (once weekly rifapentine plus isoniazid for 3 months)	Fixed Doze Combination (FDC) Tablet	Rifapentine 300mg/ Isoniazid 300mg		3-5.9
	Single medicine tablet	Pyridoxine 25mg/day		
6H (daily isoniazid for 6 months)	Single medicine tablet			3-5.9 kgs
		Isoniazid 100 mg	<10 years 10mg/kg	0.5
			> 10 years 5mg/kg	
		Isoniazid 300 mg	> 10 years 5mg/kg	
	Single medicine tablet	Pyridoxine 25 mg		0.5
3RH (daily Rifampicin in Isoniazid for 3 months)	Fixed Doze Combination (FDC) Tablet			< 4kg

Recommended number of tablets per body weight in kilograms							
kg	6-9.9Kgs	10-15kgs	16-23kgs	24-30kgs	31-34kgs	35-45kgs	>45kgs
0	1	1.5	2	2.5	3	3	
	1	1	1	1	1	1	
0	6-9.9 Kgs	10 - 13.9 kgs	14 - 19.9 kgs	20 - 24.9 kgs	25 - 34.5 kgs	35 - 44.5 kgs	45 - 49.9 kgs
	1	1.5	2	2.5			
					1.5	2	2.5
							1
	0.5	1	1	1	1	1	1
kg	4-7 kgs	8-11 kgs	12-15 kgs	16-24 kgs	25-32 kgs	33-39 kgs	40-54 kgs

		RH 75mg/50mg	< 10 years R-15mg/kg	0.5
	Single medicine tablet	RH 150mg/75mg	H-10mg/kg >10 years R-10mg/kg	
			H-5 mg/kg	
	Single medicine tablet	Pyridoxine 25mg/day		0.5
Medicine frequency & duration	Formulation	Dose of TPT medicine (mgs)	Dose/ weight	Recon
1HP (once daily rifapentine plus isoniazid for 1 month - 28 days) for adolescents >13 years & adults			Regardless of weight band	3-5.9
	Single medicine tablets	ne Isoniazid (H) 300mg tablet 4 Rifapentine (P) 150mg tablets / day		
		Pyridoxine 25mg/day		

1	2	3	4	4			
					2	3	
1	1	1	1	1	1	1	
Recommended number of tablets per body weight in kilograms							
0kgs	6-9.9Kgs	10-15kgs	16-23kgs	24-30kgs	31-34kgs	35-45kgs	>45kgs
	1	1.5	2	2.5	1	1	
	1	1	1	1	4	4	
	1	1	1	1	1	1	

Preferred options for TPT	
TPT medicine option	Target population
Isoniazid monotherapy	Contact
	PLHIV
	3. Prevention a. history b. CD4 c. WHO
Isoniazid/co-trimoxazole/pyridoxine (Q-TIB)	PLHIV
	new (< 12 months) CD4 < 500
	WHO
3 months of Rifapentine/Isoniazid	PLHIV
	Contact
1 month of Rifapentine/Isoniazid	Prisoners
	Healthcare workers

## B Preventive Treatment

### **Set population (active TB ruled out)**

Contacts of PBC TB patients < 2 years of age

On protease inhibitors

Pregnant women living with HIV with;

History of contact with a TB patient

CD4 < 200 cells/ml

WHO stage 3 or 4

; or

<12 months) in care

< 200 cells/ml

stage 3 or 4

For those > 2 years of age (not on protease inhibitors (PI))

Contacts of PBC TB patients > 2 years

Healthcare workers

Healthcare workers

# 6 Gastrointestinal and Hepatic Diseases

## 6.1 GASTROINTESTINAL EMERGENCIES

### 6.1.1 Appendicitis (Acute)

ICD10 CODE: K35-K37

Inflammation of the appendix.

#### Causes

- ⦿ Blockage of the appendix duct with stool or particles, followed by infection by intestinal bacteria

#### Clinical features

- ⦿ Constipation (common)
- ⦿ Pain situated around the umbilicus
  - Crampy, keeps on increasing in severity
- ⦿ After some hours, the pain is localised in the right iliac fossa and becomes continuous
- ⦿ There may be nausea and vomiting
- ⦿ Fever (low grade in initial stages)
- ⦿ Tenderness and rigidity (guarding) in right iliac fossa
- ⦿ Generalized abdominal pain and signs of peritonitis follows rupture when the contents are poured into the abdominal cavity

#### Differential diagnosis

- ⦿ Salpingitis (in females), ovarian cyst
- ⦿ Ectopic pregnancy



- Ⓐ Pyelonephritis, ureteritis (inflammation of the ureter)
- Ⓐ Intestinal obstruction

### Investigations

- No special investigations - good history and physical examination are essential for diagnosis
- Complete blood count: look for leucocytosis
- Transabdominal ultrasound
- Abdominal X ray (to assess for perforation and intestinal occlusion)

### Management

TREATMENT	LOC
<p><input type="checkbox"/> Emergency surgery</p> <p><input type="checkbox"/> If surgery is delayed, start antibiotic treatment while referring           <ul style="list-style-type: none"> <li>- ceftriaxone 2 g IV once daily</li> <li>- Child: 80 mg/kg IV once daily</li> <li>- plus metronidazole 500 mg IV every 8 hours child 10 mg/kg IV every 8 hours</li> </ul> </p> <p><input type="checkbox"/> Start antibiotic prophylaxis before the surgery and continue for a duration depending on the findings (&lt; 24 hours for unperforated appendix, at least 5 days for perforated appendix)</p>	H

### 6.1.2 Acute Pancreatitis

ICD10 CODE: K85

Acute inflammation of the pancreas.

#### Cause

- Ⓐ Excessive alcohol intake
- Ⓐ Gall stones, biliary tract disease (obstructive cancer or anatomical abnormalities)
- Ⓐ Infections, e.g. mumps, HIV, hepatitis A, ascaris
- Ⓐ Drugs, e.g. sulphonamides, furosemide, lamivudine, analgesics, organophosphate poisoning

- Peptic/duodenal ulcers

### Clinical features

- Acute abdominal pain usually in the epigastrium radiating to the back
- Pain worsened by eating or lying down and relieved by sitting up or leaning forward
- Nausea, vomiting, abdominal distension
- Fever, tachycardia, dehydration (may be severely ill with shock)
- Abdomen is very tender but in the absence of peritonitis there is no rigidity/rebound tenderness

### Complications

- Pseudocysts
- Necrotizing pancreatitis with infection
- Peritonitis

### Differential diagnosis

- Perforated peptic ulcer, peritonitis
- Acute cholecystitis, inflammation of the biliary tract
- Sickle-cell anaemia crisis

### Investigations

- Blood: Serum analysis, complete blood count, random blood sugar
- Raised pancreatic amylase and lipase  $> 3$  times normal
- Ultrasound: gallstones, pancreatic oedema, abdominal fluid
- Liver function tests: raised liver enzymes

## Management

TREATMENT	LOC
<p><b>Mild acute pancreatitis</b></p> <p>(No organ failure, no local or systematic complications, no signs of peritonitis, normal serum creatinine, normal haematocrit [not increased])</p> <p><b>Early aggressive fluid resuscitation and acid-base balance</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Prevent volume depletion (adequate fluids with Ringer's Lactate). Give 5-10 ml/kg/hour or 250-</li> <li>500 ml of isotonic crystalloids in the first 12-24 hours or urine output of at least 0.5 ml/kg/hour</li> <li><input type="checkbox"/> Give IV fluids to correct metabolic and electrolyte disturbances and to prevent hypovolaemia and hypotension</li> <li><input type="checkbox"/> Monitor electrolytes</li> <li><input type="checkbox"/> Goal is to decrease haematocrit and BUN in 48 hours, evaluate every 4-6 hours</li> </ul> <p><b>Pain control</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Opioids, paracetamol, epidural anaesthesia [avoid NSAIDs] <ul style="list-style-type: none"> <li>- Rectal/IV paracetamol 500 mg 6-8 hourly</li> <li>- or Pethidine 25-100 mg SC or IM or 25-50 mg slow IV. Repeat prn every 4-6 hours</li> <li>- IV morphine 1-3 mg every 4 hours</li> <li>- Be aware of complications e.g. constipation, dysphagia, respiratory depression, confusion</li> </ul> </li> <li><input type="checkbox"/> Emesis</li> <li><input type="checkbox"/> Anti-emetics as appropriate <ul style="list-style-type: none"> <li>- Metoclopramide 10 mg IV/IM every 8 hours</li> </ul> </li> <li><input type="checkbox"/> Pass a nasogastric tube for suction when persistent vomiting or ileus occurs</li> </ul>	HC4

TREATMENT	LOC
<b>Feeding and nutrition</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> No feeding by mouth until signs and symptoms of acute inflammation subside (i.e. cessation of abdominal tenderness and pain, return of hunger and well-being)</li> </ul>	
<ul style="list-style-type: none"> <li><input type="checkbox"/> Provide energy with dextrose 50% 300-500 ml a day (add 50 ml to 500 ml Normal saline) to prevent muscle wasting</li> <li><input type="checkbox"/> Start early oral re-feeding on demand, start within 48-72 hours as soon as the patient is able and can tolerate feeds</li> <li><input type="checkbox"/> Start with clear liquids, then low fat semi-solid feeds then a normal diet – according to tolerance</li> <li><input type="checkbox"/> Monitor daily for vital signs, fluid intake, urinary output, and GI symptoms</li> <li><input type="checkbox"/> If oral feeding not possible, consider peripheral parenteral and central parenteral nutrition</li> </ul>	
<b>Glycaemic control (hyperglycaemia is common)</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Keep serum blood sugar between 6-9 mmol/l f Avoid hypoglycemia</li> </ul>	
<b>Antibiotics</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Avoid inappropriate use of antibiotics and other medications e.g. for prophylaxis</li> <li><input type="checkbox"/> In case of specific infection, e.g. biliary sepsis, pulmonary infection, or UTI, treat vigorously with appropriate antibiotic therapy</li> </ul>	
<b>Other measures</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Address the underlying cause as is appropriate</li> <li><input type="checkbox"/> Stop alcohol or drugs</li> </ul>	

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Mobilisation</li> <li><input type="checkbox"/> Evaluation for gall stones by ultrasound scans</li> <li><input type="checkbox"/> Manage complications e.g. acute peri-pancreatic fluid collections, acute necrosis, pseudocyst</li> </ul>	
<b>Moderately acute pancreatitis</b> <ul style="list-style-type: none"> <li>– Transient organ failure (&lt; 48 hours)</li> <li>– Local or systematic complications without persistent organ failure</li> </ul>	RR
<b>Severe acute pancreatitis</b> <ul style="list-style-type: none"> <li>– Persistent organ failure (&gt; 48 hours)</li> <li>– Either single or multiple organ failure</li> </ul>	RR
<b>Treatment as above plus</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Refer or consult with specialist at higher level</li> <li><input type="checkbox"/> HDU/ICU (monitoring and nursing) f Volume resuscitation</li> <li><input type="checkbox"/> Pain management f Nutrition/ re-feeding f Glycaemic control f Nasogastric tube</li> <li><input type="checkbox"/> Oxygen / mechanical ventilation</li> <li><input type="checkbox"/> Renal replacement</li> <li><input type="checkbox"/> Address the cause where possible</li> <li><input type="checkbox"/> Manage complications as appropriate e.g. acute peri-pancreatic fluid collection, acute necrosis, pseudocyst.</li> </ul>	RR
<b>Note</b> <ul style="list-style-type: none"> <li>▪ Look out for diabetes mellitus as a consequence of damage to the pancreas</li> </ul>	

## Prevention

- Reduce alcohol intake - moderate consumption
- Limit use of toxic drugs

### 6.1.3 Upper Gastrointestinal Bleeding ICD10 CODE: K92.2

Bleeding from the upper gastrointestinal tract (oesophagus, stomach and duodenum). It can be a medical emergency.

#### Cause

- Gastro-oesophageal varices
- Peptic ulcer disease/severe gastritis/cancer
- Mallory Weiss tear (a tear in the oesophageal mucosa caused by forceful retching)

#### Clinical features

- Vomiting of fresh blood (haematemesis)
- Coffee brown emesis (degraded blood mixed with stomach content)
- Melena: passing of soft dark red smelly stool
- Black stools (in case of minor bleeding)

#### Complications

- Acute hypovolaemia (if acute and abundant): syncope, hypotension, tachycardia, sweating
- Chronic anaemia (if subacute/chronic loss)

#### Diagnosis

- Endoscopy

## 6.1.4 Peritonitis

ICD10 code K65

Irritation (inflammation) of the peritoneum

### Causes

Infection following:

- Ⓐ Perforation of the gut and leakage of its contents, e.g. burst appendix, perforated peptic ulcer
- Ⓐ Perforated bowel due to obstruction or injury
- Ⓐ Perforation of gall bladder, containing infected bile
- Ⓐ Perforation of the uterus
- Ⓐ Tuberculosis, abscess, typhoid ulcers
- Ⓐ Malignancy
- Ⓐ Post-operative peritonitis

### Chemical causes

- Ⓐ Leakage of urine, blood, bile or stomach or pancreas content into the peritoneal cavity

### Clinical features

- Ⓐ Severe and continuous pain
- ▢ Generalised if the whole peritoneum is affected
- Ⓐ Abdominal swelling (distension)
- Ⓐ Fever, vomiting, tachycardia, hypoxia
- Ⓐ Hypovolemic shock, reduced urinary volume
- Ⓐ Tenderr rigid abdomen
- Ⓐ Rebound tenderness - pressure on the abdomen and sudden release causes sharper pain
- Ⓐ Absent bowel sounds

### investigations

- Ⓐ Abdominal X-ray and/or ultrasound

- Blood: Complete blood cell count, culture and sensitivity
- Renal function and electrolytes
- Liver function tests

TREATMENT	LOC
<p><input type="checkbox"/> Refer to hospital</p> <p><input type="checkbox"/> Start initial treatment before referral</p> <p><input type="checkbox"/> Monitor temperature</p> <p><input type="checkbox"/> Monitor BP, pulse, SpO<sub>2</sub>, urine output, mention</p> <p><input type="checkbox"/> Put up an IV drip with normal saline or ringer's lactate or any other crystalloid: 1 L every 1-2 hours until BP is normal, then 1 L every 4-6 hours when BP is normal</p> <p><input type="checkbox"/> Nil by mouth. Pass a nasogastric tube and start suction</p> <p><input type="checkbox"/> Ask patient to lie on their side in a comfortable position</p> <p><input type="checkbox"/> Give oxygen if patient is hypoxic</p> <p><input type="checkbox"/> Pain control (avoid NSAIDs)           <ul style="list-style-type: none"> <li>- Pethidine 50 mg IM or IV</li> <li>- Child: 0.5-2 mg/kg</li> <li>- Or Morphine 5-15 mg IV or IM or SC</li> </ul>           Child: 2.5-5 mg IM IV SC         </p> <p><input type="checkbox"/> Refer patient to hospital for further management, including possible exploratory laparotomy</p> <p><b>In suspected bacterial infection and fever: (minimum 7-day course)</b></p> <p><input type="checkbox"/> Ceftriaxone 1-2 g IV once daily</p> <p><input type="checkbox"/> Child: 50 mg/kg per dose</p> <p><input type="checkbox"/> Plus gentamicin 7 mg/kg IV daily in divided doses</p> <p>Child: 2.5 mg/kg every 8 hours</p>	H

TREATMENT	LOC
<ul style="list-style-type: none"> <li>□ Plus metronidazole 500 mg by IV infusion every 8 hours; change when possible to 400 mg orally every 8 hours Child: 12.5 mg/kg IV per dose; change when possible to oral route</li> <li>□ Identify and control the source of infection</li> <li>□ Prevent and control complications through: proper nutrition, early ambulation, rehabilitation</li> </ul>	

### 6.1.5 Diarrhoea ICD10 CODE: DEPENDING ON THE CAUSE

Occurrence of 3 or more loose watery stools in 24 hrs. Acute diarrhoea: ≥3 loose, watery stools within 24 hours Dysentery: bloody diarrhoea, visible blood and mucus Persistent diarrhoea: episodes of diarrhoea lasting more than 14 days

#### Causes

- Viruses: Rotavirus, Norovirus, adenovirus, measles, hepatitis A virus, hepatitis E virus, Ebola
- Bacteria: Vibrio cholera, E.coli, Salmonella, shigella, campylobacter
- Protozoa: giardiasis, malaria, cryptosporia
- Helminthes e.g. strongyloidiasis, schistosomiasis
- Infectious diseases, e.g. measles, malaria, and other fever-causing conditions
- Malnutrition e.g. kwashiorkor
- Drugs e.g., prolonged use of purgatives and broad-spectrum antibiotics
- Unhygienic feeding methods
- Malabsorption syndrome
- Lactose intolerance

- HIV associated-diarrhoea
- Irritable bowel syndrome
- Metabolic: diabetes, thyroid disease
- Travellers' diarrhoea
- Inflammatory bowel disease (persistent diarrhoea usually bloody)

### Clinical features

- Loose watery stools
- Abdominal cramps
- Dehydration - thirst, sunken eyes, loss of skin elasticity, low urine output
- Signs of malnutrition if diarrhoea persists for > 14 days
- Blood in stool (in dysentery)

### Investigations

- Stool: Microscopy, C&S
- Other investigations may be necessary according to history and physical examination

### Red flags

- Fever
- Extremes of age
- History of travel from a known endemic area
- Dysentery
- Shock, failure to feed, mental confusion

TREATMENT	LOC
<input type="checkbox"/> Prevent or correct dehydration with ORS or IV fluids according to treatment plans A, B or C (see section 1.1.3)	HC2
<input type="checkbox"/> Find and treat the cause if indicated <ul style="list-style-type: none"> <li>- Avoid inappropriate use of antibiotics e.g. metronidazole, ciprofloxacin</li> </ul>	HC4

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Routinely use zinc supplementation, at a dosage of 20 milligrams per day for children older than six months for 10–14 days</li> <li><input type="checkbox"/> Prevent or treat undernutrition and micronutrient deficiencies</li> </ul> <p>Persistent or chronic diarrhoea:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Adults only: As above plus codeine phosphate 30 mg every 8-12 hours as required</li> <li><input type="checkbox"/> Child: vitamin A           <ul style="list-style-type: none"> <li>- 6-11 months: 100,000 IU; 1-6 years: 200,000 IU</li> </ul> </li> </ul>	HC2
	HC4

## Prevention

- Ⓐ Vaccination: measles, rotavirus, polio, hepatitis A virus
- Ⓐ Notify in case of suspected epidemics e.g. cholera, hepatitis A or E virus infections, Ebola
- Ⓐ Encourage handwashing, use of clean drinking water, and proper waste disposal

## 6.2 GASTROINTESTINAL INFECTIONS

### 6.2.1 Amoebiasis

ICD10 CODE: A06

A common parasitic infection of the gastrointestinal system acquired through oral-faecal transmission.

#### Causes

- Ⓐ Protozoan Entamoeba histolytica

#### Clinical features

It may present as:

## Amoebic dysentery

- Persistent mucoid/bloody diarrhoea
- Abdominal pain, tenesmus
- Chronic carriers are symptomless

## Amoebic abscess (as a result of spread via the blood stream):

- Liver abscess: swelling/pain in the right sub-costal area, fever, chills, sweating, weight loss
- Brain: presenting as space-occupying lesion
- Lungs: cough and blood stained sputum
- Amoeboma: swelling anywhere in the abdomen, especially ascending colon
- Anal ulceration: may occur by direct extension from the intestinal infection

## Differential diagnosis

- Bacillary dysentery
- Any other cause of bloody diarrhoea
- Cancer of the liver
- Other causes of swelling in the liver
- Carcinoma colon

## Investigations

- Stool: Microscopy for cysts and motile organisms
- Ultrasound

TREATMENT	LOC
<input type="checkbox"/> Correct any dehydration (section 1.1.3) <input type="checkbox"/> Metronidazole 800 mg every 8 hours for 10 days Child: 10 mg/kg per dose <input type="checkbox"/> Or tinidazole 2 g daily for 5 days Child: 50 mg/kg per dose	HC2
	H

TREATMENT	LOC
<p><b>Caution</b></p> <ul style="list-style-type: none"> <li>▪ Metronidazole/tinidazole: do not use in 1st trimester of pregnancy; avoid alcohol during treatment and for 48 hours thereafter</li> <li>▪ Metronidazole: Take after food</li> </ul>	

## Prevention

- Ⓐ Educate the public on personal and food hygiene (washing hands before eating), proper faecal disposal
- Ⓐ Ensure proper management of carriers and patients
- Ⓐ Promote use of clean drinking water

### 6.2.2 Bacillary Dysentery (Shigellosis) ICD10 CODE: A03.9

An acute bacterial disease involving the large and small intestine, characterised by bloody mucoid diarrhoea.

Bacillary dysentery is a notifiable disease.

#### Cause

- Ⓐ Shigella dysenteriae, Shigella flexneri, Shigella sonnei, all spread by faecal-oral route

#### Clinical features

- Ⓐ Mucoid bloody diarrhoea
- Ⓐ Fever
- Ⓐ Nausea, vomiting, abdominal cramps
- Ⓐ Tenesmus (sensation of desire to defecate without production of significant amounts of faeces)
- Ⓐ Toxaemia (sometimes)
- Ⓐ S. flexneri infection may be complicated with Reiter's syndrome – urethritis, conjutivitis and arthritis

## Differential diagnosis

- Amoebic dysentery
- Other causes of bloody diarrhoea

## Investigations

- Stool: For C&S, microscopy
- Mobile vibrios under microscope

## Management

Up to 90% of patients with cholera only require prompt oral rehydration.  
Only severely dehydrated patients need IV fluids and antimicrobials

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Start rehydration with ORS at HC1/2 and refer for isolation</li> <li><input checked="" type="checkbox"/> Give oral (ORS) or IV fluids (Ringer's lactate) according to degree of dehydration (see section 1.1.3)</li> <li><input checked="" type="checkbox"/> Give glucose IV for hypoglycemia</li> <li><input checked="" type="checkbox"/> Give maintenance fluid; at least 4-5 litres/day</li> <li><input checked="" type="checkbox"/> Doxycycline 300 mg single dose (children 4 mg/kg single dose)  Or erythromycin 25-50 mg/kg every 6 hours for 3 days in children under 12 years <input checked="" type="checkbox"/> Or ciprofloxacin 1 g single dose or 20 mg/kg 12 hourly for 3 days</li> </ul>	HC2
	HC3

## Caution

- Ciprofloxacin, doxycycline: usually contraindicated in pregnancy and children < 8 years but single dose in cholera should not provoke adverse effect
- Alternative: erythromycin 500 mg every 6 hours for 5 days

## Prevention

Educate the patient/public to:

- Rehydrate with plenty of fluids
- Continue breastfeeding or weaning
- Personal and food hygiene, e.g. washing hands before preparing and eating food and after using the toilet
- Using and drinking clean safe water
- Proper human faeces disposal
- Prompt isolation, treatment, and reporting of cases

### 6.2.4 Giardiasis

ICD10 CODE: A07.1

A protozoan infection of the upper small intestine transmitted by faecal-oral route.

#### Cause

- Giardia lamblia (a flagellated protozoan)

#### Clinical features

- Often asymptomatic
- Prolonged diarrhoea, steatorrhoea
- Abdominal cramps, bloating
- Fatigue, weight loss
- Malabsorption of fats and fat-soluble vitamins
- Severe giardiasis may cause reactive arthritis, damage to duodenal, and jejunal mucosa

#### Differential diagnosis

- Other causes of prolonged diarrhoea
- Other causes of malabsorption

#### Investigations

- Stool: For cysts and trophozoites

TREATMENT	LOC
Metronidazole 2 g after food daily for 3 days Child: 30 mg/kg (max: 1.2 g) per dose <input checked="" type="checkbox"/> Or tinidazole 2 g single dose Child: 50 mg/kg	HC2  H
<b>Caution</b> <ul style="list-style-type: none"> <li>▪ Metronidazole, tinidazole: Avoid in first trimester, avoid alcohol during treatment and for 48 hours after</li> <li>▪ Metronidazole: Take after food</li> </ul>	

## Prevention

- Provide health education on
  - Personal and food hygiene e.g. washing hands before handling or eating food and after using toilets
  - Proper disposal of human faeces
  - Use of safe clean drinking water

## 6.3 GASTROINTESTINAL DISORDERS

### 6.3.1 Dysphagia ICD10 CODE: R13.1

Dysphagia is difficulty in swallowing. It may be oropharyngeal dysphagia or oesophageal dysphagia

#### Causes

##### Oropharyngeal dysphagia

- Neurological: stroke, parkinson's, dementia, multiple sclerosis, Guillainbarre, myasthenia, cerebral palsy, tardive dyskinesia, brain tumours, trauma
- Myopathy: connective tissue diseases, sarcoidosis, dermatomyositis
- Structural: Zenker's diverticulum, webs, oropharyngeal tumours, osteophytes
- Infections: syphilis botulism, rabies, mucositis
- Metabolic: Cushing's, thyrotoxicosis, Wilson's disease
- Iatrogenic: chemotherapy, neuroleptics, post surgery, post radiation



## Oesophageal dysphagia

- Tumours: cancer of the oesophagus
- Oesophagiitis: gastroesophageal reflux disease, candidiasis, pill oesophagitis (e.g. doxycycline), caustic soda injury
- Extrinsic compression: tumors, lymph nodes
- Motility: achalasia, scleroderma, oesophageal spasms

## Clinical presentation

- Difficulty initiating a swallow, repetitive swallowing
- Nasal regurgitation
- Coughing, nasal speech, drooling
- Diminished cough reflex
- Choking (aspiration may occur without concurrent choking or coughing)
- Dysarthria and diplopia (may accompany neurologic conditions that cause oropharyngeal dysphagia)
- Halitosis in patients with a large, residue-containing Zenker's diverticulum or in patients with advanced achalasia or long-term obstruction with luminal accumulation of decomposing residue
- Recurrent pneumonia
- Other features due to causative problem

## Investigations

- Medical history and physical examination
- Timed water swallow test (complemented by a food test)
- Endoscopy (mandatory)
- HIV serology, RBS, electrolytes

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Ensure rehydration with IV fluids</li> <li><input type="checkbox"/> Prevent malnutrition through appropriate energy replacement</li> <li><input type="checkbox"/> Treat cause if possible (e.g. fluconazole trial in case of suspected oral candidiasis among HIV patients)</li> <li><input type="checkbox"/> Consult and/or refer the patient</li> </ul>	HC3

### 6.3.2 Dyspepsia

ICD10 CODE: K30

Upper abdominal discomfort arising from the upper gastrointestinal tract usually lasting more than 2–4 weeks.

#### Causes

- Peptic ulcer disease
- Gastroesophageal reflux disease (GERD)
- Functional dyspepsia
- Gastric or oesophageal cancer
- Oesophagitis (drugs, candida, and others)
- Gastroparesis or gastric outlet obstruction
- Other motility disorders

#### Clinical features

- Epigastric pain or discomfort, heartburn
- Bloating , early satiety and/or fullness after meals
- Repeated belching or regurgitation (often rumination)
- Nausea

**Dyspepsia alarm features: requires endoscopy—REFER**

- Dysphagia
- Odynophagia (among patients who are HIV negative)
- Weight loss
- Abdominal mass or cervical lymphadenopathy
- Evidence of upper GI bleeding
- Iron deficiency anaemia
- Recurrent vomiting
- Recent dyspeptic symptoms or new dyspepsia in individuals over the age of 40 years

**Other indications for endoscopy**

- History of long term smoking and alcohol misuse
- Persistent dyspepsia despite appropriate treatment (e.g Proton-pump inhibitors in GERD)
- Hepatobiliary disease

**6.3.3 Gastroesophageal Reflux Disease (GERD/GORD) ICD10  
CODE: K21**

Dyspepsia with mainly heart burn caused by regurgitation of gastric contents into the lower oesophagus (acid reflux).

**Predisposing factors**

- Hiatus hernia
- Increased intra-abdominal pressure
- Gastric ulcer

## Clinical features

- Ⓐ Heartburn: a burning sensation in the chest. Usually brought about by bending or exertion or lying down
- Ⓐ Unpleasant sour taste (due to stomach acid reflux)
- Ⓐ Oesophagitis with pain and difficulty when swallowing
- Ⓐ Halitosis, bloating and belching
- Ⓐ Nausea, chronic pharyngitis

## Complications

- Ⓐ Dysphagia
- Ⓐ Reflux asthma

## Differential diagnosis

- Ⓐ Peptic ulcer, gastritis, pancreatitis

## Investigations

- Ⓐ Gastroscopy
- Ⓐ Barium meal and follow through

## Management

Lifestyle modifications include the following:

- ☐ Losing weight (if overweight)
- ☐ Avoiding alcohol, chocolate, citrus juice, and tomato-based products also suggest avoiding peppermint, coffee, and possibly the onion family, spicy foods, food with high fat content, carbonated beverages)
- ☐ Avoiding large meals
- ☐ Waiting 3 hours after a meal before lying down or eating within 2-3 hours before bedtime should be avoided
- ☐ Elevating the head of the bed by 8 inches
- ☐ Avoid tight fitting clothes

TREATMENT	LOC
<input type="checkbox"/> Modify diet: avoid precipitating causes and increase milk intake <input type="checkbox"/> Give an antacid  Magnesium trisilicate compound 1-2 tablets every 8 hours	HC2
If no response and no alarm signs <input type="checkbox"/> Omeprazole 20 mg once daily for 8 weeks  <b>If not responding to 4 weeks of omeprazole, refer for further management</b>	HC3

### 6.3.4 Gastritis ICD10 CODE: K29

Acute or chronic inflammation of the gastric mucosa.

#### Causes

##### Acute gastritis

- ⦿ Non-steroidal anti-inflammatory drugs (NSAIDS), e.g. acetysalicylic acid, diclofenac, ibuprofen
- ⦿ Alcohol
- ⦿ Regurgitation of bile into the stomach

##### Chronic gastritis

- ⦿ Autoimmune gastric ulceration
- ⦿ Bacterial infection (*Helicobacter pylori*)

#### Clinical features

- ⦿ May be asymptomatic or have associated anorexia, nausea, epigastric pain, and heartburn

#### Differential diagnosis

- ⦿ Pancreatitis, cholecystitis
- ⦿ Peptic and duodenal ulcers, cancer of the stomach

- ② Epigastric hernia

## Investigations

- Gastroscopy
- Stool for occult blood
- Barium meal for chronic gastritis
- Management

TREATMENT	LOC
<input type="checkbox"/> Modify diet: Avoid precipitating causes and increase milk intake <input type="checkbox"/> Give an antacid Magnesium trisilicate compound 2 tablets every 8 hours as required If no response <input type="checkbox"/> Omeprazole 20 mg in the evening for 4 weeks	HC2
	HC3
	HC4
<b>If vomiting</b> <input type="checkbox"/> Metoclopramide 10 mg IM repeated when necessary up to 3 times daily <input type="checkbox"/> Or chlorpromazine 25 mg deep IM or oral (if tolerated) repeated prn every 4 hours	
<b>Caution</b> <ul style="list-style-type: none"> <li>▪ Acetylsalicylic acid and other NSAIDS are contraindicated in patients with gastritis</li> </ul>	

## Prevention

- Avoid spices, tobacco, alcohol, and carbonated drinks
- Encourage regular, small, and frequent meals
- Encourage milk intake

### 6.3.5 Peptic Ulcer Disease (PUD)

ICD10 CODE: K27

Ulceration of gastro-duodenal mucosa. It tends to be chronic and recurrent if untreated.

#### Causes

- Ⓐ Helicobacter pylori infection

#### Hyperacidity due to

- Ⓐ Drugs (NSAIDS e.g. acetylsalicylic acid, corticosteroids)
- Ⓐ Irregular meals
- Ⓐ Stress
- Ⓐ Alcohol and smoking
- Ⓐ Caffeine-containing beverages

#### Clinical features

##### General

- Ⓐ Epigastric pain typically worse at night and when hungry (duodenal ulcer) alleviated by food, milk, or antacid medication
- Ⓐ Epigastric pain, worse with food (gastric ulcer)
- Ⓐ Vomiting, nausea, regurgitation
- Ⓐ Discomfort on palpation of the upper abdomen

##### Bleeding ulcer

- Ⓐ Haematemesis (coffee brown or red vomitus)
- Ⓐ Black stools (i.e. melena)
- Ⓐ Sudden weakness and dizziness
- Ⓐ Cold, clammy skin (when patient has lost a lot of blood)

## Perforated ulcer

- Acute abdominal pain, signs of peritonitis such as rigid abdomen
- Ground coffee-brown vomitus (due to blood)
- Fever
- Shock (weak pulse, clammy skin, low blood pressure)

## Differential diagnosis

- Pancreatitis, hepatitis
- Disease of aorta, myocardial infarction
- Lung disease (haemoptysis)

## Investigations

- Positive stool antigen for H. pylori. Used for diagnosis and to confirm eradication.
  - This test may give false negative if the patient has been taking antibiotics or omeprazole in the previous 2 weeks

**SERUM ANTIBODY TEST IS NOT USEFUL FOR DIAGNOSIS AND FOLLOW UP**

- Gastroscopy
- Biopsy of stomach wall
- Barium meal

TREATMENT	LOC
<input type="checkbox"/> Modify diet: avoid precipitating causes and increase milk intake	HC3
<input type="checkbox"/> Give an antacid <ul style="list-style-type: none"><li>- Magnesium trisilicate compound 2 tablets every 8 hours as required</li></ul>	HC4

TREATMENT	LOC
<p>Treatment for eradication of H. pylori (Triple therapy)</p> <p>Combination 1 (First line)</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Amoxycillin 1 g every 12 hours PLUS metronidazole 400 mg every 12 hours PLUS omeprazole 20 mg every 12 hours for two weeks</li> <li><input checked="" type="checkbox"/> Check eradication with a stool antigen test after 4 weeks</li> </ul> <p>For bleeding and perforated ulcer</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Refer patient to hospital immediately for           <ul style="list-style-type: none"> <li>- IV fluids and blood if necessary</li> <li>- IV ranitidine 50 mg in 20 ml slowly every 8 hours</li> </ul> </li> </ul>	<p>HC3</p> <p>H</p>

**Note**

- Tinidazole 500 mg every 12 hours can be used instead of metronidazole
- Confirm eradication with stool antigen test a month after completion of treatment; test should be negative

### 6.3.6 Chronic Pancreatitis ICD10 CODE: K86.0-K86.1

Chronic pancreatitis is a disease of the pancreas in which recurrent episodes of inflammation lead to replacement of the pancreatic parenchyma with fibrotic connective tissue, formation of calculous and loss of duct architecture. This leads to progressive loss of pancreas function.

#### Causes

- Toxic/metabolic: alcohol, tobacco, hypercalcemia, hyperlipidemia, chronic renal failure
- Idiopathic: tropical
- Genetic, autoimmune
- Recurrent and severe acute pancreatitis
- Obstructive cancer or anatomical abnormalities

## Clinical features

- Chronic pain: main symptom in chronic pancreatitis
- Diarrhoea
- Loss of weight
- Diabetes mellitus

## Complications of chronic pancreatitis

- Pseudocysts
- Stenosis of the pancreatic duct
- Duodenal stenosis
- Vascular complications
- Compression of the bile ducts
- Malnutrition
- Increased risk of cancer of the pancreas

## Investigations

- Blood: Serum analysis, complete blood count, random blood sugar
- Raised pancreatic amylase/lipase > 3 times normal
- Ultrasound: gallstones, pancreatic oedema, abdominal fluid
- Liver function tests: raised liver enzymes

TREATMENT	LOC
<ul style="list-style-type: none"><li><input type="checkbox"/> Refer for specialist management</li><li><input type="checkbox"/> Use WHO Pain Analgesic ladder<ul style="list-style-type: none"><li>– Pethidine 50-100 mg IM or Tramadol 50-100 mg oral or IM as required</li><li><input type="checkbox"/> Avoid alcohol and fatty foods</li></ul></li></ul>	RR



## 6.4 ANORECTAL DISORDERS

### 6.4.1 Constipation

ICD10 CODE: K59.0

A condition characterised by hardened faeces and difficulty emptying the bowels

#### Causes

- Ⓐ Dietary: lack of roughage, inadequate fluid intake
- Ⓐ In infants: concentrated feeds
- Ⓐ Lack of exercise, bedridden patient especially in elderly
- Ⓐ Pregnancy
- Ⓐ Certain drugs e.g. narcotic analgesics, antidepressants, diuretics, antipsychotics, iron
- Ⓐ Colon or anorectal disorders: stricture, cancer, fissure, proctitis, congenital bowel abnormalities, irritable bowel syndrome, volvulus, intussusception
- Ⓐ Metabolic: hypercalcemia, diabetes, hypothyroidism
- Ⓐ Neurological disorders: spinal cord lesions, stroke, Parkinsonism

#### Clinical features

- Ⓐ Abdominal discomfort
- Ⓐ Small hard stools passed irregularly under strain
- Ⓐ Can cause haemorrhoids and anal fissure

#### Alarm features

- Ⓐ Symptoms and signs of intestinal obstruction or acute abdomen
- Ⓐ Confusion/disorientation
- Ⓐ Abnormal vital signs
- Ⓐ Iron deficiency

- Rectal bleeding or haematochesia or rectal mass
- Haem positive stool
- Patients > 45 years with no previous history of colon cancer screening
- History of colon cancer in immediate family relatives
- Weight loss

## Investigations

- Physical examination
  - Abdominal mass and tenderness
  - Anorectal examination (faecal impaction, stricture, rectal prolapse, rectal mass)
- Stool examination

Investigations for patients with alarm features

- Abdominal series (supine, upright, left lateral decubitus)
- Transabdominal ultrasound
- Endoscopy
- Complete blood count, renal function tests, serum calcium, thyroid function tests, blood sugar
- Barium enema +/- CT scan or X-ray

Management

TREATMENT	LOC
<b>No alarm features or chronic constipation</b>	
<input type="checkbox"/> High dietary fibre	HC2
<input type="checkbox"/> Adequate fluid intake	HC3
<input type="checkbox"/> Bisacodyl: Adult 10 mg at night. Take until stool is passed  Child 5-12 years: 5 mg (suppository only) - Contraindicated in acute abdomen as it aggravates the condition	HC4
<input type="checkbox"/> Oral or rectal lactulose (osmotic agent). Provides faster relief than bisacodyl	H

## Management

TREATMENT	LOC
If alarm features or severe chronic constipation are present	HC2
<input checked="" type="checkbox"/> Refer to hospital for specialist management	HC3

## Prevention

- Ⓐ Diet rich in roughage - plenty of vegetables and fruit
- Ⓐ Plenty of oral fluids with meals
- Ⓐ Increased exercise

### 6.4.2 Haemorrhoids (Piles) and Anal Fissures

ICD10 CODE: K64/K60.0-K60.1-K60.2

Haemorrhoids are swellings in the upper anal canal and lower rectum due to engorgement of veins. May be internal or external. Anal fissure is a tear in the lining of the lower rectum.

## Causes

- Ⓐ Constipation and straining in defecation
- Ⓐ Portal hypertension from any cause
- Ⓐ Compression of pelvic veins, e.g. abdominal tumours, pregnancy
- Ⓐ Sedentary life style

## Clinical features

### Haemorrhoids

- Ⓐ Painless rectal bleeding
- Ⓐ Visible swelling at the anus or prolapse of the swelling, especially at defecation
- Ⓐ Blood is usually not mixed with stool but instead coats the surface of the stool or toiletry
- Ⓐ Mucous discharge and irritation at anus

## Anal fissure

- Pain in passing stool
- Bleeding at passing of stool

## Differential diagnosis

- Schistosomiasis, amoeboma
- Rectal polyps, prolapsed rectum
- Anal tags (harmless growths that hang off the skin around the outside of the anus)
- Tumour of rectum
- Anal warts

## Investigations

- Visual inspection and digital rectal examination
- Proctoscopy, sigmoidoscopy, colonoscopy

## Management

TREATMENT	LOC
<input type="checkbox"/> Establish the cause <input type="checkbox"/> Increase fibre and fluid diet intake <input type="checkbox"/> Correct any constipation <input type="checkbox"/> Sitz bath (sitting for 10-15 minutes in lukewarm water with a spoon of salt) 2 or 3 times a day <input type="checkbox"/> Insert a bismuth subgallate compound rectally every 12 hours for 5 days (e.g. Anusol, Sediproct cream or suppositories)	HC2 HC4
If signs of infection:	HC2
<input type="checkbox"/> Give metronidazole 400 mg every 8 hours for 5 days <input type="checkbox"/> Give analgesics as required for the pain	
If there is no response:	
<input type="checkbox"/> Refer to hospital for surgery	

## Prevention

- Ⓐ Maintain high residue (fibre) diet
- Ⓐ Ensure adequate fluid intake
- Ⓐ Regular exercise
- Ⓐ Refrain from straining and reading in the toilet

## 6.5 HEPATIC AND BILIARY DISEASES

### 6.5.1 Viral Hepatitis

A condition characterised by inflammation of the liver due to hepatitis viruses. They may cause acute hepatitis, symptomatic or not. The hepatitis B, D, C virus can cause

chronic hepatitis. The hepatitis B virus can also give chronic carrier status.

#### Cause

- Ⓐ Hepatitis A and E: orofaecal transmission
- Ⓐ Hepatitis B: sexual, mother to child, transmission by infected body fluids /blood
- Ⓐ Hepatitis C virus: contact with infectious blood (possibly sexual and vertical)
- Ⓐ Hepatitis D: contact with infectious blood, sexual (possibly vertical)

#### 6.5.1.1 Acute Hepatitis ICD10 CODES: B15, B16, B17, B19

##### Clinical features

- Ⓐ Asymptomatic
- Ⓐ Classic form: fever, fatigue, malaise, abdominal discomfort (right upper quadrant), nausea, diarrhoea, anorexia, followed by jaundice, dark urine and more or less clay coloured stool
- Ⓐ Fulminant form: acute liver failure due to massive liver necrosis, often fatal. It is more common in HepB patients with secondary infection with D virus and pregnant women who get hepatitis E in their third trimester

## Differential diagnosis

- Other causes of hepatitis, e.g. drugs, herbs, tumours, and autoimmune diseases
- Gastroenteritis, relapsing fever
- Pancreatitis
- Malaria, leptospirosis, yellow fever
- Haemorrhagic fevers, e.g. Marburg and Ebola

## Investigations

- Complete blood count
- Slide or RDT for malaria parasites
- Liver function tests
- Viral antigens and antibodies: Hepatitis B, Hepatitis C, and HIV serology

## Management

TREATMENT	LOC
<b>Classic form</b> <ul style="list-style-type: none"><li><input type="checkbox"/> Supportive management</li><li><input type="checkbox"/> Rest and hydration</li><li><input type="checkbox"/> Diet: high in carbohydrates and vitamins and vegetable proteins. Avoid animal proteins e.g.</li><li><input type="checkbox"/> Avoid any drug – they may aggravate symptoms Refer if patient has features of liver failure or decompensated liver disease</li></ul>	HC4

## Caution

- Avoid drugs generally but especially sedatives and hepatotoxic drugs
- Ensure effective infection control measures e.g. institute barrier nursing, personal hygiene
- Patient isolation is not necessary unless there is high suspicion of viral haemorrhagic fevers

## Management

TREATMENT	LOC
<p><b>Classic form</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Supportive management</li> <li><input type="checkbox"/> Rest and hydration</li> <li><input type="checkbox"/> Diet: high in carbohydrates and vitamins and vegetable proteins. Avoid animal proteins e.g.</li> <li><input type="checkbox"/> Avoid any drug – they may aggravate symptoms Refer if patient has features of liver failure or decompensated liver disease</li> </ul>	HC4

## Caution

- Avoid drugs generally but especially sedatives and hepatotoxic drugs
- Ensure effective infection control measures e.g. institute barrier nursing, personal hygiene
- Patient isolation is not necessary unless there is high suspicion of viral haemorrhagic fevers

## Prevention

- Hygiene and sanitation
- Immunization against hepatitis B (all children, health workers, household contacts of people with chronic hepatitis B, sex workers and other populations at risk)
- Safe transfusion practices
- Infection control in health facilities
- Screening of pregnant women
- Safe sexual practices (condom use)

### 6.5.1.2 Chronic Hepatitis

ICD10 CODE: B18

The hepatitis viruses B, C and D can give chronic infection with chronic low level inflammation of the liver and progressive damage which may progress to liver cirrhosis.

## 6.5.2 Chronic Hepatitis B Infection

ICD10 CODES: 18.0, 18.1, 19.1

### Clinical features

Can be symptomatic or asymptomatic:

- Weakness and malaise, low grade fever
- Nausea, loss of appetite and vomiting
- Pain or tenderness over the right upper abdomen
- Jaundice, dark urine, severe pruritus
- Enlarged liver
- Complications: liver cirrhosis, hepatocarcinoma

### Investigations

- Hepatitis B surface antigen positive for >6 months
- Hepatitis B core antibody: Negative IgM and Positive IgG to exclude acute hepatitis B infection
- Liver tests, repeated at 6 months
- HBeAg (can be positive or negative)
- HBV DNA if available
- HIV serology
- APRI (AST to Platelets Ratio Index): a marker for fibrosis

APRI =  $(\text{AST}/\text{ULN}) / 100$

Platelet count (10<sup>9</sup>/L)

(ULN: upper limit of normal, usually 40 IU/L)

- Alpha fetoprotein at 6 months
- Abdominal ultrasound at 4-6 months

TREATMENT	LOC
<b>General principles</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Screen for HIV: if positive, refer to HIV clinic for ART: coinfection is a risk factor for disease progression and some ARVs are active against Hepatitis B virus</li> <li><input type="checkbox"/> If HIV negative: refer to a regional hospital for specialist management</li> <li><input type="checkbox"/> Antiviral treatment is given to prevent complications and it is usually given for life</li> <li><input type="checkbox"/> Patients with chronic hepatitis B need periodic monitoring and follow up for life</li> <li><input type="checkbox"/> Periodic screening for hepatocarcinoma with alfa fetoprotein and abdominal ultrasound once a year</li> </ul>	RR
<b>Treat with antivirals if the patient has any one of these:</b> <ul style="list-style-type: none"> <li>- All persons with chronic HBV infections who have cirrhosis (whether compensated or not) based on clinical findings and/or APRI score &gt;2, irrespective of liver enzyme levels, HbeAg status or hepatitis B viral load)</li> <li>- HIV co-infection (use a tenofovir based combination)</li> <li>- Patients with no cirrhosis (APRI score &lt;2) but persistently elevated ALT on 3 occasion within 6-12 months and viral load &gt;20,000 IU/L (if available) regardless of HbeAg status</li> <li><input type="checkbox"/> First line antivirals</li> </ul> <p>Adults and children &gt;12 years or &gt;35 kg: tenofovir 300 mg once a day</p> <p>Child 2-11 years (&gt;10 kg): Entecavir 0.02 mg/kg</p>	RR

TREATMENT	LOC
<p>The following patients should NOT be treated</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Patients without evidence of cirrhosis (APRI ≤2) and with persistently normal ALT level and HBV viral load &lt; 2000 IU/ml (if available)</li> </ul>	

## Health education

- Management is lifelong because of the need to monitor hepatitis
- Bed rest
- Urge patient to avoid alcohol as it worsens disease
- Immunisation of household contacts
- Do not share items that the patient puts in mouth (e.g. toothbrushes, cutlery) and razor blades

### 6.5.2.1 Inactive Hepatitis B Carriers ICD10 CODE: B18.1

Carriers are patients with chronic but inactive infection:

- HBsAg positive for more than 6 months plus
- Persistently normal liver function (at least 3 times in 12 months) and
- No evidence of viral replication (negative HBeAg and/or
- HBV DNA < 2000 IU/ml)

Patients classified as inactive carriers need to be monitored once a year with CBC, renal and liver tests, HBsAg, abdominal ultrasound. If possible, do HBV-DNA every 3 years.

They are not highly infectious but close contacts should be immunized and appropriate precautions should be followed.

### 6.5.2.2 Pregnant Mother HbsAg Positive ICD10 CODE: B18.1

If a pregnant mother is found HBsAg positive:

- If also HIV positive,
- Start ARVs.

- Child should receive HepB vaccine at birth
  - ⦿ If she is HIV negative,
  - She should be referred for further testing (HBeAg, HBV DNA) to assess the risk of transmission to the baby and eventual need of antiretrovirals
  - Child should be immunized at birth
  - ⦿ Breastfeeding is safe

### **6.5.3 Chronic Hepatitis C Infection ICD10 CODE: B18.2**

#### **Clinical features**

- ⦿ Can be symptomatic or asymptomatic

#### **Investigation**

- ⦿ Anti hepatitis C antibody positive at 0 and 6 months
- ⦿ Abdominal ultrasound
- ⦿ Liver function tests, INR
- ⦿ Renal function tests
- ⦿ Blood glucose

TREATMENT	LOC
<input type="checkbox"/> Refer to a regional hospital or higher for confirmatory investigations and management	RR

### **6.5.4 Liver Cirrhosis CICD10 CODES: K74, K70.3**

Cirrhosis is a chronic disease with necrosis of liver cells followed by fibrosis and nodule formation. Decompensated cirrhosis is defined by the presence of complications such as ascites, variceal bleeding, encephalopathy, or jaundice which result from the portal hypertension and liver insufficiency caused by cirrhosis.

#### **Causes**

- ⦿ Infections e.g. viral hepatitis B and D, hepatitis C
- ⦿ Intoxication with alcohol, drugs, or toxins e.g. methotrexate, isoniazid, methyldopa

- Infiltrative disorders, e.g. non-alcoholic fatty liver disease, Wilson's disease, haemochromatosis
- Iron overload (e.g. in over transfused SCD patients)
- Immunological, chronic autoimmune hepatitis
- Congestion with bile e.g. primary biliary cirrhosis (PBC)
- Congestion with blood e.g. chronic cardiac failure, Budd Chiari syndrome
- Idiopathic

### Clinical features

- General symptoms: Fatigue, weight loss, features of malnutrition, nausea, vomiting and loss of appetite
- Initially enlarged liver which later decreases in size
- Distension of blood vessels on the abdomen
- Enlarged spleen
- Loss of libido
- Cirrhosis is decompensated when the following are present:  
Jaundice  
Encephalopathy  
Ascites (fluid in abdominal cavity) with or without leg oedema  
Vomiting of blood from ruptured blood vessels in oesophagus (varices)

### First line anti-TB medication

	Stage	Clinical	Death At 1 Year
0	Fibrosis		1%
1	Compensated cirrhosis	No varices No ascites	1%
2		No ascites Varices present	3%
3	Decompensated cirrhosis	Ascites ± varices	20%
4		Bleeding ± ascites	57%



## First line anti-TB medication

Stage	Clinical	Death At 1 Year
	Spontaneous bacterial peritonitis + sepsis Renal failure Hepatocellular carcinoma Jaundice Hepatic encephalopathy	

## Differential diagnosis

- Diffuse hepatic parenchymal disease
- Metastatic or multifocal cancer in the liver
- Hepatic vein obstruction
- Any cause of enlarged spleen
- Heart failure, renal disease

## Investigations

- Blood: Hb, film, WBC, platelets, prothrombin time (INR), serology (hepatitis B, C, and D), HIV serology
- Stool and urine
- Abdominal ultrasound
- Liver: Liver function tests, alpha fetoprotein, and biopsy
- APRI score >2 is diagnostic
- Endoscopy (for varices)

## Management

Refer to a regional hospital or higher for the attention of specialist

TREATMENT	LOC
General principles <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Treat cause and prevent progression               <ul style="list-style-type: none"> <li>- Stop alcohol</li> <li>- Appropriate nutrition</li> <li>- If chronic hepatitis B, start antiviral treatment</li> <li>- Specific treatment according to the cause</li> </ul> </li> </ul>	RR

TREATMENT	LOC
<ul style="list-style-type: none"> <li>- Avoid herbs and self medication</li> <li>- Use medicines only after prescription from a health worker</li> </ul> <p><input checked="" type="checkbox"/> Manage and prevent complications (see below)</p> <ul style="list-style-type: none"> <li>- Ascites</li> <li>- Encephalopathy</li> <li>- Bleeding varices</li> </ul>	RR
<p>General principles</p> <p><input checked="" type="checkbox"/> Treat cause and prevent progression</p> <ul style="list-style-type: none"> <li>- Stop alcohol</li> <li>- Appropriate nutrition</li> <li>- If chronic hepatitis B, start antiviral treatment</li> <li>- Specific treatment according to the cause</li> <li>- Avoid herbs and self medication           <ul style="list-style-type: none"> <li>- Use medicines only after prescription from a health worker</li> </ul> </li> </ul> <p><input checked="" type="checkbox"/> Manage and prevent complications (see below)</p> <ul style="list-style-type: none"> <li>- Ascites</li> <li>- Encephalopathy</li> <li>- Bleeding varices</li> </ul>	RR

#### 6.5.4.1 Ascites ICD10 CODES: 70.31, 70.11, 71.51

Pathological accumulation of fluid in the peritoneal cavity.

##### Clinical features

- Ⓐ Ascites not infected and not associated with hepatorenal syndrome

CLASSIFICATION	FEATURES
Grade 1 Ascites (mild)	Only detectable by ultrasound examination

CLASSIFICATION	FEATURES
Grade 2 Ascites (moderate)	Ascites causing moderate symmetrical distension of the abdomen
Grade 3 Ascites (severe)	Ascites causing marked abdominal distension

### Clinical diagnosis

- Fluid thrill (fluid wave)
- Shifting dullness

### Investigations

- Abdominal ultrasound scan
- Peritoneal tap (paracentesis)
- Analysis of fluid

### Management

The main principles of management are: diet modification, daily monitoring, diuretics and drainage

TREATMENT	LOC
<b>Diet</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Restrict dietary salt to a no-add or low salt diet</li> <li><input type="checkbox"/> Avoid protein malnutrition (associated with higher mortality), so consume plant proteins liberally and animal proteins occasionally (titrate to symptoms and signs of hepatic encephalopathy)</li> <li><input type="checkbox"/> Restrict water if oedema and hyponatremia are present</li> <li><input type="checkbox"/> Abstain from alcohol, NSAIDS, herbs</li> </ul>	H
<b>Daily monitoring</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Daily weight, BP, pulse, stool for melaena, encephalopathy</li> </ul>	

TREATMENT	LOC
<p><b>Diuretics</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Use spironolactone 50-100 mg/day in the morning, to reach goal of weight loss: 300–500 g/ day. If needed, doses to be increased every 7 days up to maximum of 400 mg/day of spironolactone</li> <li><input type="checkbox"/> Furosemide can be added at a starting dose of 20–40 mg/day and subsequently increased to 160 mg/day if needed. Best used if pedal oedema is present; monitor for hypotension</li> <li><input type="checkbox"/> For maintenance, it is best to titrate to the lowest diuretic dose. Most patients do well with spironolactone 50 mg/day if they have no ascites</li> </ul>	
<p><b>Drainage</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Indicated for severe ascites (Grade 3). Paracentesis is always followed by spironolactone</li> </ul>	
<p><b>How much should you tap?</b></p> <ul style="list-style-type: none"> <li>- Small volume (less than 5 L in 3–4 hours) or large volume (5–10 L) with infusion of a plasma expander (e.g. 8 g albumin per litre of ascites removed)</li> <li>- Monitor for hypotension or reduced urine output</li> <li><input type="checkbox"/> Refer if patient has or develops complicated ascites</li> </ul>	

#### **6.5.4.2 Spontaneous Bacterial Peritonitis (SBP)**

ICD10 CODE: K65.2

SBP is an acute bacterial infection of ascitic fluid. It is a common and severe complication of advanced liver cirrhosis and it is associated with a poor prognosis.



## Clinical features

Patients must be admitted to hospital and should be suspected of SBP infection when:

- Ⓐ Ascites increases in severity
- Ⓐ Presence of fever
- Ⓐ Abdominal pain, abdominal tenderness
- Ⓐ Worsening encephalopathy
- Ⓐ Complications: renal failure, bleeding varices, death

## Investigations

- Diagnosis is confirmed by an ascitic tap and cell counts. A neutrophil count of  $> 250/\text{mm}^3$  in ascitic fluid confirms the diagnosis

### Management

TREATMENT	LOC
<input type="checkbox"/> Treat with IV antibiotics for 5–10 days <input type="checkbox"/> IV ceftriaxone 1-2 g daily - If needed, add metronidazole 500 mg IV every 8 hours	H
<input type="checkbox"/> Give albumin infusion 1 g/kg to prevent hepatorenal syndrome <input type="checkbox"/> Consult or refer for specialist care as soon as possible	RR
<b>Caution</b>	
▪ Avoid gentamicin and NSAIDs	

### 6.5.4.3 Hepatic Encephalopathy (HE)

ICD10 CODES: 70.41, 71.11, 72.11, 72.91

Hepatic encephalopathy is a syndrome of neuropsychiatric symptoms and signs, including coma, observed in patients with cirrhosis. It is probably due to the accumulation of toxins in the blood.

### 6.5.4.3 Hepatic Encephalopathy (HE)

ICD10 CODES: 70.41, 71.11, 72.11, 72.91

Hepatic encephalopathy is a syndrome of neuropsychiatric symptoms and signs, including coma, observed in patients with cirrhosis. It is probably due to the accumulation of toxins in the blood.

#### Clinical features

- Grade 0: Subclinical – personality changes, construction apraxia (inability or difficulty to build, assemble, or draw objects)
- Grade I: Confusion, flap tremor
- Grade II: Drowsy
- Grade III: Stuporous
- Grade IV: Coma
- Encephalopathy may be aggravated by surgery, parenchymal, excessive diuretics, sedatives, and opioid analgesics
- Intracranial hypertension and sepsis are the main causes of death

#### Management

Management involves addressing the pathophysiological mechanisms related to brain, gut and liver

##### Management of pneumonia

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> identify and correct precipitating factors including renal impairment, gastrointestinal bleeding, infections, and electrolyte disturbances</li> <li><input type="checkbox"/> Empty the gut           <ul style="list-style-type: none"> <li>- Give oral lactulose 15-30 mL every 8 hours until the condition resolves (aim at 2-3 soft stools/day)</li> </ul> </li> </ul>	H

## Management of pneumonia

TREATMENT	LOC
<ul style="list-style-type: none"> <li>- Lactulose can be administered through a nasogastric tube (grade 1 and 2) or as an enema in patients with acute HE (grade 3 and 4)</li> </ul> <p><input type="checkbox"/> Refer to a specialist</p> <p><b>If referral delays</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Give an antibiotic with a local action on the gut: oral metronidazole 400–800 mg every 8 hours for 5 days</li> <li><input type="checkbox"/> Or oral paromomycin 1000 mg every 6 hours for 5 days</li> </ul>	RR

### 6.5.4.2 Oesophageal Varices ICD10 CODE: I85.1

Extremely dilated sub-mucosal veins in the lower third of the esophagus, due to portal hypertension caused by liver cirrhosis. They can cause severe upper gastrointestinal bleeding.

## Management of pneumonia

TREATMENT	LOC
<p><input type="checkbox"/> Screen patients with liver cirrhosis with endoscopy to assess for presence of varices</p> <p><input type="checkbox"/> In case of varices, consider the use of beta blockers to prevent bleeding</p> <ul style="list-style-type: none"> <li>- Propranolol 20 mg every 12 hours, titrate to keep resting heart rate at 55-60 bpm</li> <li>- Avoid in refractory ascitis and SBP</li> </ul>	H
<p><input type="checkbox"/> Endoscopic ligation sclerotherapy</p> <p><input type="checkbox"/> If acute bleeding, see section 6.1.3</p>	NR

### **6.5.4.3 Hepatorenal Syndrome ICD10 CODE: K76.7**

Hepatorenal syndrome (HRS) is the development of renal failure in patients with advanced chronic liver disease. It can be precipitated by infection (SBP) and large volume paracentesis without albumin replacement. It carries a very poor prognosis.

It is characterized by:

- Reduced urinary output (< 500 ml in 24 hours in adults)
- Abnormal renal function test (progressively raising creatinine)
- Normal urine sediment

#### Management of pneumonia

TREATMENT	LOC
<input type="checkbox"/> Correct hypovolemia <input type="checkbox"/> Treat precipitating factors <input type="checkbox"/> Refer for specialised management	H

### **6.5.4.4 Hepatocellular Carcinoma ICD10 CODE: C22.0**

Liver cancer usually in patients with risk factors such as Hepatitis B and C, aflatoxin, alcoholic liver disease and cirrhosis.

#### Clinical features

- Ⓐ Presents with right upper quadrant pain, hepatomegaly with or without splenomegaly
- Ⓐ Weight loss
- Ⓐ Jaundice, ascites, and lymphadenopathy

#### Differential diagnosis

- Ⓐ Liver metastasis
- Ⓐ Liver abscess, hydatid cyst

## Investigations

- Abdominal ultrasound ( sonogram)
- Alpha fetoprotein
- Liver tests
- Liver biopsy

## Management of pneumonia

TREATMENT	LOC
<input checked="" type="checkbox"/> Refer to a regional hospital or higher	RR

### 6.5.5 Hepatic Schistosomiasis

ICD10 CODE: B65.1

Most common cause of liver disease among communities where Schistosoma mansoni is endemic (see section 2)

#### Cause

- Inflammatory and fibrotic reaction to eggs laid by Schistosoma parasites and transported to the liver through the veins from the intestine

#### Clinical features

- Upper gastrointestinal bleeding due to varices or portal hypertension gastropathy
- Splenomegaly and ruptured spleen
- Thrombocytopenia
- Portal vein thrombosis
- Bloody diarrhoea, anaemia and stunting

## Investigations

- Liver ultrasound features: periportal fibrosis patterns and portal vein thickening as described by World Health Organization Niamey ultrasound protocol
- Screen for varices with endoscopy

## Management

TREATMENT	LOC
<input type="checkbox"/> Refer to a specialist	HC4
<input type="checkbox"/> Praziquantel 40 mg/kg single dose if schistosoma eggs are detected	HC4
<input type="checkbox"/> Correct anaemia as appropriate	RR
<input type="checkbox"/> Surveillance for oesophageal varices with endoscopy	
<input type="checkbox"/> Primary and secondary prevention of bleeding oesophageal varices with propranolol (see section 6.5.4.4), endoscopic band ligation	
<input type="checkbox"/> Treat acute upper gastrointestinal bleeding (see section on 6.1.3)	

### 6.5.6 Drug-Induced Liver Injury

ICD10 CODE: K71

Drugs are an important and common cause of liver injury. Many medicines and herbs are known to cause liver damage. The drug-induced liver injury can range from asymptomatic elevation of liver enzymes to severe hepatic failure. Health workers must be vigilant in identifying drug-related liver injury because early detection can decrease the severity of hepatotoxicity if the drug is discontinued. Knowledge of the commonly implicated agents is essential in diagnosis.

#### Common causes

- ⦿ Phenytoin, carbamazepine, anti-tuberculosis drugs, cotrimoxazole, diclofenac, paracetamol, antiretroviral drugs, ketoconazole

#### Clinical features

It is a diagnosis of exclusion:

- ⦿ Any patient with liver enzyme elevation that cannot be attributed to infections, autoimmune disease or malignancy



- ⦿ Patient exposed to a drug or herbal medication known to cause liver cell injury
- ⦿ Patients may present with skin or mucosal drug reactions
- ⦿ e.g. Stevens-Johnson syndrome or toxic epidermal necrolysis

### Management of pneumonia

TREATMENT	LOC
<input type="checkbox"/> Stop all drugs or herbs <input type="checkbox"/> Give supportive care: rehydration <input type="checkbox"/> See section 1.3.5 for paracetamol poisoning <input type="checkbox"/> Do not give the drug again (do not rechallenge!) <input type="checkbox"/> Refer to a regional hospital or higher for attention of a specialist	H

### 6.5.7 Jaundice (Hyperbilirubinemia) ICD10 CODE: R17

Yellowish discolouration of sclera and skin due to raised levels of bilirubin in the body. Bilirubin is a by-product of red cell breakdown, processed in the liver and excreted mainly in bile. Jaundice may be benign or life threatening.

#### Causes

- ⦿ Pre hepatic – haemolysis e.g sepsis, sickle cell disease, pregnancy (HELLP syndrome), disseminated intravascular coagulation (DIC), vascular
- ⦿ Hepatic – hepatitis, drugs, tumors, alcohol, toxins, herbs, autoimmune disease, pregnancy, cholangitis
- ⦿ Post hepatic – gall stones, strictures, tumors, surgery, pancreatitis, biliary disease

#### Complications

- ⦿ Renal failure , coagulopathy
- ⦿ Sepsis

## Investigations

- Liver function tests (AST, ALT, bilirubin), Coomb's tests, low haptoglobin, LDH
- Hepatitis A, B, C
- Malaria, sickle cell screen
- Ultrasound shows dilated bile ducts and gall bladder
- CBC, INR, RFTS, LDH, Endoscopic retrograde cholangiopancreatogram (ERCP)
- Liver biopsy

## Management

TREATMENT	LOC
<input type="checkbox"/> Refer and/or consult as appropriate	H
<input type="checkbox"/> Treat the underlying cause f Discontinue offending factors	
<input type="checkbox"/> Use phototherapy with UV light for newborn babies OR expose the newborn to natural sun	

## 6.5.8 Gallstones/Biliary Colic ICD10 CODES: K80

Small hard masses formed in the gallbladder or biliary tree.

### Risk factors

- Age, gender, family history
- Obesity, diabetes, use of oral contraceptives, dyslipidemia

### Clinical features

- Asymptomatic and often found by chance at an abdominal ultrasound
- Biliary colic: episodes of intense acute epigastric right hypocondrial pain (due to acute temporary blockage of a bile duct) lasting few minutes to few hours, often triggered by a high-fat meal. It can occur sporadically. NO fever or jaundice are present.
- Cholecystitis or cholangitis due to blockage and infection of bile
- Pancreatitis due to blockage of the pancreatic duct



## Differential diagnosis

- Ⓐ Peptic ulcer disease

## Investigations

- Ⓑ Abdominal ultrasound
- Ⓑ Liver function tests

## Management

TREATMENT	LOC
Asymptomatic	HC4
<input type="checkbox"/> Does not require any intervention Biliary colic <input type="checkbox"/> Diclofenac 75 mg IM and/or f Pethidine 50-100 mg IM <input type="checkbox"/> Low-fat diet, Weight management <input type="checkbox"/> Refer for cholecystectomy after acute phase	RR

## 6.5.9 Acute Cholecystitis/Cholangitis ICD10 CODES: K81

Inflammation of the gall bladder and/or of the biliary tract. It often requires surgical management.

### Causes

- Ⓐ Obstruction of gall bladder duct by gall stones (calculi)
- Ⓐ May occur after major trauma, burns, or surgery
- Ⓐ Occurs in HIV infected persons as acalculous cholecystitis

### Clinical features

- Ⓐ Sudden onset of pain and tenderness in the right upper quadrant of the abdomen; worsens on deep breathing
- Ⓐ Nausea and vomiting
- Ⓐ Jaundice (in cholangitis)
- Ⓐ Fever (38-39 C) with chills

Severity of acute cholecystitis is classified into:

TREATMENT	
<b>Grade I (mild acute cholecystitis)</b>	Associated with no organ dysfunction and limited disease in the gallbladder, making cholecystectomy a low-risk procedure
<b>Grade II (moderate acute cholecystitis)</b>	Associated with no organ dysfunction, but with extensive disease in the gallbladder, resulting in difficulty in safely performing a cholecystectomy Usually characterized by: <ul style="list-style-type: none"> <li>- An elevated white blood cell count</li> <li>- A palpable, tender mass in the right upper abdominal quadrant</li> <li>- Disease duration of more than 72 hours</li> <li>- Imaging studies indicating significant inflammatory changes in the gallbladder.</li> </ul> Acute cholecystitis with organ dysfunction (shock)

### Differential diagnosis

- Ⓐ Acute alcoholic hepatitis
- Ⓐ Intestinal obstruction

### Investigations

- X-ray, abdominal ultrasound: findings are wall thickening ± stone pericholecystic fluid
- Blood: Haemogram, liver tests, pancreatitis. Findings are: fever, elevated white blood cells
- Enzymes and renal function tests

**Management**

TREATMENT	LOC
<input type="checkbox"/> Nil by mouth (duration?)	HC4
<input type="checkbox"/> Relieve pain: Pethidine 50–100 mg IM every 6 hours	
<input type="checkbox"/> Rehydrate with IV fluids and electrolytes e.g. Ringer's lactate	RR
<input type="checkbox"/> Ceftriaxone 1-2 g daily	
In cholecystitis:	
<input type="checkbox"/> Refer to hospital within 2–3 days for surgery (cholecystectomy)	
<input type="checkbox"/> In cholangitis, if not better refer for urgent surgical management	

# 7 Renal and Urinary Diseases

## 7.1 RENAL DISEASES

### 7.1.1 Acute Renal Failure ICD10 CODE: N17

Acute impairment of renal function

#### Causes

- Ⓐ Compromised renal perfusion e.g. dehydration, heart failure, shock (acute)
- Ⓐ Obstructed urinary flow
- Ⓐ Damage to renal tissue by infectious and inflammatory diseases (e.g. glomerulonephritis), intoxications, nephrotoxic drugs

#### Clinical features

- Ⓐ Oliguria (urine flow <1 ml/kg/hour)
- Ⓐ Generalised oedema
- Ⓐ Hypertension, heart failure, dyspnoea
- Ⓐ Nausea and vomiting, anorexia
- Ⓐ Lethargy, convulsions

#### Differential diagnosis

- Ⓐ Other renal disorders
- Ⓐ Biventricular heart failure



## Investigation

- Urine analysis: for blood, proteins, leucocytes, casts
- Urea, creatinine and electrolytes

## Management

- Management of acute kidney condition can be started at hospital level but the patient should be referred at higher level for more appropriate management:

### Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Treat underlying conditions e.g. dehydration</li> <li><input type="checkbox"/> Monitor fluid input and output           <ul style="list-style-type: none"> <li>- Daily fluid requirements = <math>10 \text{ ml/kg} + \text{total of losses through urine, vomitus and diarrhoea}</math></li> </ul> </li> <li><input type="checkbox"/> Monitor BP twice daily</li> <li><input type="checkbox"/> Daily weighing</li> <li><input type="checkbox"/> Restrict salt intake (&lt;2 g or half teaspoonful daily)</li> <li><input type="checkbox"/> Restrict potassium intake e.g. oranges, bananas, vegetables, meat, fizzy drinks</li> <li><input type="checkbox"/> Moderate protein intake</li> <li><input type="checkbox"/> Ensure adequate calories in diet f Check urine and electrolytes frequently f Treat any complications (e.g. infections, hypertension, convulsions), adjusting drug dosages according to the clinical response where appropriate</li> <li><input type="checkbox"/> If oliguria, furosemide IV according to response (high doses may be necessary)</li> </ul> <p>If no response to above general measures, worsening kidney function or anuria (urine output less than 100 ml/24 hours)</p>	HC4
	RR

TREATMENT	LOC
<input type="checkbox"/> Refer for specialist management including possible dialysis as soon as possible and before the patient's condition becomes critical	HC4
<b>Caution</b> <ul style="list-style-type: none"> <li>▪ Do not give any drugs which may make kidney damage worse e.g. use gentamicin with caution</li> </ul>	

## 7.1.2 Chronic Kidney Disease (CKD) ICD10 CODE: N18

Chronic impairment of kidney function

### Causes/risk factors

- Ⓐ Diabetes mellitus
- Ⓐ Hypertension/cardiovascular disease
- Ⓐ Age >50 years
- Ⓐ Kidney stones
- Ⓐ Drugs especially pain killers like diclofenac, ibuprofen and other NSAIDs
- Ⓐ Family history of kidney disease
- Ⓐ HIV/AIDS

### Clinical features

- Ⓐ Most patients with CKD have no symptoms until the disease is advanced
- Ⓐ May present with features of predisposing risk factor
- Ⓐ Anaemia, lethargy, easy fatigue, appetite loss, nausea, vomiting, skin itching, bone pains



- May have body swelling
- May have loin pain

### Differential diagnosis

- Other causes of chronic anaemia
- Heart failure
- Protein-energy malnutrition
- Chronic liver disease

### Investigations

- Creatinine/Urea/electrolytes
- Urine dip stick for protein and blood
- Kidney ultrasound

### How to screen for CKD in patient at risk

- Urine dipsticks (for protein and blood) and blood pressure measurement at least once a year in high risk patients
- In diabetics, urine microalbumin where possible or a spot urine for protein: creatinine ratio at least once a year
- Patients with detected abnormalities should have a serum creatinine test performed and GFR calculated as suggested above

### Refer the following patients for specialist attention:

- Children
- Persistent proteinuria or haematuria beyond 3 months
- GFR <60 ml/min or creatinine >1.9 mg/dl
- Familial kidney disease, e.g. polycystic kidney disease

### Management

Treatment of end stage renal disease is complex and expensive, and available only at national referral hospital

## Goals

- Establish diagnosis and treat reversible diseases
- Identify co-morbid conditions and manage further complications of CKD
- Slow progression of CKD by optimizing treatment
- Plan renal replacement therapy well before end stage kidney disease is reached

## Management

TREATMENT	LOC
Treatment to preserve kidney function in patients with CKD	HC4
<ul style="list-style-type: none"> <li>□ <b>Lifestyle modifications:</b> Weight loss, stop smoking, exercise, healthy balanced diet, lipid control, salt restriction</li> <li>□ Blood pressure control: Target 130/80 mmHg (lower in children). Use ACE inhibitors as first line antihypertensives for diabetics and patients with proteinuria, plus low salt diet</li> <li>□ <b>In diabetics:</b> BP control is paramount</li> <li>□ Optimal blood sugar control (HbA1C &lt;7%)</li> <li>□ <b>Proteinuria:</b> Reduce using ACE inhibitors and/or ARBs; target &lt; 1 g/day</li> <li>□ <b>Avoid nephrotoxic medicines, e.g. NSAIDs, celecoxibs, aminoglycosides, contrast agents</b></li> </ul>	RR
Prevention of complications	HR
<ul style="list-style-type: none"> <li>□ <b>Anaemia:</b> due to multiple causes. Consider iron and folic supplements. Target Hb 11-12 gr/dL</li> <li>□ <b>Bone mineral disease:</b> consider adding calcium</li> </ul>	
Treatment of symptoms	

TREATMENT	LOC
<input type="checkbox"/> If fluid retention/oliguria, furosemide tablet according to response (high doses may be necessary) <input type="checkbox"/> Dialysis for end stage cases	
<b>Caution</b>	
<ul style="list-style-type: none"> <li>▪ Start ACE inhibitors at low doses and monitor renal function</li> </ul>	

### Prevention

- Ⓐ Screening of high risk patients
- Ⓐ Optimal treatment of risk factors
- Ⓐ Treatments to slow progression in initial phases
- Ⓐ Avoidance of nephrotoxic drugs

### 7.1.3 Use of Drugs in Renal Failure

- Ⓐ Be very careful when prescribing any medicine and check available prescribing information (e.g. in Practical Guidelines for Dispensing 2015) regarding use in renal failure/ impairment
- Ⓐ Many medicines are excreted through the kidneys and accumulate when urinary output is reduced
- Ⓐ Some drugs are presented as sodium or potassium salts and contribute to accumulation of these electrolytes
- Ⓐ With life-threatening infections (e.g. meningitis), use normal or high doses of antibiotics initially, and then reduce doses once the condition has responded

### Drugs which are usually safe fDoxycycline

- ◻ Erythromycin
- ◻ Benzylpenicillin (max 6 g daily in severe impairment)
- ◻ Phenytoin
- ◻ Rifampicin

## Drugs to use with care in reduced doses

ACE inhibitors (e.g. captopril)

- Amoxicillin
- Chloramphenicol (avoid in severe impairment)
- Ciprofloxacin r Cotrimoxazole r Diazepam
- Digoxin
- Insulin
- Isoniazid-containing medicines
- Pethidine (increase dose interval, avoid in severe impairment)
- Phenobarbital
- Propranolol

## Drugs to avoid using

- Acetylsalicylic acid (aspirin) and other NSAIDS e.g. ibuprofen, indomethacin
- Codeine
- Ethambutol
- Gentamicin
- Metformin
- Nalidixic acid
- Nitrofurantoin
- Streptomycin
- Tenofovir (TDF)

### 7.1.4 Glomerulonephritis

ICD10 CODE: N00-N01

Acute inflammation of the renal glomeruli (small blood vessels in the kidney)

#### Cause

- ② Immune reactions often following an infection - usually 1-5 weeks after a streptococcal skin or throat infection



## Clinical features

- Ⓐ Common in children >3 years and adolescents
- Ⓐ Haematuria (red, or tea-coloured urine)
- Ⓐ Oedema: Puffiness of the face/around the eyes, less commonly generalised body swelling
- Ⓐ Discomfort in the kidney area (abdominal or back pain)
- Ⓐ Anorexia
- Ⓐ General weakness (malaise)
- Ⓐ High blood pressure for age, commonly presenting as headaches, visual disturbances, vomiting, and occasionally pulmonary oedema with dyspnoea
- Ⓐ Convulsions (in hypertensive crisis)
- Ⓐ Oliguria (passing little urine) as renal failure sets in
- Ⓐ Evidence of primary streptococcal infection:
  - ▢ Usually as acute tonsillitis with cervical adenitis
  - ▢ Less often as skin sepsis

## Differential diagnosis

- Ⓐ Kidney infections e.g. TB, pyelonephritis
- Ⓐ Kidney tumours
- Ⓐ Heart failure
- Ⓐ Malnutrition
- Ⓐ Allergic reactions

## Investigations

- Ⓐ Urine: Protein, microscopy for RBCs and casts, WBCs
- Ⓐ Blood: Urea (uraemia) and creatinine levels, ASOT, electrolytes
- Ⓐ Ultrasound: Kidneys

## Management

Inflammatory kidney disease with oedema, hypertension and oliguria should be referred to regional hospital for specialised management.

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Monitor urine output, BP, daily weight</li> <li><input type="checkbox"/> Restrict fluid input (in oliguria)</li> <li><input type="checkbox"/> Restrict salt and regulate protein in the diet (in oliguria)</li> <li><input type="checkbox"/> Avoid or use with caution any drugs excreted by the kidney (see section 7.1.3)</li> <li><input type="checkbox"/> Treat any continuing hypertension (see section 4.1.6)</li> </ul>	H
If post-streptococcal <ul style="list-style-type: none"> <li><input type="checkbox"/> Treat primary streptococcal infection (10-day course): ph noxymethylpenicillin 500 mg every 6 hours Child: 10-20 mg/kg per dose</li> <li><input type="checkbox"/> Or Amoxicillin 500 mg every 8 hours for 10 days Child: 20 mg/kg per dose</li> </ul>	H
If allergic to penicillin <ul style="list-style-type: none"> <li><input type="checkbox"/> Erythromycin 500 mg every 6 hours for 10 days Child: 15 mg/kg per dose</li> </ul>	
For fluid overload (oedema) <ul style="list-style-type: none"> <li><input type="checkbox"/> Furosemide 80 mg IV (slow bolus) Child: 1 mg/kg every 8-12 hours</li> </ul>	
For fluid overload (oedema) <ul style="list-style-type: none"> <li><input type="checkbox"/> Furosemide 80 mg IV (slow bolus) Child: 1 mg/kg every 8-12 hours</li> </ul>	
For high blood pressure <ul style="list-style-type: none"> <li><input type="checkbox"/> Nifedipine 20 mg every 12 hours Children: refer to specialist</li> </ul>	



## Prevention

- ⦿ Treat throat and skin infections promptly and effectively
- ⦿ Avoid overcrowding
- ⦿ Adequate ventilation in dwellings

### 7.1.5 Nephrotic Syndrome ICD10 CODE: N04

Disorder characterised by loss of protein in the urine due to damage of the kidney. It is common in children.

#### Causes

- ⦿ Idiopathic/unknown (majority of cases)
- ⦿ Congenital (rare)
- ⦿ Secondary: Due to post-streptococcal acute glomerulonephritis, malaria, allergy, UTI, hepatitis B, HIV

#### Clinical features

- ⦿ Generalised oedema
- ⦿ Severe loss of protein in urine (proteinuria)
- ⦿ Low protein (albumin) levels in the blood serum (hypoalbuminaemia)
- ⦿ Hyperlipidaemia (high blood cholesterol)

#### Investigations

- ⦿ As for Acute glomerulonephritis plus
- ⦿ 24-hour urine protein quantification or Albumin creatinine ratio (ACR)
- ⦿ Serum protein and cholesterol

#### Differential diagnosis

- ⦿ Cardiac failure, liver disease
- ⦿ Malnutrition with oedema e.g. kwashiorkor
- ⦿ Malabsorption syndrome

- Allergic states causing generalised body swelling
  - Chronic glomerulonephritis

## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Restrict salt intake (&lt;2 g daily, i.e. less than a half teaspoon/day)</li> <li><input type="checkbox"/> Restrict water/fluid intake           <ul style="list-style-type: none"> <li>- Both salt and water/fluid intake should be moderated until diuresis is induced and swelling is subsiding, which can take several weeks</li> </ul> </li> <li><input type="checkbox"/> Furosemide 40-80 mg each morning to induce diuresis Child: 1-2 mg/kg per dose (but see notes below)</li> <li><input type="checkbox"/> Prednisolone 2 mg/kg daily (max: 60 mg)           <ul style="list-style-type: none"> <li>- Continue until no further proteinuria (around 6 weeks)</li> <li>- Gradually reduce the dose after the first 4 weeks, e.g. reduce by 0.5 mg/kg per day each week</li> </ul> </li> </ul>	H
When oedema has subsided and if still hypertensive	RR
<ul style="list-style-type: none"> <li><input type="checkbox"/> Give appropriate treatment (see section 4.1.6)</li> </ul>	
If clinical signs of/suspected streptococcal infection:	
<ul style="list-style-type: none"> <li><input type="checkbox"/> Give antibiotic as in Acute glomerulonephritis</li> </ul>	
If patient from area of endemic schistosomiasis	
<ul style="list-style-type: none"> <li><input type="checkbox"/> Praziquantel 40 mg/kg single dose</li> </ul>	
If no improvement after 4 weeks or patient relapses	
<ul style="list-style-type: none"> <li><input type="checkbox"/> Refer for further management</li> </ul>	

## 7.2 UROLOGICAL DISEASES

### **7.2.1 Acute Cystitis**

ICD10 CODE: N30

An infection/inflammation involving the bladder, a part of the lower urinary tract. It is a common manifestation of uncomplicated UTI (Urinary Tract Infection) in non-pregnant women.



Uncomplicated cystitis is less common in men and needs to be differentiated from prostatitis and urethritis (sexually transmitted).

### Cause

- ⦿ Bacterial infection, usually gram negative (from intestinal flora) e.g. Escherichia coli

### Clinical features

- ⦿ Dysuria (pain and difficulty in passing urine)
- ⦿ Urgency of passing urine, frequent passing of small amounts of urine
- ⦿ Suprapubic pain and tenderness
- ⦿ Pyuria/haematuria (pus/blood in the urine making it cloudy)
- ⦿ Foul smelling urine
- ⦿ There may be retention of urine in severe infection

### Investigations

- ⦿ Midstream urine: urine analysis for protein, blood, leucocytes, nitrates, sediment
- ⦿ Culture and sensitivity (if resistant/repeated infections)

### Diagnostic criteria

Symptoms ± leucocytes and/ or nitrates at urine analysis

### Differential diagnosis

- ⦿ Women: vaginitis
- ⦿ Men: urethritis (in young sexually active patients), prostatitis (fever, chills, malaise, perineal pain, confusion, in older men)

**Note:** Asymptomatic bacteriuria or pyuria (leucocytes in urine) does not need treatment except in risk groups such as pregnant women, patients undergoing urological interventions and post kidney transplant patients



## Management

TREATMENT	LOC
<p>Uncomplicated UTI (cystitis) in non-pregnant women</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Ensure high fluid intake</li> </ul> <p>First line agents:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Nitrofurantoin 100 mg 6 hourly for 5-7 days[advise patient to take after meals]</li> </ul> <p>Child: 3 mg/kg/day 6 hourly for 7 days</p> <p>Second line agents</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Ciprofloxacin 500 mg 12 hourly for 7 days (adults)</li> </ul> <p>Children: amoxicillin 125-250 mg 8 hourly for 7 days</p> <p>If poor response or recurrent infections</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Refer for investigation of culture and sensitivity and further management</li> </ul>	HC2

### Note

- For urinary tract infection in pregnancy, see section 16.2.6

### Prevention

- Improved personal/genital hygiene
- Pass urine after coitus
- Drink plenty of fluids

## 7.2.2 Acute Pyelonephritis ICD10 CODE: N10

Upper urinary tract infection involving one or both kidneys (but not usually involving the glomeruli)

### Cause

- Bacterial infection, e.g. Escherichia coli, usually due to ascending infection (faecal-perineal-urethral progression of bacteria)



## Risk factors

- Ⓐ Bladder outlet obstruction
- Ⓐ Malformations of urinary tract
- Ⓐ Pregnancy
- Ⓐ HIV, old age, diabetes

## Clinical features

- Ⓐ Loin pain, tenderness in one or both kidney areas (renal a gle)
- Ⓐ Fever, rigors (generalised body tremors)
- Ⓐ Vomiting
- Ⓐ If associated cystitis: dysuria, urgency, frequency
- Ⓐ Diarrhoea and convulsions (common in children)
- Ⓐ In infants and elderly: may simply present as fever and poor feeding/disorientation without other signs

## Differential diagnosis

- Ⓐ Appendicitis
- Ⓐ Infection of the fallopian tubes (salpingitis)
- Ⓐ Infection of the gall bladder (cholecystitis)

## Investigations

- Urine: Microscopy for pus cells and organisms, C&S of mid-stream urine
- Specimen should reach the lab within 2 hours of collection or be refrigerated at 4 C for not >24 hours
- Blood: Full count, C&S, urea, electrolytes
- Ultrasound kidneys/prostate

## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Ensure adequate intake of fluid (oral or IV) to irrigate bladder and dilute bacterial concentrations</li> <li><input type="checkbox"/> Give paracetamol 1 g every 6-8 hours for pain and fever</li> </ul> <p>If outpatient (only adults):</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Ciprofloxacin 500 mg every 12 hours for 10-14 days (only adults)</li> </ul> <p>In severe cases, all children or if no response to above in 48 hours:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Ceftriaxone 1 g IV once a day Child: 50-80 mg/kg IV once a day</li> </ul> <p>Following initial response to parenteral therapy</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Consider changing to:           <ul style="list-style-type: none"> <li>- Ciprofloxacin 750 mg every 12 hours to complete 10 days (adults only)</li> <li>- Or cefixime 200 mg every 12 hours to complete 10 days of treatment</li> </ul> </li> </ul> <p>Child: 16 mg/kg the first day then 8 mg/kg to complete 10 days</p> <p>Alternative regimen</p>	HC3
<ul style="list-style-type: none"> <li><input type="checkbox"/> Gentamicin 5-7 mg/kg IV in one or divided doses with or without ampicillin 2 g IV every 6 hours Child : gentamicin 2.5 mg/kg every 8 hours (or 7.5 mg/kg once daily on outpatient basis) with or without ampicillin 25 mg/kg every 6 hours</li> <li><input type="checkbox"/> Consider referral if there is no response in 72 hours and for children with recurrent infections (to exclude urinary tract malformations)</li> </ul>	HC2



## Prevention

- Ensure perianal hygiene
- Ensure regular complete emptying of the bladder and/or double voiding (additional attempt to empty bladder after initial urine flow ceases)

### 7.2.3 Prostatitis ICD10 CODE: N41

Acute inflammation/infection of the prostate, a gland present in the male and located below the bladder, around the proximal urethra.

#### Cause

- Bacterial infection as for UTI

#### Clinical features

- Fever, chills
- Rectal, perineal and low back pain
- Urinary urgency, frequency and dysuria
- May cause acute urinary retention
- At rectal examination: tender enlarged prostate (avoid vigorous examination)

#### Investigations

- Haemogram
- Urine analysis and C&S

#### Management

TREATMENT	LOC
<input type="checkbox"/> IV fluids, antipyretics, bed rest	HC4
<input type="checkbox"/> Stool softeners	
<input type="checkbox"/> Ciprofloxacin 500 mg 12 hourly for 4-6 weeks	

## 7.2.4 Renal Colic ICD10 CODE: N23

Acute severe pain in the loin (kidney area) as a result of obstruction of the ureters by a stone.

### Causes

- Urinary stones
- Rarely clot or tumor

### Clinical features

- Acute, severe, colicky loin pain often radiating to the iliac fossa, testes, or labia of the same side
- At times dysuria
- Nausea and vomiting

### Differential diagnosis

- Lower UTI
- Acute upper UTI
- Other causes of acute abdominal pain

### Investigations

- Urinalysis (for blood)
- Plain abdominal X-ray: for radio-opaque stones
- Ultrasound

### Management

TREATMENT	LOC
<ul style="list-style-type: none"><li><input type="checkbox"/> Oral or IV fluids to maintain hydration</li><li><input type="checkbox"/> Antiemetics if necessary e.g. metoclopramide 10 mg IM or IV</li><li><input type="checkbox"/> Diclofenac 75 mg IM single dose and/or</li><li><input type="checkbox"/> Pethidine 50-100 mg IM single dose</li></ul> <p>Refer if repeated episodes/unresolving episode.</p>	HC4



## Prevention

- Ⓐ Ensure oral fluid intake of 3-4 L/day
- Ⓐ Reduce salt intake and animal protein

### **7.2.5 Benign Prostatic Hyperplasia ICD10 CODE: N40**

Enlargement of the prostate causing urinary symptoms. Common in men above 50 years.

#### Cause

- Ⓐ Benign growth of prostate size, age related

#### Clinical features

- Ⓐ Obstructive symptoms: weak urine stream, straining at micturition, hesitancy, intermittency, sensation of incomplete bladder emptying
- Ⓐ Irritative symptoms: frequent micturition especially during the night, urgency, urge incontinence
- Ⓐ Complications: acute urinary retention, frequent infections which may precipitate symptoms

#### Investigations

- Ⓐ Urine analysis (blood, leucocytes)
- Ⓐ Renal function
- Ⓐ Abdominal ultrasound

#### Management

TREATMENT	LOC
<input type="checkbox"/> Treat with antibiotics if infection present (see prostatitis or acute cystitis in previous section 7.2.3)	HC2 RR
<input type="checkbox"/> Surgical management if severe symptoms	

## 7.2.6 Bladder Outlet Obstruction

Obstruction of urinary tract anywhere below the bladder, causing distension and incomplete emptying of the bladder. It can be acute (Acute Urinary Retention) or chronic.

### Causes

- BPH/ prostate cancer
- Bladder tumors, stones
- Pelvic masses (rarely pregnancy)
- Rarely neurological causes
- Infections can precipitate acute retention
- Chronic obstruction can cause hydronephrosis and chronic kidney damage

### Clinical features

- Acute: painful and tender pelvic mass, difficulty in passing urine
- Chronic: obstructive and irritative symptoms (see BPH), painless pelvic mass

### Investigations

- Urine analysis, C&S
- Abdominal ultrasound
- Renal function tests
- Other specialised investigations (Cystourethrogram)

### Management

TREATMENT	LOC
<input type="checkbox"/> Urethral catheter to relieve obstruction ( $\geq 18$ F)	HC4
<input type="checkbox"/> Suprapubic catheter if urethral fails	RR
<input type="checkbox"/> Treat infection if present	
<input type="checkbox"/> Refer to specialist for assessment/care	



## 7.2.7 Urine Incontinence

ICD10 CODE: N39.3-4

Involuntary urine leakage

### Causes and clinical features

- Ⓐ Pelvic floor muscles dysfunction (e.g. following pregnancy): stress incontinence (at strains like coughing, sneezing)
- Ⓐ Overactive bladder: urge incontinence (sudden compelling need to urinate, difficult to defer)
- Ⓐ Anatomical problems: continuous incontinence (VVF, ectopic ureter)
- Ⓐ Chronic bladder outlet obstruction: overflow incontinence

### Investigations

- Careful history and examination
- Urine analysis
- Abdominal ultrasound

### Management

TREATMENT	LOC
<input type="checkbox"/> Stress incontinence: pelvic floor exercises	HC2
<input type="checkbox"/> Other: specific according to the cause	H



# 8 Endocrine and Metabolic Diseases

## 8.1.1 Addison's Disease

ICD10 CODE: E27.1-4

A condition where the adrenal gland produces insufficient glucocorticoid hormones (adrenal insufficiency)

### Causes

- More common: abrupt cessation of steroid treatment after long use
- Autoimmune (self destruction of the gland)
- TB of the adrenals, HIV/AIDS
- Surgical adrenal removal, cancer affecting adrenal glands, bleeding into the adrenals, necrosis of the adrenals

### Clinical features

#### Acute

- Weakness and fatigability (getting tired easily)
- Shock, very low BP
- Hypoglycaemic attacks
- Mental changes, e.g., irritability and restlessness until coma
- Fever, hyponatremia (low Na), hyperkalemia (high K), acidosis

#### Chronic

- As above plus weight loss, hair loss
- Darkening of the skin and mouth
- Menstrual disturbance and infertility
- Symptoms are worse in situations of stress (e.g., infections)



## Differential diagnosis

- Ⓐ HIV/AIDS, TB, cancer
- Ⓐ Depression
- Ⓐ Diabetes mellitus
- Ⓐ Hypothyroidism

## Investigations

- Ⓐ Drug history
- Ⓐ Refer at higher level for hormone tests if no clear history of abrupt withdrawal of steroid treatment

## Management

TREATMENT	LOC
<p>Acute crisis</p> <p><input type="checkbox"/> Hydrocortisone 100 mg IV 6 hourly until stable, then switch to oral</p> <p>Child 0-3 years: 25 mg</p> <p>Child 3-12 years: 50 mg</p> <p><input type="checkbox"/> IV fluids and dextrose to maintain normal volume and blood sugar</p> <p><input type="checkbox"/> Treat complications/concomitant illnesses (e.g. infections)</p>	H
<p>Chronic case</p> <p>Hydrocortisone tablets 10mg</p> <p><input type="checkbox"/> If history of abrupt steroid cessation, restart prednisolone treatment, and slowly decrease it by 2.5-5 mg per week</p> <p><input type="checkbox"/> Replacement treatment with prednisolone (5-7.5 mg/day)</p> <p>Child: 1-5 mg/day</p> <p><input type="checkbox"/> Use doses as in acute regimens in case of stress (e.g., surgery, disease, labour)</p>	H

## Prevention

- Ⓐ Avoid self medication with steroids (prednisolone, dexamethasone)
- Ⓐ Decrease steroids gradually if used for treatment durations longer than 2 weeks (see above)

## 8.1.2 Cushing's Syndrome ICD10 CODE: E24

Constellation of signs and symptoms caused by chronic glucocorticoid (steroid) excess, from excessive secretion or, more commonly, from chronic glucocorticoid therapy.

### Causes

- Iatrogenic (steroid treatment)
- Cushing's Disease
- Adrenal adenoma, adrenal carcinoma

### Clinical Features

- Central (truncal) obesity, moon face, buffalo hump
- Thinning of the skin, striae
- Poor wound healing, muscle weakness and atrophy
- Hirsutism and acne (females)
- Hypertension and hyperglycaemia

### Differential diagnosis

- Ordinary obesity
- Alcoholism (alcohol-induced pseudo-Cushing's syndrome)

### Investigations

- Drug history
- Refer to higher level for hormonal tests (dexamethasone suppression test) if no history of steroid overuse

### Management

TREATMENT	LOC
Iatrogenic <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Slowly decrease steroid dose by 2.5-5 mg every 1 to 2 weeks</li> </ul>	H

## Management

TREATMENT	LOC
<b>Non-iatrogenic</b> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Refer non-iatrogenic Cushing's, or iatrogenic cases with complications to higher level of care</li> </ul>	RR

### 8.1.3 Diabetes Mellitus

ICD10 CODE: E08-E13

Metabolic disease resulting from insulin insufficiency or ineffectiveness, due to decreased insulin secretion, or peripheral resistance to the action of insulin, or a combination of the two.

#### Causes

- Type 1: decreased insulin production due to autoimmune destruction of the pancreas. Usually starts at a young age
- Type 2: insulin resistance, usually combined with insufficient production of insulin as the disease progresses. Usually starts in adulthood
- Gestational Diabetes - any degree of glucose intolerance with onset or first recognition during pregnancy.
- Secondary diabetes: due to other identifiable causes, e.g., Cushing's syndrome, chronic pancreatitis, etc.

#### Risk factors

- **Type 1:** genetic factors, environmental factors (e.g., some viral infections)
- **Type 2**
- Non-Modifiable risk factors: Age >40 years, Family history in first degree relatives, Gestational DM, delivery of big baby >4kg
- Modifiable risk factors; Unhealthy diets, physical inactivity, tobacco use, harmful use of alcohol, hypertension, stress, obesity, high cholesterol levels, impaired glucose tolerance

## Clinical features

### Classical symptoms

- o Polyuria – frequent urination, night waking to urinate
- o Polydipsia – frequent thirst, drink a lot of water
- o Polyphagia – increased appetite, feeling hungry all the time, frequent, eating
- o Polyneuropathy-burning pains, pins and needles, numbness

### Other symptoms

- o Weight loss despite high appetite
- o Frequent skin infections like boils, itchy genitalia (candidiasis), slow healing wounds
- o Fatigue – feeling tired all the time, children not wanting to play
- o Bed-wetting in children
- o Poor vision
- o May present with complications
  - ⦿ Type 2 diabetes often only presents with minor aspecific symptoms, and it is diagnosed either by screening or when the patient presents with complications

### Complications

#### Acute complications of diabetes

- Acute coma due to diabetic ketoacidosis, or hyperosmolar hyperglycaemia (see section 8.1.4), or hypoglycaemia (see section 1.1.6)

#### Chronic complications

**1. Microvascular complications:** affect the small blood vessels, such as those supplying blood to the eyes and kidneys. The microvascular

complications of diabetes are retinopathy, nephropathy and neuropathy.

**2. Macrovascular complications:** affect the larger blood vessels, such as those supplying blood to the heart, brain and legs: stroke, heart attack, peripheral artery disease

- Stroke, ischaemic heart disease, kidney failure
- Blindness, impotence, peripheral neuropathy
- Diabetic foot which may lead to amputations

### Differential diagnosis

- ⦿ Diabetes insipidus, HIV/AIDS, TB

### Investigations

- ⦿ Blood glucose (fasting, random, and/or 2 hours after 75mg of glucose)
  - ⦿ Urine: for glucose, and ketones (in type 1)
- HbA1c – Glycated haemoglobin 1c

Other baseline tests- RFTs, Lipid profile, ECG, urine protein or microalbuminuria

1	Fasting blood sugar >7.0 mmol/L (126 mg/dl)
2	Two-hour blood sugar after 75 mg of glucose >11.1 mmol/L (200 mg/dl)
3	HbA1c >6.5%
4	In a patient with classical symptoms of hyperglycaemia: Random Blood Sugar >11.1 mmol/L (200 mg/dl)

### Diagnostic criteria

#### Caution

- In the absence of unequivocal hyperglycaemia (very high levels of blood sugar), criteria 1-3 should be confirmed by repeated testing. One single slightly elevated blood sugar in the absence of symptoms IS NOT DIAGNOSTIC for diabetes

## General Management

### Goals of treatment

- Treatment of hyperglycaemia
- Treatment of associated risk factors
- Prevention and treatment of acute and chronic complications

TREATMENT	LOC
Lifestyle modifications f Diabetic diet (see section 19.1.3) Weight loss if overweight <ul style="list-style-type: none"> <li><input type="checkbox"/> Regular physical exercise</li> <li><input type="checkbox"/> Moderate, or no alcohol intake</li> <li><input type="checkbox"/> Smoking cessation</li> </ul>	HC2
Management of risk factors <ul style="list-style-type: none"> <li><input type="checkbox"/> Assess for other risk factors (hypertension, obesity, smoking, etc.), and manage accordingly</li> <li><input type="checkbox"/> Hypertension: target BP 120/80, first line medication are ACE inhibitors (renal protection effect), e.g., enalapril (see section 4.1.6)</li> <li><input type="checkbox"/> Dyslipidaemia: consider statin treatment, e.g. atorvastatin 20-40 mg once daily or simvastatin 20-40 mg once daily in the evening, especially if:               <ul style="list-style-type: none"> <li>- Ischaemic heart disease or cerebrovascular disease already present</li> <li>- Age &gt;40 years</li> </ul> </li> </ul>	HC2 HC4 H
<b>Caution</b> <ul style="list-style-type: none"> <li>■ Do not use beta blockers, e.g., atenolol in diabetes</li> </ul>	

TREATMENT	LOC
Management of complications  <input type="checkbox"/> Assess for complications (renal disease, eye problems, diabetic foot, peripheral neuropathy, heart problem, stroke), and refer/ treat accordingly	HC3
<input type="checkbox"/> Aspirin 75-100 mg/daily in ischaemic heart disease, or stroke  <input type="checkbox"/> Amitriptyline 10-25 mg at night (max 100 mg in divided doses) for peripheral neuropathy  <input type="checkbox"/> Atorvastatin 20-40 mg once a day in ischaemic heart disease, or stroke	HC3 H

### Treatment targets

- Fasting blood sugar <7 mmol/l
- Postprandial sugar <10 mmol/l
- HbA1c <7% (7.5 % for elderly)

Elderly people are at higher risk of hypoglycaemia. Monitor carefully, and do not aim at very strict control of blood sugar.

### Management of Type 1 Diabetes

Insulin SC: 0.6 -1.5 IU/kg/day HC4 Children <5 years: start with 0.5 IU/Kg/day, and refer to a paediatrician

Type of Insulin	Usual Protocol	Action		
		Onset	Peak	Duration
Insulin short acting, regular soluble (e.g. Actrapid)	3 times daily, 30 minutes before meals	30 minutes	2-5 hours	5-8 hours

Type of Insulin	Usual Protocol	Action		
		Onset	Peak	Duration
Insulin Aspart	3 times daily 10-15 minutes before meals	10-20mins	45 mins	3-5hours
Insulin intermediate acting, NPH, (e.g. Insulatard)	Once or twice daily (evening ± morning)	1–3 hours	6–12 hours	16–24 hours
Insulin biphasic, mixture of regular and NPH (e.g. Mixtard 30/70)	Once or twice daily	30 minutes	2–12 hours	16–24 hours
<p>Preferably, a combination of intermediate and short acting insulin should be used, in the following regimens e.g.,</p> <ul style="list-style-type: none"> <li>▶ Pre-meals short acting insulin (e.g. actrapid) or Rapid acting insulin analogue (e.g Aspart) and evening intermediate acting insulin (e.g. Insulatard) or long acting insulin analogues (e.g Glargin). The evening dose should be 40-50% of the daily dose (basal-bolus therapy)</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>▶ Twice daily premixed insulin Mixtard: usually 2/3 of total dose in the morning and 1/3 in the evening, 30 minutes before meals or Biphasic Insulin Aspart 2/3 of total dose in the morning and 1/3 in the evening 10-15 minutes before meals.</li> </ul>				

Type of Insulin	Usual Protocol	Action		
		Onset	Peak	Duration
<b>Note</b>				
▪ Patients on insulin should measure their blood glucose level at least twice daily (before breakfast, and before dinner), and insulin doses adjusted accordingly	▪ More frequent pre- and post-meals measurements are required to adjust the doses especially with a basal-bolus therapy.			
<b>Caution</b>				
▪ Oral antidiabetic medicines are NOT used in type 1. Metformin can be used but only under specialist advice				

### Management of Type 2 Diabetes

TREATMENT	LOC
<b>First line</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Life style modifications           <ul style="list-style-type: none"> <li>- If sugar levels not very high, and patient is willing, try lifestyle modifications for 3 months, and reassess</li> </ul> </li> </ul> <p>If lifestyle modifications not enough, and/or sugar level initially very high, start on:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> <b>Metformin</b> 1.5-2 g daily in divided doses at meals (start with 500 mg once a day for one week, then increase by 500 mg every week until target control is achieved)</li> </ul> <p>If treatment targets not achieved with lifestyle modifications and metformin, add a second line drug.</p> <p>If intolerance or contraindication to metformin, start directly with second line</p>	HC2
<b>Second line</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Or Glimepiride 1-4 mg once daily before or with the first meal of the day</li> <li>- Start with lowest dose, and increase every 1-2 weeks according to response</li> </ul> <p>If control not achieved, add basal insulin (third line)</p>	HC4   H

## Management of Type 2 Diabetes

TREATMENT	LOC
<p>Third line</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Insulin SC NPH (Insulatard)</li> </ul> <p>8 IU (or 0.3 IU/Kg) in the evening, increase by 2-4 IU every 3-7 days until fasting blood glucose is in range</p>	HC4
<p>If control still not achieved, consider a full insulin regimen. Stop glimepiride, but maintain metformin if possible</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Biphasic insulin (e.g. Mixtard 30/70) twice a day, 2/3 total dose in the morning before breakfast, and 1/3 in the evening before supper</li> </ul> <p>E.g., Starting dose: 10 IU SC morning, 5 IU SC evening, increase by 4-5 IU/weekly. Adjust morning dose as per pre-supper blood glucose, and evening dose as per pre-breakfast blood glucose OR</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Basal-bolus regimen: 0.4-0.6 IU/kg/day, half is given as basal insulin (e.g. Insulatard) in the evening, and half given as rapid insulin 30 minutes before meals</li> </ul> <p>Adjust basal dose according to fasting blood sugar, and pre-meals insulin according to pre- and post- meals blood sugar levels</p>	HC4
<p><b>Caution</b></p> <ul style="list-style-type: none"> <li>▪ Metformin is contraindicated in advanced kidney disease</li> <li>▪ Do not use oral anti-diabetics in acute complications, and in acutely sick patients: use insulin for initial management</li> </ul>	

### 8.1.4 Diabetic Ketoacidosis (DKA) and Hyperosmolar Hyperglycaemic State (HHS) ICD10 CODE: E10.1 AND E11.0

Acute metabolic complications of diabetes mellitus:

- DKA is characterized by ketosis, acidosis, and hyperglycaemia. It is more common in type 1 diabetes.
- HHS is characterized by hyperglycaemia, severe dehydration and hypovolemia, but no ketosis and acidosis. It is more common in type 2 diabetes.



## Causes

- Newly diagnosed diabetes
- Poor control of diabetes mellitus
- Treatment interruptions
- Infections and trauma

## Clinical features

### DKA

- Acute onset (24 hours or less)
- May be preceded by the typical symptoms of excessive thirst, fluid intake, and passing of urine, weight loss, tiredness
- Abdominal pain, vomiting
- Altered consciousness, coma
- Deep breathing (acidotic)
- Sweet, acetone smell on the breath (from ketosis)
- Cardiovascular collapse (hypotension)

### HHS

- Slower onset
- More severe dehydration and fluid deficit
- No ketosis and acidosis (no/few ketones in urine)

## Differential diagnosis

- Other causes of ketoacidosis/hyperglycaemia
- Other causes of acute abdominal pain
- Other causes of coma

## Investigations

- Blood sugar
- Urine analysis (for ketones, positive)
- Full blood count
- Renal function and electrolytes (Na,K)

Management	
TREATMENT	LOC
General measures <ul style="list-style-type: none"> <li><input type="checkbox"/> Monitor BP, urine output, and blood sugar hourly</li> <li><input type="checkbox"/> Urinary catheter if unconscious</li> <li><input type="checkbox"/> Treat infections if present (they can be a precipitating factor)</li> <li><input type="checkbox"/> <b>Enoxaparin 4000 IU SC</b> until patient is able to move (to prevent thromboembolism)</li> </ul>	HC4 H
<input type="checkbox"/> Normal saline (NaCl 0.9%) <ul style="list-style-type: none"> <li>- 15-20 ml/kg in the first hour (500-1000 ml)</li> <li>- Children: 10-20 ml/kg</li> <li>- Continue with 5-15 ml/kg/hour according to vital signs, urinary output, and clinical condition</li> </ul> <input type="checkbox"/> If blood sugar <14 mmol/L, switch to dextrose 5% if ketones still present, and/or clinical condition not yet normal (patient unable to eat)	HC4
<input type="checkbox"/> <b>Soluble insulin 4-6 IU IM</b> every hour until condition stabilises <ul style="list-style-type: none"> <li>Child &gt;5 years: 0.1 IU/kg/hour</li> <li>Child &lt;5 years: 0.05 IU/Kg/hour</li> <li>- Continue insulin until ketosis resolves, and patient is able to eat</li> <li>- Once clinical condition normalises (normal BP, consciousness, urine output, and able to eat), start Insulin SC regimen (see section 8.1.3) 1-2 hours before stopping the IM insulin</li> </ul>	HC4
Potassium (KCl) <p>If potassium level not available</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Add potassium chloride 1 ampoule in every 1 litre of infusion as soon as the patient has started passing urine</li> </ul>	HC4

TREATMENT	LOC
If potassium levels available: <ul style="list-style-type: none"> <li>- K &lt;3.5 mmol/L: add 40 mmol (2 ampoules) per 1 litre of fluid</li> <li>- K 3.5-5.5 mmol/L: add 20 mmol (1 ampoule) per 1 litre of infusion</li> <li>- K &gt;5.5 mmol/L: do not add any potassium</li> </ul>	

### Prevention

- Ⓐ Early detection
- Ⓐ Good control of diabetes
- Ⓐ Prompt treatment of infections
- Ⓐ General education

### Hypoglycemia

For hypoglycaemia in patients on anti-DM drugs, manage as in section 1.1.6, and

Add Glucagon 1mg (1 unit) IM/SC, repeat every 15minutes once or twice according to response to treat severe hypoglycemia in diabetes patients treated with insulin who are unconscious or cannot take some form of sugar by mouth.

### 8.1.5 Goitre ICD10 CODE: E04

Visible enlargement of thyroid gland. May be associated with abnormal thyroid function (hyper or hypothyroidism), or not.

#### Causes

- Ⓐ Iodine deficiency
- Ⓐ Grave's disease

- Thyroiditis
- Multinodular
- Physiological (pregnancy, puberty)

### Clinical features

- Visible neck swelling
- (Rarely) difficulty in swallowing

### Investigations

- Thyroid hormones
- Neck ultrasound

### Management

TREATMENT	LOC
<input type="checkbox"/> Refer for thyroid hormones and specialist management <ul style="list-style-type: none"> <li>- If hypo or hyperthyroidism, (see sections 1.1.6)</li> <li>- If causing obstruction, surgery is indicated</li> </ul>	RR

### 8.1.6 Hyperthyroidism

ICD10 CODE: E05

A condition resulting from an excess of thyroid hormones, usually due to excessive production.

### Causes

- Grave's disease (autoimmune, common in females)
- Neonatal thyrotoxicosis
- Tumours of thyroid gland (adenomas, multinodular toxic goiter)
- Inflammation of the thyroid gland (thyroiditis)
- Iatrogenic causes (side effect of some medications)

### Clinical features

- Weight loss with increased appetite
- Swelling in the neck (goitre)



- Ⓐ Palpitations, tachycardia
- Ⓐ Irritability, nervousness, inability to rest or sleep
- Ⓐ Irregular, scanty menstrual periods
- Ⓐ Profuse sweating, extreme discomfort in hot weather
- Ⓐ High blood pressure
- Ⓐ Protruding eyes (exophthalmos) in some forms
- Ⓐ Frequent defecation

### Differential diagnosis

- Ⓐ Anxiety states
- Ⓐ Tumours of the adrenal gland (pheochromocytoma)
- Ⓐ Other causes of weight loss
- Ⓐ Other causes of protruding eyes

### Investigations

- Ⓐ Blood levels of thyroid hormone (high T3, T4, low TSH)
- Ⓐ Thyroid ultrasound scan
- Ⓐ Biopsy of thyroid gland for cytology/histology

### Management

The aim is to restore the euthyroid state

- Ⓐ Use pulse rate and thyroid hormones level to monitor progress

TREATMENT	LOC
<input checked="" type="checkbox"/> Carbimazole 15-40 mg (max 60 mg) in 2-3 divided doses for 1-2 months Child: 750 micrograms/kg/day in divided doses (max 30 mg) <ul style="list-style-type: none"> <li>- Adjust dose according to thyroid hormone levels (under specialist management only)</li> </ul>	H

TREATMENT	LOC
<ul style="list-style-type: none"> <li>- To control excessive sympathetic symptoms (e.g. palpitations), add:</li> </ul> <p><input checked="" type="checkbox"/> Propranolol 40-80 mg every 12 hours for at least 1 month</p> <p>- Child: 250-500 micrograms/kg 3-4 times daily</p>	H
<p>Once patient is euthyroid</p> <p><input checked="" type="checkbox"/> Stop propranolol, and progressively reduce carbimazole to daily maintenance dose of 5-15 mg. Continue carbimazole for at least 18 months</p> <p><input checked="" type="checkbox"/> Surgery may be required in certain cases, e.g., obstruction, intolerance, or lack of response to drug treatment</p> <p><input checked="" type="checkbox"/> Radioactive iodine may also be used especially in toxic multinodular goitre</p>	
<p>Caution</p> <ul style="list-style-type: none"> <li>▪ Patients treated with carbimazole should be advised to report any sore throat immediately because of the rare complication of agranulocytosis (low white cell count)</li> </ul>	

### 8.1.7 Hypothyroidism ICD10 CODE: E03

A condition resulting from thyroid hormone deficiency. It is 5 times more common in females than in males.

#### Causes

- Autoimmune disease
- Post-therapeutic, especially after radiotherapy, or surgical treatment for hyperthyroidism
- Secondary; due to enzyme defects (congenital)
- Iodine deficiency
- Iatrogenic (side effects of some medicines)

## Clinical features

- Ⓐ Dull facial expression, puffiness, periorbital swelling
- Ⓐ Hoarse voice, slow speech
- Ⓐ Weight gain, drooping eyelids
- Ⓐ Hair sparse, coarse, and dry: skin dry, scaly, and thick
- Ⓐ Forgetfulness, other signs of mental impairment
- Ⓐ Gradual personality change
- Ⓐ Bradycardia, constipation (often), anaemia (often)
- Ⓐ Paraesthesia (numbness) of hands and feet

## Differential diagnosis

- Ⓐ Myasthenia gravis
- Ⓐ Depression

## Investigations

- Blood levels of thyroid hormone (low T3, T4, high TSH)

TREATMENT	LOC
<input checked="" type="checkbox"/> Levothyroxine <ul style="list-style-type: none"><li>- Initial dose 50-100 micrograms once daily before breakfast</li><li>Elderly: start with 50 micrograms<ul style="list-style-type: none"><li>- Gradually increase by 25-50 micrograms every 4 weeks to maintenance dose of 100-200 micrograms daily, according to hormonal levels</li><li>- Once stable, check hormone levels every 6-12 months</li></ul></li><li>Child: refer for specialist management</li></ul>	H
<b>Note</b> <ul style="list-style-type: none"><li>- In most cases, the treatment is for life</li></ul>	

## Prevention

- Educate patients on the use of iodised salt

### 8.1.8. Central precocious puberty

Also referred to as gonadotropin dependent precocious puberty is an endocrine- related developmental disease characterized by the onset of pubertal changes, with development of secondary sexual characteristics and accelerated growth and bone maturation, before the normal age of puberty (8 years in girls and 9 years in boys).

#### Causes

- Ⓐ Premature activation of the hypothalamic-pituitary-gonadal (HPG) axis.
- Ⓐ Idiopathic
- Ⓐ Secondary causes include brain tumors (glioma, astrocytoma), CNS infections (meningitis, encephalitis), brain malformations (hydrocephalus, arachnoid cysts), trauma and injuries.

#### Clinical features

- Ⓐ Accelerated growth and bone maturation
- Ⓐ Premature breast development
- Ⓐ Early menarche in girls, and testicular and penile enlargement with development of facial and sexual hair in boys

#### Genetic counselling

- Ⓐ Most cases are sporadic, familiar cases show autosomal dominant mode of transmission with incomplete, gender-dependent penetrance



## Differential diagnosis

- Ⓐ Gonadotropin-independent precocious puberty
- Ⓐ McCune-Albright syndrome
- Ⓐ Gonadal tumours
- Ⓐ Benign premature the larche

## Investigations

- Pelvic ultrasound
- Screening of basal luteinizing hormone (LH) levels or measurement of gonadotropin levels after stimulation tests using gonadotropin releasing hormone (GnRH)

## Management

TREATMENT	LOC
<input type="checkbox"/> Treatment of progressive CPP using GnRH agonists (leuprolide acetate for depot suspension)	NH
<input type="checkbox"/> ILeuprolide acetate for depot suspension 7.5mg inj monthly	

## Prognosis

The disease has minimal consequences during adulthood, although the association of variation of pubertal timing with adult disease or behaviour may be questioned.

# 9 Mental, Neurological and Substance Use Disorders

## 9.1 NEUROLOGICAL DISORDERS

### 9.1.1 Epilepsy ICD10 CODE: G40

- ⦿ A chronic condition characterised by recurrent unprovoked seizures. Seizures are caused by abnormal discharges in the brain and present in two different forms: convulsive and non-convulsive forms.
- ⦿ Convulsive epilepsy has features such as sudden muscle contraction, causing the person to fall and lie rigidly, followed by the muscles alternating between relaxation and rigidity with or without loss of bowel or bladder control
- ⦿ Non-convulsive epilepsy has features such as change in awareness, behaviour, emotions or senses (such as taste, smell, vision or hearing) similar to mental health conditions, so may be confused with them
- ⦿ Consider a diagnosis of epilepsy if a person has had at least 2 seizures in the last calendar year on two different days.
- ⦿ Seizures during an acute event (e.g. meningitis, acute traumatic brain injury) are not epilepsy.

#### Causes

- ⦿ Genetic, congenital malformation, birth asphyxia, brain tumour
- ⦿ Brain infections, cysticercosis, trauma (acute or in the past)
- ⦿ Metabolic disorders
- ⦿ In some cases, no specific causes can be identified.

## Clinical features

- Depending on the type of epilepsy:

TYPE OF EPILEPSY	DESCRIPTION
Generalized epilepsy	Seizure involves whole brain, consciousness is lost at the onset
Tonic Clonic (grand mal) or convulsive epilepsy	<ul style="list-style-type: none"><li>May commence with a warning sensation in the form of sound, light or abdominal pain (aura)</li><li>There may be a sharp cry followed by loss of consciousness and falling</li><li>Tonic contraction (rigidity) of muscles occurs followed by jerking movements (clonic phase)</li><li>There may be incontinence of urine or faeces, frothing, and tongue biting</li><li>A period of deep sleep follows</li></ul>
Absence seizures (petit mal)	<ul style="list-style-type: none"><li>Mainly a disorder of children</li><li>The attack is characterized by a brief loss of consciousness (5-10 seconds) in which posture is retained but other activities cease</li><li>The child has a vacant stare</li><li>Previous activities are resumed at the end of the attack</li><li>Several attacks may occur in a single day</li></ul>
Atonic or tonic seizures (drop attacks)	<ul style="list-style-type: none"><li>Sudden loss of muscular tone, of brief duration (15 seconds), with consciousness maintained or</li><li>Sudden stiffening of muscle</li></ul>
Myoclonus epilepsy	<ul style="list-style-type: none"><li>Abnormal jerking movements occurring usually in the limbs but may involve the whole body</li></ul>

TYPE OF EPILEPSY	DESCRIPTION
Focal Epilepsy	Seizure activity starts in one area of the brain
Simple	<ul style="list-style-type: none"> <li>Patient remains alert but has abnormal sensory, motor, psychic or autonomic manifestation e.g. jerking of a limb, déjà vu, nausea, strange taste or smell, signs of autonomic nerve dysfunction i.e. sweating, flushing, and gastric sensation, motor contraction or sensory change in a particular point of the body)</li> </ul>
Complex	<ul style="list-style-type: none"> <li>Altered awareness and behaviour e.g. confusion, repetitive movements</li> </ul>
Status epilepticus	<ul style="list-style-type: none"> <li>A convulsive state in which the convulsions last &gt;30 minutes or several epileptic convulsions occur in succession without recovery of consciousness in between or convulsions not responsive to 2 doses of diazepam. It is a medical emergency.</li> </ul>

### Differential diagnosis

- Syncope (fainting),
- Hypoglycaemia (low blood sugar)
- Hypocalcaemia (low blood calcium levels)
- Conversion disorder (previously known as hysteria)
- Hyperventilation (fast breathing) and Panic attacks

### Investigations

- A complete medical and mental health assessment
- Electroencephalogram (EEG)
  - Useful in petit mal and focal seizures
  - To be done at specialist level (RR and NR)
- Other investigations are guided by suspected cause



## Management

### General principles

- ⦿ All suspected cases of non-convulsive epilepsy should be confirmed and treated by a specialist
- ⦿ Convulsive epilepsy can be diagnosed at hospital/HC3 level but drug refills should be available at lower levels
- ⦿ One brief isolated seizure does not need further treatment but review at 3 months and re-assessment. Treat patients with repeated episodes as per definition
- ⦿ Treatment can effectively control epilepsy in most cases
- ⦿ Treatment should include psychological and social support
- ⦿ Start with a single anti-epileptic medicine
- ⦿ Start with low doses and increase gradually according to response
- ⦿ If a patient has been seizure free for 2 years, consider gradual stopping of medication

### Commonly used antiepileptics include:

- ⦿ Generalized tonic-clonic seizures
  - Children <2 years: phenobarbital or carbamazepine
  - Children >2 years: carbamazepine or valproate
- ⦿ Absence seizures: Valproate or ethosuximide
- ⦿ Caution: Avoid phenobarbital and phenytoin in children with intellectual disability and/or behavioural problems

## Management

TREATMENT	LOC
First aid for acute seizure <ul style="list-style-type: none"> <li>▶ DO NOT RESTRAIN or put anything in the mouth</li> <li>▶ Protect person from injury: make sure they are in a safe place away from fire or other things that might injure them</li> </ul>	HC2

## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li>▶ DO NOT leave patient alone. Seek help if possible</li> <li>▶ After the crisis, check airway, breathing and circulation and, while unconscious, put the person in recovery position (on their side)</li> <li>▶ Most seizures resolve spontaneously.</li> </ul>	HC2
<p>Status epilepticus</p> <ul style="list-style-type: none"> <li>▶ Dextrose 50% 1 mL/kg adults and Dextrose 10%</li> <li>▶ Give diazepam 10 mg IV or rectal 5 mL/kg children             <ul style="list-style-type: none"> <li>- Child: 0.05 mg/kg rectally, 0.02 mg/kg IV repeat dose after 5-10 min if seizures persist</li> </ul> </li> </ul> <p>If not responsive, consider</p> <ul style="list-style-type: none"> <li>▶ Phenobarbital 10-15 mg/kg slowly IV. Dilute the solution with 10 times its volume of water for injections and give VERY SLOWLY (at a rate <math>\geq 0.1</math> mg/minute)             <ul style="list-style-type: none"> <li>- Monitor BP and respiration, be ready to administer IV fluids if hypotension develops and ventilate with Ambu bag in case of respiratory depression</li> </ul> </li> <li>▶ Or phenytoin 15-18 mg/kg over 1 hour</li> <li>▶ Phenytoin can cause severe tissue damage so use a good IV line</li> </ul>	HC3
<p>If not responsive</p> <ul style="list-style-type: none"> <li>▶ Give another drug (if available) or add phenytoin 10 mg/kg in 30 minutes             <ul style="list-style-type: none"> <li>- Monitor for respiratory depression</li> </ul> </li> </ul>	



## Chronic epilepsy

TREATMENT	LOC
<p>General principles</p> <ul style="list-style-type: none"> <li>▶ Start with a single anti-epileptic medicine. The effective dose must be reached progressively and patient monitored for tolerance and side effects. Aim at the lowest dose able to control (prevent) the seizures</li> <li>▶ If treatment is ineffective (less than 50% reduction in crisis) try another monotherapy (slowly reduce the current anti-epileptic and introduce the new one)</li> <li>▶ If high doses with side effects are required and seizures are anyway infrequent, less than complete control can be the goal</li> <li>▶ Follow up monthly until stable, then every 3 months</li> <li>▶ Warn patient that treatment interruptions can trigger seizures or even status epilepticus</li> <li>▶ If no seizure for 2 years and no known cause like head trauma or infection, consider possibility of stopping treatment (over 2 months). Discuss with the patient</li> <li>▶ If 2 monotherapy trials fail, refer to specialist</li> </ul>	HC3
<p>Carbamazepine</p> <p>Effective in all generalized tonic-clonic seizures, focal seizures</p> <ul style="list-style-type: none"> <li>- Given twice daily, steady state reached in 8 days</li> <li>- Adult: starting dose of 100-200 mg daily and increased in 100 mg increments every 1-2 weeks to a maintenance dose of 400 to 1400 mg daily</li> <li>- Child: starting dose of 5 mg/kg/day and maintenance dose of 10-20 mg/kg/day in divided doses</li> </ul> <p>△ Side effects: skin rash, diplopia, blurred vision, ataxia (staggering gait), nausea</p>	HC4

## Chronic epilepsy

TREATMENT	LOC
<p><b>Phenobarbital</b></p> <p>Effective for tonic-clonic seizures and focal seizures but is sedative in adults and cause behavioural disturbances and hyperkinesia in children. It may be tried for atypical absences, atonic and tonic seizures</p> <ul style="list-style-type: none"> <li>- Given once a day in the evening to reduce drowsiness</li> <li>- Adult: starting dose of 1 mg/kg (60 mg) daily for 2 weeks, if not controlled increase to 2 mg/kg (120 mg) for 2 months, if not controlled increase to 3 mg/kg (180 mg)</li> <li>- Child: starting dose of 2 mg/kg/day for 2 weeks, if not controlled increase to 3 mg/kg for 2 months, if not controlled increase until maximum of 6 mg/kg/day</li> <li>- It takes 2-3 weeks for the drug to achieve steady blood levels so assess effect only after this period</li> </ul> <p>△ Side effects: drowsiness, lethargy, hyperactivity and irritability in children, skin rash, confusion in elderly, depression</p>	HC3
<p><b>Phenytoin</b></p> <p>Effective in all forms of epilepsy except absences.</p> <ul style="list-style-type: none"> <li>- Adult: starting dose of 150-200 mg daily as single dose or 2 divided doses and maintenance dose of 200-400 mg daily</li> <li>- Child: starting dose of 3-4 mg/kg and maintenance dose of 3-8 mg/kg/day (max 300 mg daily)</li> <li>- Increase slowly by 25-30 mg every 2 weeks</li> </ul> <p>△ Side effects: drowsiness, ataxia, slurred speech, blurred vision, twitching, confusion, gum hyperplasia, blood abnormalities, rash, hepatitis</p>	



TREATMENT	LOC
<p>Ethosuximide</p> <p>Effective in absence seizures.</p> <ul style="list-style-type: none"> <li>- Child &gt;6 years: initially 500 mg daily in 2 divided doses, increase if necessary by 250 mg every 5-7 days up to a usual daily dose of 1-1.5 g in 2 divided doses</li> <li>- Child 1 month to 6 years: Initially 250 mg single dose at night increased gradually every 5-7 days as required to usual dose of 20 to 40 mg/kg daily in 2 divided doses</li> </ul> <p>△ Side effects: gastrointestinal disorders, blood disorders, gum hyperplasia, drowsiness</p>	RR

### Note

- In children, look for presence of associated intellectual disability or behavioural problems. If present, consider carbamazepine or valproate. (avoid phenobarbital and phenytoin) and manage associated intellectual disability or behavioural problem
- All pregnant women with epilepsy should be referred to specialist for appropriate management (most)

### Health education

- Health/psycho-education to patients, carers and community
- Advice on management of seizures and safety precautions
- In children, look for and manage presence of associated intellectual disability or behavioural problems

### Prevention

- Good antenatal care and delivery
- Avoid causative factors

## 9.1.2 Nodding Disease

ICD10 CODE: G40.4

An unexplained neurologic condition characterized by episodes of repetitive dropping forward of the head, often accompanied by other seizure-like activity, such as convulsions or staring spells.

The condition predominantly affects children aged 5–15 years and has been reported in South Sudan from the states of Western and Central Equatorial, northern Uganda and southern Tanzania.

### Cause

Not yet certain but consistent association with onchocerciasis has been found

**Other associated factors:** malnutrition, pyridoxine deficiency

### Clinical features

- ⦿ Starts at age 5-7 years in previously normal child
- ⦿ Early symptoms: problems in concentration and thinking
- ⦿ Then “nodding” starts, which is a type of seizure (tonic seizures) often triggered by eating or cold temperatures
- ⦿ Cognitive impairment appears
- ⦿ Neurological deterioration, delayed puberty and growth retardation progresses until the child becomes mentally and physically disabled

### Investigations

- ⦿ No diagnostic investigations have been identified

#### Chronic epilepsy

TREATMENT	LOC
▶ Supportive ▶ Antiepileptic drugs as above (valproate and phenobarbital)	HC4

### 9.1.3 Headache ICD10 CODE: R51

Common complaint and cause of disability. Pain can be of varying intensity and affect different areas of the head.

#### Causes

- Ⓐ Facial and frontal headache: sinusitis, eye problems, oropharyngeal disorders
- Ⓑ Temporal headache: severe hypertension, stress, ear disorders, subarachnoid haemorrhage
- Ⓒ Top of the head: stress, tension
- Ⓓ Unilateral (one sided): migraine
- Ⓔ Whole head: malaria, meningitis, severe hypertension, dehydration
- Ⓕ Back of the head (occiput and neck): meningitis, malaria, refractive eye problems, neck trauma or sprain, tension

#### Danger signs

Sign Or Symptom	Possible Cause
Recent trauma to the head	Intracranial bleeding
Head injury	
High fever	Malaria Meningitis
Other infections	
Acute onset, severe	Intracranial bleeding
Chronic worsening headache	Tumours, hypertension
Altered consciousness and/or focal neurological symptoms and/or seizure	Tumour, intracranial bleeding, intracranial infection

TREATMENT	LOC
<ul style="list-style-type: none"> <li>▶ Investigate and treat cause if found/possible</li> <li>▶ If any danger signs, refer to hospital for further assessment</li> <li>▶ Follow pain ladder for control of symptoms</li> </ul>	HC2

### 9.1.3.1 Migraine

ICD10 CODE: G43

Periodic severe headache, usually unilateral, which may occur with or without an aura (neurological warning signs) and associated with nausea and/or vomiting

#### Causes

The cause is unknown but thought to be linked to:

- Ⓐ Familial factors
- Ⓐ Craniovascular disorders, which can be precipitated by: stress, anxiety, menstruation, flashing lights, hunger, lack of sleep, oestrogens (in COC), perfumes, tyramine-containing foods e.g. red wine, cheese, chocolate
- Ⓐ Clinical features
- Ⓐ Warning signs (aura): visual or sensory symptoms (flashing lights) preceding the start of the headache
- Ⓐ Migraine with warning signs is called migraine with aura. They are not always present
- Ⓐ Moderate to severe episodic unilateral headache throbbing (pulsating)
- Ⓐ Nausea and vomiting, sensitivity to light and sound

#### Differential diagnosis

- Ⓐ Any cause of headache
- Ⓐ Conversion disorder (hysteria)

## Investigations

- No specific investigations needed except if another cause is suspected

TREATMENT	LOC
Treatment of acute episode ▶ Paracetamol 1 g every 6 hours ▶ Or Ibuprofen 400 mg every 6-8 hours ▶ Or Acetylsalicylic acid 300-900 mg every 4-6 hours (max 4 g daily)	HC2
If severe and/or not responding to the above treatment ▶ Diclofenac 75 mg IM - Plus metoclopramide 10 mg IM /IV for the nausea and vomiting ▶ Or ergotamine 2 mg sublingual, then 1-2 mg hourly to a max of 6 mg in 24 hours ▶ Or Sumatriptan 50 mg, repeat after 2 hours if necessary, max 300 mg in 24 hours	HC4 RR
Prophylaxis: in case of >3 attacks/month and/or functional impairment ▶ Amitriptyline 10-75 mg nocte or ▶ Propranolol 40-80 mg every 12 hours	HC3 HC4

## Prevention

- Avoid precipitating factors

### 9.1.4 Dementia ICD10 CODE: F01, F03

A chronic slowly progressive organic mental disorder characterised by progressive loss of memory and cognitive function, with difficulty in carrying out everyday activities.

## Causes

- Primary degeneration of the brain
- Vascular disorders
- Infections e.g. syphilis, TB, HIV/AIDS, meningitis
- Metabolic disorders e.g. hypothyroidism
- Deficiencies of vitamin B12 and B1
- Brain trauma (chronic subdural haematoma, hydrocephalus)
- Toxic agents e.g. carbon monoxide, alcohol

## Clinical features

- Impairment of short and long-term memory
- Impaired judgment, poor abstract thinking
- Language disturbances (aphasia)
- Personality changes: may become apathetic or withdrawn, may have associated anxiety or depression because of failing memory, may become aggressive
- Wandering and incontinence in later stages

## Differential diagnosis

- Normal aging
- Delirium, chronic psychosis, depression

## Investigations

- Guided by history and clinical picture to establish cause
- Thorough physical, neurologic and mental state examination
- Laboratory: thyroid hormones, RPR and vitamin B12 levels, other tests as indicated

TREATMENT	LOC
<ul style="list-style-type: none"> <li>▶ Where possible, identify and treat the cause</li> <li>▶ Psychosocial interventions:           <ul style="list-style-type: none"> <li>- psychoeducation of family members about the illness and about following a regular routine programme</li> <li>- provision of regular orientation information</li> <li>- creation of an environment to support activities of daily living</li> </ul> </li> <li>▶ Assess for and treat other co-occurring health problems e.g. depression, HIV</li> </ul>	HC2
<ul style="list-style-type: none"> <li>▶ Donepezil 5mg once daily initially, can increase to 10mg after 4-6 weeks</li> <li>▶ Alternatively; Memantine 10mg once daily initially, can increase to 20mg after 4-6 weeks</li> </ul> <p>Preferably at bed time</p> <p>Note: These medicines only slow progression of symptoms but not cure dementia.</p> <p>If restless and agitated</p> <ul style="list-style-type: none"> <li>▶ Haloperidol 0.5-1 mg every 8 hours with higher dose at night if required</li> </ul> <p>Alternatively; Risperidone 0.5-1 mg once daily, preferably at night.</p> <ul style="list-style-type: none"> <li>- Adjust dose according to response and review regularly, monitor for and treat extrapyramidal side effects with Benhexol 2 mg every 12 hours if necessary</li> </ul>	H HC4
<p>Caution</p> <p>△ Avoid Diazepam: it can lead to falls and is often not effective</p>	

## Caution

- Ⓐ Avoid Diazepam: it can lead to falls and is often not effective
- Ⓐ Prevention
- Ⓐ Avoid and treat preventable causes

### 9.1.5 Parkinsonism ICD10 CODE: G20, G21

A syndrome characterized by tremor, rigidity, bradykinesia (slow movement) and postural disturbances, due to primary degeneration or damage to particular areas of the brain (basal ganglia).

#### Causes

##### Primary Parkinsonism:

- Ⓐ Cause is unknown

##### Secondary Parkinsonism:

- Ⓐ Infections e.g. sleeping sickness, syphilis
- Ⓐ Poisoning e.g. manganese, carbon monoxide
- Ⓐ Drugs e.g. chlorpromazine, haloperidol
- Ⓐ Vascular disorders, intracranial tumour, trauma

#### Clinical features

- Ⓐ Non intentional tremor
- Ⓐ Muscle rigidity
- Ⓐ Slowness of voluntary movement
- Ⓐ Walking with short quick steps (shuffling gait)
- Ⓐ Vacant facial expression (mask face)



- Excessive salivation
- Urinary incontinence (sometimes occurs)
- Variable cognitive impairment

### Differential diagnosis

- Essential tremor (isolated intentional tremor, benign)
- Thyrotoxicosis
- Dementia, depression

### Investigations

- Good history and clinical examination

### Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li>▶ Levodopa-carbidopa 10/100 mg. The dose can increased to 25/100mg</li> <li>▶ Start with 1 tablet every 8 hours (specialist only management)</li> </ul> <p>Only for drug-induced parkinsonism</p> <ul style="list-style-type: none"> <li>▶ Benhexol 2-15 mg daily in 1-3 divided doses           <ul style="list-style-type: none"> <li>- Initially: 1 mg/day; increase by 2 mg increments at intervals of 3 to 5 days</li> <li>- Usual dose: 6 to 10 mg/day in 3 to 4 divided doses; doses of 12 to 15 mg/day may be required</li> </ul> </li> </ul>	RR HC2
<p>Caution</p> <ul style="list-style-type: none"> <li>△ Benhexol side effects: dry mouth, constipation, palpitations, urinary retention, confusion and agitation (especially in the elderly)</li> <li>△ Do not give benhexol routinely to patients on antipsychotic medicines in the absence of Parkinson-like</li> </ul>	

## 9.1.6 Delirium (Acute Confusional State) F05

ICD10 CODE:

A clinical syndrome usually with acute onset, which involves abnormalities in thought and perception and fluctuating level of consciousness. It is caused by impaired brain function resulting from diffuse physiological change.

### Causes

- ⦿ Infections e.g. malaria, trypanosomiasis, syphilis, meningitis, rabies, typhoid fever, HIV/AIDS
- ⦿ Pneumonia and urinary tract infections in elderly
- ⦿ Intoxication with or withdrawal from alcohol or other substances of dependence
- ⦿ Some medicines e.g. anticonvulsants and neuropsychiatric medications
- ⦿ Cerebral pathology e.g. head trauma, tumour
- ⦿ Severe anaemia, dehydration
- ⦿ Electrolyte imbalances, hyperglycemia

### Clinical features

- ⦿ Acute onset of mental confusion with associated disorientation, developing within hours or a few days. Attention, concentration and memory for recent events is impaired
- ⦿ Reduced ability to think coherently: reasoning and problem solving are difficult or impossible
- ⦿ Illusions and hallucinations are common
- ⦿ Symptoms tend to fluctuate: patients feel better in the day and worse at night
- ⦿ Some patients may present with reduced activity and/or movement (hypactive delirium)



## Differential diagnosis

Acute psychosis

## Investigations

- ⦿ Guided by history and physical examination: aim at identifying the cause

NB: drug history is very important!

- ⦿ CBC, blood glucose, RDT, renal function and electrolytes

## Management

Due to the complexity of underlying conditions, patients with acute confusional state should be referred to hospital for appropriate management and investigation.

### Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li>▶ Identify and treat the cause such as substance and alcohol use disorders, diabetes, head injury or infections e.g. malaria, UTI, pneumonia in older people</li> <li>Supportive treatment</li> <li>▶ Ensure hydration, control of fever, safe and quiet environment, constant monitoring</li> <li>▶ Withhold any unnecessary medicines, keep the use of sedatives and antipsychotics to the minimum necessary</li> </ul>	H
If patient is agitated and acutely disturbed <ul style="list-style-type: none"> <li>▶ Haloperidol 5 mg IM: repeat after 60 min if necessary <ul style="list-style-type: none"> <li>- Continue with haloperidol 1.25-5 mg every 8 to 12 hours</li> </ul> </li> <li>▶ Or chlorpromazine 25-50 mg every 8-12 hours (IM or oral)</li> <li>▶ Trifluoperazine 5-10 mg every 12 hours</li> </ul>	

## Prevention

- ⦿ Early diagnosis and treatment of underlying cause

# 9.2 PSYCHIATRIC AND SUBSTANCE USE DISORDERS

## 9.2.1 Anxiety ICD10 CODE: F40-F48

Anxiety is a normal physiological response, which enables a person to take steps to deal with a threat. When anxiety is prolonged or interferes with normal functions of the individual, it constitutes the clinical condition of an anxiety disorder.

### Causes

- ⦿ Not fully understood: possibly external traumatic events may trigger anxiety in predisposed people
- ⦿ Association with other mental conditions e.g. depression, alcohol and substance abuse

### Types and clinical features

- ⦿ Generalized anxiety: Unrealistic and excessive worry about almost everything
- ⦿ Panic attacks: Episodes of sudden onset of intense apprehension or fear; anxiety symptoms usually peak within 10-15 minutes and resolve in a few minutes to one hour
- ⦿ Phobia: An excessive fear of a known stimulus (object or situation) e.g. animals, water, confined space) causing the person to consciously avoid the object or situation

Each of the above clinical types will have one or more of the following manifestations:

- ⦿ Sleep, mood and concentration problems

- Palpitations, dizziness, shortness of breath
  - Shakiness or tremors, excessive sweatiness
  - Easily frightened
  - Other symptoms: urinary frequency, hesitancy, or urgency, diarrhoea

## Differential diagnosis

- Consider organic conditions e.g. hyperthyroidism, hypoglycaemia, phaeochromocytoma

Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li>▶ Psychosocial interventions: counselling, psychotherapy (individual and group psychotherapy)</li> </ul> <p>For an acute episode or intense prolonged anxiety</p> <ul style="list-style-type: none"> <li>▶ Benzodiazepines e.g. diazepam 5 mg 1-2 times daily           <ul style="list-style-type: none"> <li>- Increase if necessary to 15-30 mg daily in divided doses</li> </ul> </li> </ul> <p>Elderly: Alprazolam 0.25mg -0.5mg twice daily initially, Increase if necessary to 3-6 mg daily in divided doses.</p> <p>If alprazolam is not available, Give half the above dose of diazepam</p> <ul style="list-style-type: none"> <li>- Duration of therapy 1-2 weeks, tapering off to zero within 6 weeks</li> </ul> <p>If poor response: refer to specialist</p> <ul style="list-style-type: none"> <li>▶ Fluoxetine 20 mg once a day for long term management of the anxiety disorder</li> </ul> <p>Or Sertraline 50mg once daily</p> <ul style="list-style-type: none"> <li>- Continue antidepressant for 4 to 6 weeks then evaluate the response</li> </ul>	HC2
	HC4

### Caution

- △ Diazepam is addictive and abrupt cessation can cause withdrawal symptoms. Use for short periods and gradually reduce the dose. Avoid alcohol

### Notes

- Diazepam is NOT appropriate for treating depression, phobic or obsessional states, or chronic psychoses (see relevant sections 9.2.2 for more information)
- Antidepressants: May be useful in managing panic disorders and other anxiety disorders which require long term treatment

### Prevention

- Good personality development
- Good stress management

## 9.2.2 Depression ICD10 CODE: F32, F33

A common disorder characterised by low mood, loss of interest and enjoyment and reduced energy leading to diminished activity and in severe forms, difficult day-to-day functioning.

### Causes

- Biological, genetic, and environmental factors

### Clinical features

For at least two weeks, the person had at least two of the symptoms below:

- Low mood (most of the day, almost every day)
- Loss of interest or pleasure in activities that are normally pleasurable



- Associated lack of energy, body weakness or easily fatigued
- During the 2 weeks, the person also has some of the symptoms below:
- Difficulty in concentrating, reduced attention
- Reduced self-esteem and self confidence
- Poor sleep, poor appetite, reduced libido
- Bleak and pessimistic view of the future
- Feeling of guilt and unworthiness
- Multiple body pains or other medically unexplained somatic symptoms
- Ideas or acts of self harm or suicide (occurs in up to 65% of patients)
- Children and adolescents usually present with irritability, school phobia, truancy, poor academic performance, alcohol and drug abuse

### Differential diagnosis

- Thyroid dysfunction (hypothyroidism)
- Adrenal dysfunction (Addison's disease)
- Parkinson's disease, stroke, dementia
- Anxiety disorder

### Investigations

- Medical, social and personal history
- Check for bereavement or other major personal loss
- Find out if person has had an episode of mania in the past: if so consider treatment for bipolar disorder and consult a specialist
- Find out if they have psychotic features e.g. hallucinations (refer to section 9.2.4 on Psychosis)
- Assess for co-occurring health conditions (e.g. HIV/AIDS), substance or alcohol abuse
- Assess risk of self-harm/suicide

## Management

TREATMENT	LOC
<p>First line</p> <ul style="list-style-type: none"> <li>▶ Psychological therapy (Individual or group psychotherapy) is first line for mild cases:           <ul style="list-style-type: none"> <li>- Psychoeducation (counselling of patient and family)</li> <li>- Addressing current stressors (abuse, neglect...)</li> <li>- Re activating social networks</li> <li>- Structured physical activities</li> <li>- Regular follow up</li> </ul> </li> <li>▶ Manage concurrent physical medical problems</li> <li>▶ Address co-existing mental problems e.g. substance abuse</li> <li>▶ If available, consider psychotherapy (cognitive behavioural therapy, interpersonal psychotherapy, behavioural activation etc)</li> </ul> <p>If bereavement or another major personal loss</p> <ul style="list-style-type: none"> <li>- ▶ Counselling and support</li> <li>- ▶ Do not consider drugs or psychotherapy as first line</li> </ul>	
<ul style="list-style-type: none"> <li>- If not responding to all above</li> </ul> <p>▶ Consider antidepressant</p> <ul style="list-style-type: none"> <li>- DO NOT use in children &lt;12 years</li> <li>- Adolescents: only under specialist supervision</li> </ul> <p>▶ Fluoxetine 20 mg once daily in the morning</p> <ul style="list-style-type: none"> <li>- Start with 10 mg in elderly</li> <li>- If not better after 4-6 weeks, increase to 40 mg</li> </ul> <p>▶ Or Amitriptyline 50 mg at bedtime</p> <ul style="list-style-type: none"> <li>- Increase by 25 mg every week aiming at 100-150 mg in divided doses or single bedtime dose by 4-6 weeks of treatment</li> </ul>	HC4 RR H

## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li>- weeks of treatment</li> <li>- Useful in case of associated anxiety</li> <li>- Avoid in adolescents, elderly, heart diseases, suicide risks</li> <li>- Or Venflaxine 37.5 mg given in the morning or evening</li> <li>- Increase dose to 75mg per day divided 8-12 hourly</li> </ul>	HC4 RR H
<ul style="list-style-type: none"> <li>- Maintenance dose is 75 to 225 mg once a day</li> <li>- Maximum dose is 375mg; Useful in the patients with comorbid anxiety disorders.</li> <li>- Or Sertaline 50mg per day; preferred for patients on other medicines due to its low potential for drug interactions and for breast feeding mothers, may increase dose by 25mg at weekly intervals</li> <li>- Do not exceed 200mg per day</li> <li>- Or Escitalopram 10mg, may increase dose to 20mg per day.</li> <li>- Or Bupropion 150 mg/day PO for those than cannot tolerate SSRIs and with comorbid Nicotine use disorder. Titrate to 150-450 mg/day based on tolerability and efficacy; may administer in divided doses</li> </ul>	H RR RR
If patient responding to medication <ul style="list-style-type: none"> <li>▶ Continue for at least 9-12 months</li> <li>▶ Consider stopping if patient has been without depressive symptoms and able to carry out normal activities for at least 9 months               <ul style="list-style-type: none"> <li>- Counsel the patient about withdrawal symptoms</li> <li>- (dizziness, tingling, anxiety, irritability, nausea, headache, sleep problems)</li> </ul> </li> </ul>	

## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li>- Counsel the patient about possibility of relapse and when to come back</li> <li>- Reduce slowly over at least 4 weeks even slower if withdrawal symptoms are significant</li> <li>- Monitor periodically for re-emergence of symptoms</li> </ul> <p>In case of pregnant woman, child, adolescent, patients not responding to treatment with antidepressant, psychotic features, history of mania</p> <p>► Refer for specialist management</p>	
<p>Caution</p> <p>△ SSRI in bipolar depression can trigger a manic</p>	

## Prevention

- ① Stress management skills
- ② Promotion of useful social support networks

### 9.2.2.1 Postnatal Depression

Refer to section 16.6.2

### 9.2.2.2 Suicidal Behaviour/Self Harm ICD10 CODES: T14.91, Z91.5

Suicidal behaviour is an emergency and requires immediate attention. It is an attempted conscious act of self-destruction, which the individual concerned views as the best solution. It is usually associated with feelings of hopelessness, helplessness and conflicts between survival and death.

Self-harm is a broader term referring to intentional poisoning or self-inflicted harm, which may or may not have an intent of fatal outcome.



## Causes/risk factors

- ⦿ Physical illness e.g. HIV/AIDS, head injury, malignancies, body disfigurement, chronic pain
- ⦿ Psychiatric disorders e.g. depression, chronic psychosis, dementia, alcohol and substance use disorders, personality disorders, epilepsy

## Risk is high in the following cases:

- ⦿ Patient >45 years old
- ⦿ Alcohol and substance use
- ⦿ History of suicide attempts
- ⦿ Family history of suicide
- ⦿ History of recent loss or disappointment
- ⦿ Current mental illness e.g. depression, psychosis
- ⦿ Evidence of violent behaviour or previous psychiatric admission

Risk may be low if patient is

- ⦿ <45 years old
- ⦿ Married or in stable interpersonal relationships
- ⦿ Employed
- ⦿ In good physical health

## Clinical features

Patients can present in one of the following situations:

- ⦿ A current suicide attempt or self harm
- ⦿ A situation of imminent risk of suicidal attempt or self harm:
  - Current thoughts or plans of suicide/self harm or history of thoughts or plans of suicide/self harm in the last 1 month,

- or acts of self harm/suicide attempts in the last 1 years plus
- Person is agitated, violent, emotionally distressed or uncommunicative and socially isolated, hopeless
- ⦿ A situation of no imminent risk but
- Thoughts or plans of suicide/self harm in the last 1 month or acts of self/harm/suicide attempt in the last one year in person not acutely distressed

## Investigations

- ⦿ Complete medical, social and family history
- ⦿ Ask the patient about suicidal or self harm thoughts/plans/ acts and reasons for it
- ⦿ Asking about self harm or suicide does not increase the risk of those acts. On the contrary, it may help the patient to feel understood and considered. First try to establish a good relationship with the patient before asking
- ⦿ Always assess risk of suicide and self-harm in patient
- ⦿ With any other mental illness (depression, mania, psychosis, alcohol and substance abuse, dementia, behavioural or development disorders)
- ⦿ Chronic pain, severe emotional distress

## Management

TREATMENT	LOC
If acute suicidal behaviour/act of self harm or imminent risk <ul style="list-style-type: none"> <li>▶ Admit the patient and treat any medical complications (bleeding, poisoning etc.)</li> <li>▶ Keep in a secure and supportive environment               <ul style="list-style-type: none"> <li>- Do not leave patient alone</li> <li>- Remove any means of self-harm</li> </ul> </li> <li>▶ Continuous monitoring</li> <li>▶ Offer/activate psychosocial support</li> <li>▶ Consult mental health specialist</li> <li>▶ Treat any medical and mental condition present</li> </ul>	HC4
If no imminent risk <ul style="list-style-type: none"> <li>▶ Offer/activate psychosocial support</li> <li>▶ Refer to mental health specialist for further assessment</li> <li>▶ Establish regular follow up</li> </ul>	

TREATMENT	LOC
<b>Note</b> <ul style="list-style-type: none"> <li>▪ Suicide is less frequent in children and adolescents, but there is increased risk if there is disturbed family background (e.g. death of parents, divorce), use of alcohol and other drugs of abuse, physical illness, psychiatric disorder</li> </ul>	

### 9.2.3 Bipolar Disorder (Mania) ICD10 CODE: F30, F31

A disorder of mood control characterized by episodes in which the person's mood and activity level are significantly disturbed: in some occasions, there is an elevation of mood and increased energy and activity (mania) and in other occasions, there is a lowering of mood and decreased energy and activity (depression). Characteristically, recovery is complete in between the episodes.

#### Causes

- ⦿ Biological, genetic, environmental factors

#### Clinical features

Patient can present in an acute manic episode, in a depressive episode or in between the episodes.

#### Mania

- ⦿ Elevated, expansive or irritable moods and increased activity or subjective experience of increased energy
- ⦿ Increased talkativeness
- ⦿ Flight of ideas
- ⦿ Increased self-image, self-esteem or grandiosity,
- ⦿ Decreased need for sleep
- ⦿ Distractibility
- ⦿ Impulsive reckless behavior, extravagancy, partying and, increased
- ⦿ Increased sexual drive, sociability and goal directed behaviour

- Increased appetite but weight loss occurs due to over- activity
- Auditory and visual hallucinations may be present

### Depression

- As for depression described above, but with a history of manic episode
- High index of suspicion for bipolar in early onset depression with family history of bipolar illness
- Differential diagnosis
- Organic mental states e.g. drug or alcohol intoxication, delirium
- Chronic Psychosis

### Investigations

- Good medical, social and personal history
- Assess for acute state of mania
- If depressive symptoms, investigate for previous manic episodes
- Assess for other medical or mental conditions (alcohol or substance abuse, dementia, suicide/self harm)

### Management

Patients with suspected bipolar disorder should be referred for specialist assessment

#### Management

TREATMENT	LOC
Manic episode Multiple symptoms as above for > 1 week and severe enough to interfere with work/social activities and/or requiring hospitalization	HC3 HC4 H



## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li>▶ Assess risk to self and others</li> <li>Discontinue antidepressant if any</li> <li>▶ Provide counseling and education</li> <li>▶ Chlorpromazine initially 100-200 mg every 8 hours, then adjust according to response <ul style="list-style-type: none"> <li>- Daily doses of up to 300 mg may be given as a single dose at night</li> <li>- Gradually reduce the dose when symptoms of mania resolve and maintain on doses as indicated in section 9.2.4 on Chronic psychosis</li> </ul> </li> <li>▶ Or haloperidol initially 5-10 mg every 12 hours then adjust according to response <ul style="list-style-type: none"> <li>- Up to 30-40 mg daily may be required in severe or resistant cases</li> </ul> </li> <li>▶ Or trifluoperazine initially 5-10 mg every 12 hours then adjust according to response <ul style="list-style-type: none"> <li>- Up to 40 mg or more daily may be required in severe or resistant cases</li> <li>- Or Olanzapine 10-15 mg/day initially; may adjust to 20mg according to response</li> <li>- Or Risperidone 2-3mg initially, may increase to 6mg in over 3 weeks according to response.</li> </ul> </li> </ul>	HC3 HC4 H
If under specialist supervision: initiate a mood stabilizer	H
<ul style="list-style-type: none"> <li>▶ Carbamazepine initial dose 200 mg at night, increase slowly to 600-1000 mg/day in divided doses</li> <li>▶ Or Valproate initial dose of 500 mg/day. Usual maintenance dose 1000-2000 mg</li> </ul>	RR
Or Lithium 900-1800mg/day in two divided doses (RR)	RR

Management		
TREATMENT	LOC	
<p><b>Note</b></p> <p>Serum lithium should be monitored 12 hours after dose, twice weekly until serum concentration and clinical condition stabilize, and every 3 months thereafter.</p> <p>Increase dose as tolerated to target serum lithium concentrations of 0.8-1.2 mEq/L.</p> <p>Monitor Wt, BP, PR, Lipid profile and LFTs. Do RFTS, TSH and Ca levels for those on Lithium</p>		
<p>If agitation/restlessness, add a benzodiazepine for short period (until symptoms improve)</p> <ul style="list-style-type: none"> <li>▶ Diazepam 5-10 mg every 12 hours</li> </ul> <p>Zuclopentixol acetate 50-100 mg given 48-72 hours if available</p>	HC2	
<p><b>Note</b></p> <ul style="list-style-type: none"> <li>▪ If extrapyramidal side-effects (muscle rigidity, dripping of saliva, tongue protrusion, tremors) are present while on antipsychotic drugs</li> <li>- Add an anticholinergic: Benhexol initially 2 mg every 12 hours then reduce gradually to once daily and eventually give 2 mg only when required</li> </ul> <p><b>DO NOT INITIATE LITHIUM AND VALPROATE AT LOWER CENTRE EXCEPT AS CONTINUATION</b></p> <p>REFER if poor response, poor adherence, pregnant, side effects, underlying physical or mental comorbidity</p>		
<p>Bipolar depression</p> <p>Depressive symptoms but with history of manic episode/diagnosis of bipolar disorder</p> <ul style="list-style-type: none"> <li>▶ Counsel about bipolar disorder</li> </ul>		

TREATMENT	LOC
<p>Psychological support for mild depression otherwise refer for specialist care</p> <ul style="list-style-type: none"> <li>▶ If on olanzapine, add fluoxetine or give quetiapine alone. If not available</li> <li>▶ Begin treatment with a mood stabilizer (carbamazepine or valproate, see above)</li> <li>▶ Psychoeducation and psychotherapy if available</li> <li>▶ If moderate/severe depression, consider treatment with antidepressant in addition to mood stabilizer BUT under specialist supervision (there is risk of triggering a manic episode)</li> </ul>	
<p>In between episodes</p> <p>Indication for use of mood stabilizers to prevent both manic and depressive episodes</p> <ul style="list-style-type: none"> <li>- 2 or more episodes (2 manic or 1 manic and 1 depressive)</li> <li>- 1 severe manic episode involving significant risk and consequences</li> </ul> <ul style="list-style-type: none"> <li>▶ Valproate (or carbamazepine) as above or lithium at higher levels.</li> </ul> <p>Provide psychoeducation and support</p>	
<p>Caution</p> <ul style="list-style-type: none"> <li>△ Avoid mood stabilizers in pregnant women. Use low dose haloperidol if necessary</li> <li>△ Use lower doses in elderly</li> <li>▶ Refer adolescents for specialist management</li> </ul>	

## Prevention

- Ⓐ Information and support
- Ⓐ Self management techniques
- Ⓐ Adherence to care
- Ⓐ Good psychosocial support

## 9.2.4 Psychosis ICD10 CODE: F20-F29

A mental condition characterized by distortions of thinking and perception, as well as inappropriate or narrowed range of emotions.

### Causes

- Not known, but there are associated biological, genetic and environmental factors

### Clinical features

Any one or more of these may be diagnostic:

- Delusions (abnormal, fixed, false beliefs) or excessive and unwarranted suspicions (may be multiple, fragmented or bizarre)
- Disconnected ideas with vague or incoherent speech and inadequate in content
- Hallucinations: hearing voices or seeing things that are not witnessed by others
- Severe behaviour abnormalities: agitation or disorganized behaviour, excitement, inactivity or overactivity
- Disturbance of emotions such as marked apathy or disconnection between reported emotions and observed effect
- Mood is usually inappropriate
- Difficulty in forming and sustaining relationships
- Social withdrawal and neglect of usual responsibilities

### Chronic psychosis or schizophrenia

- Symptoms of psychosis lasting for 3 or more months
- Accompanied by deterioration in social, general and occupational functioning

### Differential diagnosis

- Alcohol and drug intoxication or withdrawal
- Organic delirium, dementia, mood disorders



## Investigations

- Good social, personal and family history
- Laboratory investigations for infectious diseases e.g. HIV,

## Management

TREATMENT	LOC
- Acute psychosis	HC2
▶ Counselling/psychoeducation of patient and carers	HC4
- Antipsychotic drugs	H
▶ Chlorpromazine: starting dose 75-150 mg daily and maintenance dose of 75-300 mg daily. Up to 1000 mg daily in divided doses may be required for those with severe disturbance	H
▶ Or Haloperidol: starting dose 5-10 mg daily	NR
- (Lower in elderly) and maintenance dose of 5-20 mg daily in divided doses	NR
- Or Olanzapine 5-10 mg daily, maintenance dose is 10-20mg/day	NR
- Or Risperidone 2 mg initially, may increase to 8 mg/day in divided.	NR
- Or Quetiapine 150-750mg/day twice daily	
- Or For treatment resistant schizophrenia, Clozapine 25-50mg/day initially, if well tolerated titrate to 450mg per day in two weeks depending on response	
▶ Administer orally or IM for those with agitation	RR
▶ Only use one antipsychotic at a time	
▶ Gradually adjust doses depending on response	
▶ Monitor for side effects e.g. extrapyramidal side effects	
▶ Use therapeutic dose for 4-6 weeks to assess effect	
▶ Psychological interventions (family therapy or social skills therapy) if available	
▶ Ensure follow up	

TREATMENT	LOC
<ul style="list-style-type: none"> <li>▶ For acute psychosis, continue treatment for at least 12 months. Discuss discontinuation with patient, carergivers and specialist</li> </ul>	RR
<p>If extrapyramidal side-effects</p> <ul style="list-style-type: none"> <li>▶ Add an anticholinergic: Benhexol initially 2 mg every 12 hours then reduce gradually to once daily and eventually give 2 mg only when required</li> </ul> <p>If no response</p> <ul style="list-style-type: none"> <li>▶ Refer to specialist</li> </ul>	HC2
<p>Chronic psychosis</p> <p>Treat as above, but if adherence is a problem or the patient prefers, use:</p> <ul style="list-style-type: none"> <li>▶ Fluphenazine decanoate 12.5-50 mg every 2-5 weeks deep IM into gluteal muscle</li> <li>▶ Or Haloperidol injection (oily) 50-200 mg (300 mg) deep IM into gluteal muscle every 3-4 weeks OR Zuclopentixol decanoate 200-500mg every 4 weeks depending on response</li> </ul> <p>Psychosocial support for long term care</p>	<p>HC4</p> <p>RR</p>

### 9.2.4.1 Postnatal Psychosis      ICD10 CODE: F53 Postpartum

psychosis is the most severe form of postpartum psychiatric illness.

#### Causes

- ⌚ Not well known, but hormonal changes may have a role

#### Predisposing factors

- ⌚ First child
- ⌚ Previous episode of post-natal psychosis
- ⌚ Previous major psychiatric history



- ⦿ Family history of mental illness
- ⦿ Inadequate psychosocial support during pregnancy
- ⦿ Infections in early puerperium

### Clinical features

- ⦿ Symptoms develop within the first 2 postpartum weeks (sometimes as early as 48-72 hours after delivery)
- ⦿ The condition resembles a rapidly evolving manic or mixed episode with symptoms such as restlessness and insomnia, irritability, rapidly shifting depressed or elated mood and disorganized behavior
- ⦿ The mother may have delusional beliefs that relate to the infant (e.g. the baby is defective or dying, the infant is Satan or God) or she may have auditory hallucinations that instruct her to harm herself or her infant
- ⦿ The risk for infanticide and suicide is high

### Differential diagnosis

- ⦿ Depression with psychotic features
- ⦿ Mania, chronic psychosis

### Investigations

- Good history, physical and psychiatric assessment

### Management

TREATMENT	LOC
<ul style="list-style-type: none"><li>► It is a psychiatric emergency: admit to hospital</li><li>► Treat any identifiable cause/precipitant e.g. infection</li><li>► Haloperidol 10 mg or Chlorpromazine 200 mg [Intramuscular Injection or tablets} every 8 or 12 hours. Monitor response to medication and adjust dosage accordingly</li><li>► If restless and agitated, add rectal or I.V</li></ul>	H

TREATMENT	LOC
<ul style="list-style-type: none"> <li>▶ Diazepam 5-10 mg slow infusion; repeat after 10 minutes if still agitated           <ul style="list-style-type: none"> <li>- Continue with diazepam tablet 5 mg every 12 hours until calm</li> </ul> </li> <li>▶ Refer to specialist</li> </ul>	H

### Notes

- Post-natal psychoses are no different from other similar psychoses, give concurrent psychosocial interventions and drug therapy

### Prevention

- Proper antenatal screening, good psychosocial support
- Early detection and treatment
- Adherence to treatment for a current mental illness e.g depression, bipolar, chronic psychosis

## 9.2 PSYCHIATRIC AND SUBSTANCE USE DISORDERS

### 9.2.1 Anxiety ICD10 CODE: F40-F48

Anxiety is a normal physiological response, which enables a person to take steps to deal with a threat. When anxiety is prolonged or interferes with normal functions of the individual, it constitutes the clinical condition of an anxiety disorder.

#### Causes

- Not fully understood: possibly external traumatic events may trigger anxiety in predisposed people
- Association with other mental conditions e.g. depression, alcohol and substance abuse

## Types and clinical features

- ⦿ Generalized anxiety: Unrealistic and excessive worry about almost everything
- ⦿ Panic attacks: Episodes of sudden onset of intense apprehension or fear; anxiety symptoms usually peak within 10-15 minutes and resolve in a few minutes to one hour
- ⦿ Phobia: An excessive fear of a known stimulus (object or situation) e.g. animals, water, confined space) causing the person to consciously avoid the object or situation

Each of the above clinical types will have one or more of the following manifestations:

- ⦿ Sleep, mood and concentration problems
- ⦿ Palpitations, dizziness, shortness of breath
- ⦿ Shakiness or tremors, excessive sweatiness
- ⦿ Easily frightened
- ⦿ Other symptoms: urinary frequency, hesitancy, or urgency, diarrhoea

## Differential diagnosis

- ⦿ Consider organic conditions e.g. hyperthyroidism, hypoglycaemia, phaeochromocytoma

## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li>▶ Psychosocial interventions: counselling, psychotherapy (individual and group psychotherapy)</li> </ul> <p>For an acute episode or intense prolonged anxiety</p> <ul style="list-style-type: none"> <li>▶ Benzodiazepines e.g. diazepam 5 mg 1-2 times daily           <ul style="list-style-type: none"> <li>- Increase if necessary to 15-30 mg daily in divided doses</li> </ul> </li> </ul> <p>Elderly: Alprazolam 0.25mg -0.5mg twice daily initially, Increase if necessary to 3-6 mg daily in divided doses.</p> <p>If alprazolam is not available, Give half the above dose of diazepam</p>	HC2
	HC4

TREATMENT	LOC
<ul style="list-style-type: none"> <li>- Duration of therapy 1-2 weeks, tapering off to zero within 6 weeks</li> </ul> <p>If poor response: refer to specialist</p> <ul style="list-style-type: none"> <li>▶ Fluoxetine 20 mg once a day for long term management of the anxiety disorder</li> </ul> <p>Or Sertraline 50mg once daily</p> <ul style="list-style-type: none"> <li>- Continue antidepressant for 4 to 6 weeks then evaluate the response</li> </ul>	HC2 HC4
Caution	
<p>△ Diazepam is addictive and abrupt cessation can cause withdrawal symptoms. Use for short periods and gradually reduce the dose. Avoid alcohol</p>	
<b>Notes</b> <ul style="list-style-type: none"> <li>▪ Diazepam is NOT appropriate for treating depression, phobic or obsessional states, or chronic psychoses (see relevant sections for more information)</li> <li>▪ Antidepressants: May be useful in managing panic disorders and other anxiety disorders which require long term treatment</li> </ul>	

### Prevention

- Good personality development
- Good stress management

### 9.2.2 Depression ICD10 CODE: F32, F33

A common disorder characterised by low mood, loss of interest and enjoyment and reduced energy leading to diminished activity and in severe forms, difficult day-to-day functioning.



## Causes

- Ⓐ Biological, genetic, and environmental factors

## Clinical features

For at least two weeks, the person had at least two of the symptoms below:

- Ⓐ Low mood (most of the day, almost every day)
- Ⓐ Loss of interest or pleasure in activities that are normally pleasurable
- Ⓐ Associated lack of energy, body weakness or easily fatigued
- Ⓐ During the 2 weeks, the person also has some of the symptoms below:
- Ⓐ Difficulty in concentrating, reduced attention
- Ⓐ Reduced self-esteem and self confidence
- Ⓐ Poor sleep, poor appetite, reduced libido
- Ⓐ Bleak and pessimistic view of the future
- Ⓐ Feeling of guilt and unworthiness
- Ⓐ Multiple body pains or other medically unexplained somatic symptoms
- Ⓐ Ideas or acts of self harm or suicide (occurs in up to 65% of patients)
- Ⓐ Children and adolescents usually present with irritability, school phobia, truancy, poor academic performance, alcohol and drug abuse

## Differential diagnosis

- Ⓐ Thyroid dysfunction (hypothyroidism)
- Ⓐ Adrenal dysfunction (Addison's disease)
- Ⓐ Parkinson's disease, stroke, dementia
- Ⓐ Anxiety disorder

## Investigations

- Medical, social and personal history
- Check for bereavement or other major personal loss
- Find out if person has had an episode of mania in the past: if so consider treatment for bipolar disorder and consult a specialist
- Find out if they have psychotic features e.g. hallucinations (refer to section 9..2.4 on Psychosis)
- Assess for co-occurring health conditions (e.g. HIV/AIDS), substance or alcohol abuse
- Assess risk of self-harm/suicide

## Management

TREATMENT	LOC
<p>First line</p> <ul style="list-style-type: none"> <li>▶ Psychological therapy (Individual or group psychotherapy) is first line for mild cases:           <ul style="list-style-type: none"> <li>- Psychoeducation (counselling of patient and family)</li> <li>- Addressing current stressors (abuse, neglect...)</li> <li>- Re activating social networks</li> <li>- Structured physical activities</li> <li>- Regular follow up</li> </ul> </li> <li>▶ Manage concurrent physical medical problems</li> <li>▶ Address co-existing mental problems e.g. substance abuse</li> <li>▶ If available, consider psychotherapy (cognitive behavioural therapy, interpersonal psychotherapy, behavioural activation etc)</li> </ul> <p>If bereavement or another major personal loss</p> <ul style="list-style-type: none"> <li>- ▶ Counselling and support</li> <li>- ▶ Do not consider drugs or psychotherapy as first line</li> </ul>	

TREATMENT	LOC
<ul style="list-style-type: none"> <li>- If not responding to all above</li> </ul> <p>► Consider antidepressant</p> <ul style="list-style-type: none"> <li>- DO NOT use in children &lt;12 years</li> <li>- Adolescents: only under specialist supervision</li> </ul> <p>► Fluoxetine 20 mg once daily in the morning</p> <ul style="list-style-type: none"> <li>- Start with 10 mg in elderly</li> <li>- If not better after 4-6 weeks, increase to 40 mg</li> </ul> <p>► Or Amitriptyline 50 mg at bedtime</p> <ul style="list-style-type: none"> <li>- Increase by 25 mg every week aiming at 100-150 mg in divided doses or single bedtime dose by 4-6 weeks of treatment</li> <li>- Useful in case of associated anxiety</li> <li>- Avoid in adolescents, elderly, heart diseases, suicide risks</li> <li>- Or Venflaxine 37.5 mg given in the morning or evening</li> <li>- Increase dose to 75mg per day divided 8-12 hourly</li> </ul>	HC4 RR H
<ul style="list-style-type: none"> <li>- Maintenance dose is 75 to 225 mg once a day</li> <li>- Maximum dose is 375mg; Useful in the patients with comorbid anxiety disorders.</li> <li>- Or Sertaline 50mg per day; preferred for patients on other medicines due to its low potential for drug interactions and for breast feeding mothers, may increase dose by 25mg at weekly intervals</li> <li>- Do not exceed 200mg per day</li> <li>- Or Escitalopram 10mg, may increase dose to 20mg per day.</li> <li>- Or Bupropion 150 mg/day PO for those than cannot tolerate SSRIs and with comorbid Nicotine use disorder. Titrate to 150-450 mg/day based on tolerability and efficacy; may administer in divided doses</li> </ul>	H RR RR

## Management

TREATMENT	LOC
<p>If patient responding to medication</p> <ul style="list-style-type: none"> <li>▶ Continue for at least 9-12 months</li> <li>▶ Consider stopping if patient has been without depressive symptoms and able to carry out normal activities for at least 9 months           <ul style="list-style-type: none"> <li>- Counsel the patient about withdrawal symptoms (dizziness, tingling, anxiety, irritability, nausea, headache, sleep problems)</li> <li>- Counsel the patient about possibility of relapse and when to come back</li> <li>- Reduce slowly over at least 4 weeks even slower if withdrawal symptoms are significant</li> <li>- Monitor periodically for re-emergence of symptoms</li> </ul> </li> </ul> <p>In case of pregnant woman, child, adolescent, patients not responding to treatment with antidepressant, psychotic features, history of mania</p> <ul style="list-style-type: none"> <li>▶ Refer for specialist management</li> </ul>	
<p>Caution</p> <p>△ SSRI in bipolar depression can trigger a manic</p>	

## Prevention

- Stress management skills
- Promotion of useful social support networks

### 9.2.2.1 Postnatal Depression

Refer to section 16.6.2

## 9.2.2.2 Suicidal Behaviour/Self Harm ICD10 CODES: T14.91, Z91.5

Suicidal behaviour is an emergency and requires immediate attention. It is an attempted conscious act of self-destruction, which the individual concerned views as the best solution. It is usually associated with feelings of hopelessness, helplessness and conflicts between survival and death.

Self-harm is a broader term referring to intentional poisoning or self-inflicted harm, which may or may not have an intent of fatal outcome.

### Causes/risk factors

- Ⓐ Physical illness e.g. HIV/AIDS, head injury, malignancies, body disfigurement, chronic pain
- Ⓑ Psychiatric disorders e.g. depression, chronic psychosis, dementia, alcohol and substance use disorders, personality disorders, epilepsy

### Risk is high in the following cases:

- Ⓐ Patient >45 years old
- Ⓐ Alcohol and substance use
- Ⓐ History of suicide attempts
- Ⓐ Family history of suicide
- Ⓐ History of recent loss or disappointment
- Ⓐ Current mental illness e.g. depression, psychosis
- Ⓐ Evidence of violent behaviour or previous psychiatric admission

Risk may be low if patient is

- Ⓐ <45 years old
- Ⓐ Married or in stable interpersonal relationships
- Ⓐ Employed
- Ⓐ In good physical health

## Clinical features

Patients can present in one of the following situations:

- Ⓐ A current suicide attempt or self harm
- Ⓑ A situation of imminent risk of suicidal attempt or self harm:
  - Current thoughts or plans of suicide/self harm or history of thoughts or plans of suicide/self harm in the last 1 month, or acts of self harm/suicide attempts in the last 1 years plus
  - Person is agitated, violent, emotionally distressed or uncommunicative and socially isolated, hopeless
- Ⓒ A situation of no imminent risk but
  - Thoughts or plans of suicide/self harm in the last 1 month or acts of self/harm/suicide attempt in the last one year in person not acutely distressed

## Investigations

- Complete medical, social and family history
- Ask the patient about suicidal or self harm thoughts/plans/ acts and reasons for it
- Asking about self harm or suicide does not increase the risk of those acts. On the contrary, it may help the patient to feel understood and considered. First try to establish a good relationship with the patient before asking
- Always assess risk of suicide and self-harm in patient
- With any other mental illness (depression, mania, psychosis, alcohol and substance abuse, dementia, behavioural or development disorders)
- Chronic pain, severe emotional distress

## Management

TREATMENT	LOC
If acute suicidal behaviour/act of self harm or imminent risk <ul style="list-style-type: none"> <li>▶ Admit the patient and treat any medical complications (bleeding, poisoning etc.)</li> <li>▶ Keep in a secure and supportive environment <ul style="list-style-type: none"> <li>- Do not leave patient alone</li> <li>- Remove any means of self-harm</li> </ul> </li> <li>▶ Continuous monitoring</li> <li>▶ Offer/activate psychosocial support</li> <li>▶ Consult mental health specialist</li> <li>▶ Treat any medical and mental condition present</li> </ul>	HC4
If no imminent risk <ul style="list-style-type: none"> <li>▶ Offer/activate psychosocial support</li> <li>▶ Refer to mental health specialist for further assessment</li> <li>▶ Establish regular follow up</li> </ul>	
<p><b>Note</b></p> <ul style="list-style-type: none"> <li>▪ Suicide is less frequent in children and adolescents, but there is increased risk if there is disturbed family background (e.g. death of parents, divorce), use of alcohol and other drugs of abuse, physical illness, psychiatric disorder</li> </ul>	

### 9.2.3 Bipolar Disorder (Mania) ICD10 CODE: F30, F31

A disorder of mood control characterized by episodes in which the person's mood and activity level are significantly disturbed: in some occasions, there is an elevation of mood and increased energy and activity (mania) and in other occasions, there is a lowering of mood and decreased energy and activity (depression). Characteristically, recovery is complete in between the episodes.

## Causes

- ⦿ Biological, genetic, environmental factors

## Clinical features

Patient can present in an acute manic episode, in a depressive episode or in between the episodes.

### Mania

- ⦿ Elevated, expansive or irritable moods and increased activity or subjective experience of increased energy
- ⦿ Increased talkativeness
- ⦿ Flight of ideas
- ⦿ Increased self-image, self-esteem or grandiosity,
- ⦿ Decreased need for sleep
- ⦿ Distractibility
- ⦿ Impulsive reckless behavior, extravagancy, partying and , increased
- ⦿ Increased sexual drive, sociability and goal directed behaviour
- ⦿ Increased appetite but weight loss occurs due to over- activity
- ⦿ Auditory and visual hallucinations may be present

### Depression

- ⦿ As for depression described above, but with a history of manic episode
- ⦿ High index of suspicion for bipolar in early onset depression with family history of bipolar illness
- ⦿ Differential diagnosis
- ⦿ Organic mental states e.g. drug or alcohol intoxication, delirium
- ⦿ Chronic Psychosis

## Investigations

- ⦿ Good medical, social and personal history
- ⦿ Assess for acute state of mania
- ⦿ If depressive symptoms, investigate for previous manic episodes
- ⦿ Assess for other medical or mental conditions (alcohol or substance abuse, dementia, suicide/self harm)

## Management

Patients with suspected bipolar disorder should be referred for specialist assessment

### Management

TREATMENT	LOC
<p>Manic episode</p> <p>Multiple symptoms as above for &gt; 1 week and severe enough to interfere with work/social activities and/or requiring hospitalization</p> <ul style="list-style-type: none"> <li>▶ Assess risk to self and others</li> <li>Discontinue antidepressant if any</li> <li>▶ Provide counseling and education</li> <li>▶ Chlorpromazine initially 100-200 mg every 8 hours, then adjust according to response <ul style="list-style-type: none"> <li>- Daily doses of up to 300 mg may be given as a single dose at night</li> <li>- Gradually reduce the dose when symptoms of mania resolve and maintain on doses as indicated in section 9.2.4 on Chronic psychosis</li> </ul> </li> <li>▶ Or haloperidol initially 5-10 mg every 12 hours then adjust according to response <ul style="list-style-type: none"> <li>- Up to 30-40 mg daily may be required in severe or resistant cases</li> </ul> </li> <li>▶ Or trifluoperazine initially 5-10 mg every 12 hours then adjust according to response</li> </ul>	<p>HC3</p> <p>HC4</p> <p>H</p>

TREATMENT	LOC
<ul style="list-style-type: none"> <li>- Or Olanzapine 10-15 mg/day initially; may adjust to 20mg according to response</li> <li>- Or Risperidone 2-3mg initially, may increase to 6mg in over 3 weeks according to response.</li> </ul>	HC3
If under specialist supervision: initiate a mood stabilizer <ul style="list-style-type: none"> <li>▶ Carbamazepine initial dose 200 mg at night, increase slowly to 600-1000 mg/day in divided doses</li> <li>▶ Or Valproate initial dose of 500 mg/day. Usual maintenance dose 1000-2000 mg</li> </ul> Or Lithium 900-1800mg/day in two divided doses (RR)	H RR RR
<b>Note</b> Serum lithium should be monitored 12 hours after dose, twice weekly until serum concentration and clinical condition stabilize, and every 3 months thereafter. Increase dose as tolerated to target serum lithium concentrations of 0.8-1.2 mEq/L. Monitor Wt, BP, PR, Lipid profile and LFTs. Do RFTS, TSH and Ca levels for those on Lithium	
If agitation/restlessness, add a benzodiazepine for short period (until symptoms improve) <ul style="list-style-type: none"> <li>▶ Diazepam 5-10 mg every 12 hours</li> </ul> Zuclopentixol acetate 50-100 mg given 48-72 hours if available	HC2

TREATMENT	LOC
<p><b>Note</b></p> <ul style="list-style-type: none"><li>▪ If extrapyramidal side-effects (muscle rigidity, dripping of saliva, tongue protrusion, tremors) are present while on antipsychotic drugs</li><li>- Add an anticholinergic: Benhexol initially 2 mg every 12 hours then reduce gradually to once daily and eventually give 2 mg only when required</li></ul> <p>DO NOT INITIATE LITHIUM AND VALPROATE AT LOWER CENTRE EXCEPT AS CONTINUATION</p> <p>REFER if poor response, poor adherence, pregnant, side effects, underlying physical or mental comorbidity</p>	
<p>Bipolar depression</p> <p>Depressive symptoms but with history of manic episode/ diagnosis of bipolar disorder</p> <ul style="list-style-type: none"><li>▶ Counsel about bipolar disorder</li></ul> <p>Psychological support for mild depression otherwise refer for specialist care</p> <ul style="list-style-type: none"><li>▶ If on olanzapine, add fluoxetine or give quetiapine alone.</li><li>If not available</li><li>▶ Begin treatment with a mood stabilizer (carbamazepine or valproate, see above)</li><li>▶ Psychoeducation and psychotherapy if available</li><li>▶ If moderate/severe depression, consider treatment with antidepressant in addition to mood stabilizer BUT under specialist supervision (there is risk of triggering a manic episode)</li></ul>	

TREATMENT	LOC
<p>In between episodes</p> <p>Indication for use of mood stabilizers to prevent both manic and depressive episodes</p> <ul style="list-style-type: none"> <li>- 2 or more episodes (2 manic or 1 manic and 1 depressive)</li> <li>- 1 severe manic episode involving significant risk and consequences</li> </ul> <p>▶ Valproate (or carbamazepine) as above or lithium at higher levels.</p> <p>Provide psychoeducation and support</p>	
<p>Caution</p> <p>△ Avoid mood stabilizers in pregnant women. Use low dose haloperidol if necessary</p> <p>△ Use lower doses in elderly</p> <p>▶ Refer adolescents for specialist management</p>	

### Prevention

- Information and support
- Self management techniques
- Adherence to care
- Good psychosocial support

### 9.2.4 Psychosis ICD10 CODE: F20-F29

A mental condition characterized by distortions of thinking and perception, as well as inappropriate or narrowed range of emotions.

#### Causes

- Not known, but there are associated biological, genetic and environmental factors

## Clinical features

Any one or more of these may be diagnostic:

- ⦿ Delusions (abnormal, fixed, false beliefs) or excessive and unwarranted suspicions (may be multiple, fragmented or bizarre)
- ⦿ Disconnected ideas with vague or incoherent speech and inadequate in content
- ⦿ Hallucinations: hearing voices or seeing things that are not witnessed by others
- ⦿ Severe behaviour abnormalities: agitation or disorganised behaviour, excitement, inactivity or overactivity
- ⦿ Disturbance of emotions such as marked apathy or disconnection between reported emotions and observed effect
- ⦿ Mood is usually inappropriate
- ⦿ Difficulty in forming and sustaining relationships
- ⦿ Social withdrawal and neglect of usual responsibilities

## Chronic psychosis or schizophrenia

- ⦿ Symptoms of psychosis lasting for 3 or more months
- ⦿ Accompanied by deterioration in social, general and occupational functioning

## Differential diagnosis

- ⦿ Alcohol and drug intoxication or withdrawal
- ⦿ Organic delirium, dementia, mood disorders

## Investigations

- ⦿ Good social, personal and family history
- ⦿ Laboratory investigations for infectious diseases e.g. HIV,

Management		
TREATMENT		LOC
- Acute psychosis ► Counselling/psychoeducation of patient and carers - Antipsychotic drugs ► Chlorpromazine: starting dose 75-150 mg daily and maintenance dose of 75-300 mg daily. Up to 1000 mg daily in divided doses may be required for those with severe disturbance ► Or Haloperidol: starting dose 5-10 mg daily - (Lower in elderly) and maintenance dose of 5-20 mg daily in divided doses - Or Olanzapine 5-10 mg daily, maintenance dose is 10-20mg/day - Or Risperidone 2 mg initially, may increase to 8 mg/day in divided. - Or Quetiapine 150-750mg/day twice daily - Or For treatment resistant schizophrenia, Clozapine 25-50mg/day initially, if well tolerated titrate to 450mg per day in two weeks depending on response	HC2 HC4 H H NR NR	
► Administer orally or IM for those with agitation ► Only use one antipsychotic at a time ► Gradually adjust doses depending on response ► Monitor for side effects e.g. extrapyramidal side effects ► Use therapeutic dose for 4-6 weeks to assess effect ► Psychological interventions (family therapy or social skills therapy) if available ► Ensure follow up ► For acute psychosis, continue treatment for at least 12 months. Discuss discontinuation with patient, carergivers and specialist		RR

TREATMENT	LOC
If extrapyramidal side-effects ▶ Add an anticholinergic: Benhexol initially 2 mg every 12 hours then reduce gradually to once daily and eventually give 2 mg only when required If no response ▶ Refer to specialist	HC2
Chronic psychosis Treat as above, but if adherence is a problem or the patient prefers, use: ▶ Fluphenazine decanoate 12.5-50 mg every 2-5 weeks deep IM into gluteal muscle ▶ Or Haloperidol injection (oily) 50-200 mg (300 mg) deep IM into gluteal muscle every 3-4 weeks OR Zuclopentixol decanoate 200-500mg every 4 weeks depending on response Psychosocial support for long term care	HC4 RR

### 9.1.1.1 Postnatal Psychosis ICD10 CODE: F53 Postpartum

psychosis is the most severe form of postpartum psychiatric illness.

#### Causes

- ⌚ Not well known, but hormonal changes may have a role

#### Predisposing factors

- ⌚ First child
- ⌚ Previous episode of post-natal psychosis
- ⌚ Previous major psychiatric history
- ⌚ Family history of mental illness
- ⌚ Inadequate psychosocial support during pregnancy
- ⌚ Infections in early puerperium

## Clinical features

- ⦿ Symptoms develop within the first 2 postpartum weeks (sometimes as early as 48-72 hours after delivery)
- ⦿ The condition resembles a rapidly evolving manic or mixed episode with symptoms such as restlessness and insomnia, irritability, rapidly shifting depressed or elated mood and disorganized behavior
- ⦿ The mother may have delusional beliefs that relate to the infant (e.g. the baby is defective or dying, the infant is Satan or God) or she may have auditory hallucinations that instruct her to harm herself or her infant
- ⦿ The risk for infanticide and suicide is high

## Differential diagnosis

- ⦿ Depression with psychotic features
- ⦿ Mania, chronic psychosis

## Investigations

- ▶ Good history, physical and psychiatric assessment

## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li>▶ It is a psychiatric emergency: admit to hospital</li> <li>▶ Treat any identifiable cause/precipitant e.g. infection</li> <li>▶ Haloperidol 10 mg or Chlorpromazine 200 mg [Intramuscular Injection or tablets} every 8 or 12 hours. Monitor response to medication and adjust dosage accordingly</li> <li>▶ If restless and agitated, add rectal or I.V Diazepam 5-10 mg slow infusion; repeat after 10 minutes if still agitated <ul style="list-style-type: none"> <li>- Continue with diazepam tablet 5 mg every 12 hours until calm</li> </ul> </li> <li>▶ Refer to specialist</li> </ul>	H

## Prevention

- Ⓐ Proper antenatal screening, good psychosocial support
- Ⓑ Early detection and treatment
- Ⓒ Adherence to treatment for a current mental illness e.g depression, bipolar, chronic psychosis

### 9.1.1 Alcohol Use Disorders ICD10 CODE: F10

Conditions resulting from different patterns of alcohol consumption, including acute alcohol intoxication, harmful alcohol use, alcohol dependence syndrome and alcohol withdrawal state.

#### Causes

- Ⓐ No single cause; a combination of factors usually leads to alcohol use disorders

#### Risk / Predisposing factors

- Ⓐ Genetic
- Ⓑ Social and environmental factors including availability
- Ⓒ Stress, peer pressure
- Ⓓ Personality disorders

#### Clinical features

##### Acute intoxication

- Ⓐ Transient condition following intake of alcohol resulting in disturbances of consciousness, cognition, perception, affect or behaviour

## Harmful alcohol use

- Pattern of alcohol consumption that is causing damage to the health, physical (e.g. liver disease) or mental (e.g. depressive disorder).
- And causing problems to one's social, occupational and other important areas of life. Criteria:
  - More than five drinks in any given occasion in the last 12 months
  - More than two drinks a day
  - Drinking every day
- These patients consume more alcohol than
- Recommended but they do not fulfil (yet) the criteria for alcohol dependence

Alcohol consumption during pregnancy is extremely harmful for the baby: it can cause foetal

## Alcohol dependence

- A disorder characterised by the need to take large daily amounts of alcohol for adequate functioning. The use of alcohol takes on a much higher priority for the individual than other behaviours that once had greater value
- Complications: malnutrition, thiamine deficiency (causing Wernicke encephalopathy), liver disease, chronic pancreatitis, peptic ulcer, cardiomyopathy, neuropathy, head trauma etc.
- Alcohol withdrawal
- Symptoms occurring upon cessation of alcohol after its prolonged daily use (6 hours to 6 days after)
- Include
- Tremor in hands, sweating, vomiting, tachycardia, hypertension, agitation, anxiety, headache, seizure and confusion in severe cases



## Alcohol dependence

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- Ⓐ Symptoms occurring upon cessation of alcohol after its prolonged daily use (6 hours to 6 days after)
- Ⓐ Include
- Ⓐ Tremor in hands, sweating, vomiting, tachycardia, hypertension, agitation, anxiety, headache, seizure and confusion in severe cases

### Diagnostic criteria for alcohol dependence:

If 3 or more of the features below are present:

- Ⓐ A strong desire to take alcohol
- Ⓐ Difficulties controlling alcohol use in terms of onset, termination or levels of use
- Ⓐ A physiological withdrawal state when alcohol use has ceased or been reduced (alcohol withdrawal syndrome)
- Ⓐ Evidence of tolerance: increased doses of alcohol are required to achieve effects originally produced by lower doses
- Ⓐ Progressive neglect of alternative pleasures or interests because of alcohol use
- Ⓐ Alcohol use persists despite clear evidence of harmful consequences e.g. liver damage, depression, cognitive impairment, loss of a job, friends, relationships

## Differential diagnosis

- ⌚ Abuse of other psychoactive substances
- ⌚ Depression, chronic psychosis (often co-existing!)

## Investigations

- ▶ Blood: complete blood count, liver enzymes
  - Shows elevated MCV and GGT levels
- ▶ Social investigations

## Management

TREATMENT	LOC
Acute intoxication, withdrawal and Wernicke's encephalopathy see section 1.3.12	
Harmful alcohol consumption <ul style="list-style-type: none"> <li>▶ Counselling and advice</li> <li>▶ Investigate and treat concurrent medical or psychiatric illness (dementia, depression anxiety, psychosis seizures etc.)</li> <li>▶ Follow up and refer if not better</li> </ul>	HC3
Alcohol dependence <ul style="list-style-type: none"> <li>▶ Counselling and education of the patient</li> <li>▶ Assess and manage concurrent medical and mental conditions</li> <li>▶ Advise thiamine 100 mg daily for at least two weeks</li> <li>If patient willing to stop, facilitate alcohol cessation           <ul style="list-style-type: none"> <li>▶ Determine appropriate setting, refer for detoxification, treat withdrawal symptoms with diazepam</li> </ul> </li> </ul>	HC4 RR

TREATMENT	LOC
DETOXIFICATION should only be undertaken within inpatient settings ► Consider referral to self -help groups (AA groups) ► Counsel the family, provide psychosocial interventions if available	HC4 RR

## Prevention

- ⦿ Health education on dangers of alcohol abuse
- ⦿ Reduce accessibility to alcohol

### 9.1.2 Substance Abuse

ICD10 CODE: F11-F19

Conditions resulting from different patterns of drug use including acute sedative overdose, acute stimulant intoxication, harmful or hazardous drug use, cannabis dependence, opioid dependence, stimulant dependence, benzodiazepine dependence and their corresponding withdrawal states.

- Harmful or hazardous use: causing damage to health (physical, mental or social functioning)
- Dependence: situation in which drug use takes on a much higher priority for a given individual than other behaviours that once had greater value.

## Causes

- ⦿ Social factors: peer pressure, idleness/unemployment, social pressures, poverty, cultural use, increased availability
- ⦿ Psychological factors: other psychiatric disorders e.g. anxiety, depression, stress, adolescent development changes

## Commonly abused drugs

- ⦿ Tobacco (cigarettes, shisha, kuber, mirage, migagi)
- ⦿ Cannabis (njaga, bhangi, marijuana)

- Khat (mairungi)
- Heroin (brown sugar)
- Cocaine
- Petrol fumes and organic solvents (e.g. thinners)
- Opioids: pethidine, morphine, Tramadol
- Amphetamines (e.g. speed)
- Mandrax® (methaqualone)
- Benzodiazepines
- Barbiturates (phenobarbitone)

### Clinical features

#### Presenting features that may point to drug use disorders

- Change in behaviour e.g. excessive irritability
- Change in function e.g. decline in school/work performance
- Loss of interest
- Episodes of intoxication e.g. slurred speech, staggering gait
- Involvement in illegal activities e.g. rape, theft
- Change in appearance e.g. weight loss, red eyes, puffy face, untidy, scars from multiple needle pricks
- Financial difficulties e.g. stealing, unpaid debts
- Relationship problems e.g. increased conflicts, communication breakdown
- Find out if person uses illegal or prescribed drugs in a way that risks damage to their health

### Investigations

- Ask about use of illicit or non-prescribed drugs

If yes, assess for features of dependence (3 or more of the following):

- A strong desire to take drugs
- Difficulties controlling drug use in terms of onset, termination or levels of use

- A physiological withdrawal state when drug use has ceased or been reduced (as shown by classic withdrawal symptoms)
- Evidence of tolerance: increased doses of the drug are required to achieve effects originally produced by lower doses
- Progressive neglect of alternative pleasures or interests because of drug use
- Drug use persists despite clear evidence of harmful consequences e.g. depression, loss of a job
- Investigate concurrent physical or mental illnesses

## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li>▶ Assess for and manage co-existing medical conditions e.g. HIV</li> <li>▶ Assess for harmful use (substance abuse but not meeting criteria for dependence) or dependence</li> <li>▶ Psychoeducation and counselling Refer to higher LOC for medical treatment of SUD Treat presenting symptoms (acute intoxication or withdrawal)</li> <li>▶ Refer to self help groups if possible</li> </ul>	HC2  RR
<ul style="list-style-type: none"> <li>▶ Refer to specialist for further management (detoxification and Medication Assisted Treatment; Naltrexone for; alcohol and opioids; Methadone and Buprenorphine for opioids use disorder at RRH and Acamprosate at NRH for alcohol.)</li> </ul>	

## Prevention

- Health education on dangers of drug use
- Employment/recreational opportunities
- Encourage social and cultural values
- Attempt to reduce availability of drugs of abuse in communities

### 9.1.3 Childhood Behavioural Disorders ICD10 CODE: F90-F98

A general term including more specific disorders such as attention deficit hyperactivity disorder (ADHD) and other behavioural disorders. Only children and adolescents with moderate to severe degree of psychological, social, educational or occupational impairment should be diagnosed as having behavioural disorders. In some children the problem persists into adulthood.

Investigate if the child's behavior is a reaction to trauma and/or fear (child is bullied or harmed at home or outside home). In this case, it is NOT a behavioral disorder; The bullying, and or Abuse must STOP'!

#### Causes

- Genetic
- Depression
- Medical conditions, alcohol or drug use
- Reaction to fear or trauma

#### Clinical features

- Attention Deficit Hyperactivity Disorder (ADHD)
- Impaired attention (breaking off from tasks and leaving activities unfinished) so severe as to affect normal functioning and learning



- ⦿ Excessive restlessness, overactivity especially in situations requiring calm, talkativeness, fidgeting
- ⦿ Of early onset (<6 years) and lasting >6 months
- ⦿ Other behavioural disorders
- ⦿ Unusually frequent and severe tantrums, persistent severe disobedience
- ⦿ Repetitive and persistent pattern of dissocial, aggressive or defiant conduct (bullying, cruelty to animals, destructiveness, fire setting etc.), more severe than ordinary mischief, not only in response to severe family or social stressors, and lasting >six months

### Differential diagnosis

- ⦿ Depression, psychosis
- ⦿ Epilepsy, developmental disorders
- ⦿ Medical conditions e.g. hyperthyroidism

### Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li>▶ Family psychoeducation and counselling</li> <li>▶ Parent skill training</li> <li>▶ Contact teachers, advise and plan for special needs education</li> <li>▶ Psychosocial interventions if available</li> </ul>	HC4
<ul style="list-style-type: none"> <li>▶ Support to family</li> <li>▶ Refer to specialist for further management</li> </ul> <p>For ADHD not improving with above interventions</p> <ul style="list-style-type: none"> <li>▶ Consider methylphenidate under specialist supervision</li> </ul>	RR

## 9.1.4 Childhood Developmental Disorders ICD10 CODE: F80-F89

A broad spectrum of disorders with childhood onset, characterized by impairment or delay in functions related to central nervous system maturation, and with a steady course rather than remissions and relapses as in other mental illnesses. They include intellectual disability/mental retardation as well as pervasive developmental disorders such as autism.

### Causes

- May not be known
- Nutritional deficiencies e.g. iodine deficiencies
- Medical conditions
- Alcohol use during pregnancy
- Risk factors: maternal depression, infections in pregnancy

### Clinical features

- Delay in development (using local developmental milestones or comparison with other children)
- Intellectual disability
- Impairment of skills across multiple development areas (i.e. cognitive, (thinking), language, motor and skills)
- Lower intelligence and decreased ability to adapt to daily demands of life

### Pervasive developmental disorders including autism

- Impaired social behaviour, communication and language
- Oddities in communication (lack of social use of language skills, lack of flexibility of language used)
- Loss of previously acquired skills
- Narrow range of interests and activities that are both unique to the individual and carried out repetitively originating in infancy or early childhood

- Some degree of intellectual disability may be present
- Some children may be gifted in specific areas e,g Music, computer

### Investigations

- Look for other priority mental, neurological or substance use disorder (depression, epilepsy, behavioural disorder)
- Consider if delay in development could be due to non- stimulating environment or maternal depression
- Assess for nutritional and other medical conditions e.g. sensory impairments (blindness, deafness etc.)

### Management

TREATMENT	LOC
<ul style="list-style-type: none"><li>▶ Address medical issues including visual and hearing impairment, nutritional problems</li><li>▶ Family psychoeducation</li><li>▶ Parent skills training</li><li>▶ Contact teachers, advise and plan for special needs education. if their needs are not met in inclusive schools</li><li>▶ Provide support to caregivers/family</li><li>▶ Link with community based rehabilitation services if available</li><li>▶ Protect and promote human rights of the child: <b>THESE CHILDREN ARE VERY VULNERABLE TO ABUSE</b></li><li>▶ Refer to specialist for more comprehensive assessment and management</li></ul>	HC4     RR

# 10 Musculoskeletal and Joint Diseases

## 10.1 INFECTIONS

### 10.1.1 Pyogenic Arthritis (Septic Arthritis) ICD10 CODE: M00

Acute infection of a single joint (usually a large joint), commonly affecting children.

#### Causes

- ⦿ Usually haematogenous spread from a primary focus following bacteraemia (e.g. septic skin lesions, sinus infections, throat infections, abrasions, wounds, pressure sores, and osteomyelitis)
- ⦿ Commonly involved in acute arthritis: *Staphylococcus aureus* and Gram negative bacilli, e.g., *Salmonella* spp, *Streptococcus* spp, *Gonococcus*
- ⦿ In chronic septic arthritis: *Brucella*, tuberculosis

#### Clinical features

- ⦿ Swollen and warm joint
- ⦿ Severe pain, reduced or abolished movement, temporary loss of limb function (pseudoparalysis)
- ⦿ Localised heat and tenderness
- ⦿ Systemic symptoms: fever (neonates may not show fever but refuse to feed), general malaise
- ⦿ Complications: irreversible joint damage if immediate treatment is not established



## Differential diagnosis

- Inflammatory joint disease
- Intra-articular haemorrhage, e.g., haemophilia and other bleeding disorders
- Trauma
- Osteomyelitis of neighbouring bone

## Investigations

- Blood: Full blood count, C&S, ESR (usually elevated)
- Joint fluid: Aspirate for C&S; in case of failure to get pus by aspiration, use arthrotomy (in theatre)
- Joint fluid: Gram stain

## Management

TREATMENT	LOC
<input checked="" type="checkbox"/> Provide pain relief, e.g., paracetamol, or ibuprofen <input checked="" type="checkbox"/> Immobilise the involved limb, try splinting <input checked="" type="checkbox"/> REFER URGENTLY to HC4, or hospital	HC2
<input checked="" type="checkbox"/> Aspirate articular fluid for gram stain, and C&S if available (use local skin and subcutaneous anaesthesia if indicated) - Repeat daily until no further pus is obtained - Use diazepam 2.5 mg rectal for sedation in children <input checked="" type="checkbox"/> Or open drainage in theatre	HC4 RR
<input checked="" type="checkbox"/> Continue pain relief, use paracetamol, ibuprofen - Or diclofenac 50 mg every 8 hours Child: 0.3-2 mg/kg rectally every 6-8 hours (max 150 mg) - Or indomethacin 25-50 mg every 8 hours Child: 0.5-1 mg/kg every 12 hours	HC4 H

TREATMENT	LOC
<p>Antibiotics: if possible, get guidance from gram stain, and culture and sensitivity results</p> <p>If Gram positive at gram stain, or negative stain but immunocompetent adult patient:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Cloxacillin 500-1 g IV every 6 hours Child: 50 mg/kg IV every 6 hours           <ul style="list-style-type: none"> <li>- Give IV for 2 weeks, then if better, switch to oral to complete 4 weeks</li> </ul> </li> <li><input checked="" type="checkbox"/> Alternative/second line: Chloramphenicol 500 mg IV every 6 hours for at least 2 weeks Child: 12.5 mg every 6 hours</li> </ul> <p>If Gram negative at gram stain</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Ceftriaxone 1 g IV for 2-4 weeks Alternatives</li> <li><input checked="" type="checkbox"/> Ciprofloxacin 500 mg every 12 hours for 3 weeks</li> </ul> <p>In adults with negative stain and underlying conditions (suspect gram negative, e.g. Salmonella in Sickle Cell Disease), and all children with negative stain, or underlying conditions</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Cloxacillin + ceftriaxone</li> </ul> <p>If suspicion of gonococcal (e.g. in sexually active adolescents)</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Ceftriaxone 1 g IV daily for 1 week</li> </ul>	HC4

### 10.1.2 Osteomyelitis ICD10 CODE: M86

Infection of bone by pus-forming bacteria, mainly affecting older children and adults.

#### Causes

- ① Any type of bacterium but most commonly *S.aureus*,
- ② following infection elsewhere in the body



- ⦿ Risk factor: sickle cell disease (causative agent mostly S. Aureus, Salmonella also common)

## Clinical features

### Acute osteomyelitis

- ⦿ Onset is usually over several days
- ⦿ Fever, usually high but may be absent, especially in neonates
- ⦿ Pain (usually severe)
- ⦿ Tenderness and increased “heat” at the site of infection, swelling of the surrounding tissues and joint
- ⦿ Reduced or complete loss of use of the affected limb
- ⦿ The patient is usually a child of four years or above with reduced immunity, but adults may also be affected
- ⦿ History of injury may be given, and may be misleading, especially if there is no fever

### Chronic osteomyelitis

- ⦿ May present with pain, erythema, or swelling, sometimes in association with a draining sinus tract
- ⦿ Deep or extensive ulcers that fail to heal after several weeks of appropriate ulcer care (e.g. in diabetic foot), and non-healing fractures, should raise suspicion of chronic osteomyelitis

### Differential diagnosis

- ⦿ Infection of joints
- ⦿ Injury (trauma) to a limb, fracture (children)
- ⦿ Bone cancer (osteosarcoma, around the knee)
- ⦿ Pyomyositis (bacterial infection of muscle)
- ⦿ Cellulitis
- ⦿ Sickle-cell disease (thrombotic crisis)

## Investigations

- X-ray shows
- Nothing abnormal in first 1-2 weeks
- Loss of bone density (rarefaction) at about 2 weeks
- May show a thin “white” line on the surface of the infected part of the bone (periosteal reaction)
- Later, may show a piece of dead bone (sequestrum)
- Blood: CBC, ESR, C&S: Type of bacterium may be detected
- attempt ZN, gene expert, culture if lesion suspect
- Calcoflour stain for fungus

## Management

Patients with suspected osteomyelitis need to be referred to hospital for appropriate management.

TREATMENT	LOC
<input type="checkbox"/> Immobilize the limb, splint <input type="checkbox"/> Provide pain and fever relief with paracetamol, or ibuprofen <input type="checkbox"/> Refer URGENTLY to hospital <input type="checkbox"/> Admit and elevate affected limb <input type="checkbox"/> Cloxacillin 500 mg IV every 6 hours for 2 weeks. Continue orally for at least 4 weeks (but up to 3 months) Child: 50 mg/kg every 6 hours	HC3
<input type="checkbox"/> See pyogenic arthritis for other antibiotic treatments (section 10.1.1) <input type="checkbox"/> Osteomyelitis in SCD: see section 11.1.3 <input type="checkbox"/> Surgical intervention may be indicated in the following cases:	H
	RR

TREATMENT	LOC
<input checked="" type="checkbox"/> Drainage of subperiosteal and soft tissue abscesses, and intramedullary purulence	HC3
- Debridement of contiguous foci of infection - (which also require antimicrobial therapy)	H
- Excision of sequestra (i.e. devitalized bone) - Failure to improve after 48-72 hours of antimicrobial therapy	RR
- Chronic osteomyelitis <input checked="" type="checkbox"/> Surgery and antibiotics	RR

### 10.1.3 Pyomyositis ICD10 CODE: M60.0

Inflammation of muscle, which may lead to pus formation and deep-seated muscle abscess.

#### Causes

- Ⓐ Bacterial infection (commonly *Staphylococcus aureus*)

#### Clinical features

- Ⓐ Most commonly localised in one muscle; usually large striated muscle
- Ⓐ Fever, painful swelling of the involved muscle
- Ⓐ Affected area is hot, swollen, and tender
- Ⓐ Fluctuation when pus forms

#### Differential diagnosis

- Ⓐ Cellulitis, boil
- Ⓐ Osteomyelitis
- Ⓐ Peritonitis (in pyomyositis of abdominal muscles)

## Investigations

- Blood: Full blood count
- Pus: culture and sensitivity
- Consider HIV infection

TREATMENT	LOC
<input type="checkbox"/> Elevate and immobilise affected limb <input type="checkbox"/> Cloxacillin 500 mg IV or oral every 6 hours for 5-10 days Child: 12.5-25 mg/kg per dose <input type="checkbox"/> During the early stage, when the muscle is indurated, hot and swollen, antibiotic treatment may be sufficient to resolve the infection	HC3
When abscess has formed,	HC4
<input type="checkbox"/> Surgical drainage is the only effective treatment - Leave the wound open, pack and clean daily	

### 10.1.4 Tuberculosis of the Spine (Pott's Disease) ICD10 CODE: A18.01

Tuberculous spondylitis (Pott's disease) is the most common form of skeletal TB; it usually affects the lower thoracic and upper lumbar region. Infection begins with inflammation

of the intervertebral joints and can spread to involve the adjacent vertebral body. Once two adjacent vertebrae are involved, infection can involve the adjoining intervertebral disc space, leading to vertebral collapse. Subsequent kyphosis can lead to cord compression and paraplegia.

#### Causes

- A chronic infection caused by Mycobacteria



## Clinical features

- Most common in young adults
- Local pain, which increases in severity over weeks to months, sometimes in association with muscle spasm and rigidity
- Constitutional symptoms such as fever and weight loss are present in < 40% of cases
- With the progression and spreading of the disease, anterior collapse of affected vertebrae leads to visible deformity (angular kyphosis or gibbus), and risk of cord compression:
- Weakness of legs (Pott's paraplegia)
  - Visceral dysfunction
  - Differential diagnosis
  - Staphylococcal spondylitis
  - Brucellosis
  - Metastatic lesion

## Investigations

- Adequate history and careful examination
- X-ray spine: disc space narrowing, paravertebral shadow, single/multiple vertebral involvement, destruction lesions of 2 or more vertebrae without new bone formation, destruction of vertebral end-plates
- Blood: raised ESR, WBC (within normal limits)

## Management

TREATMENT	LOC
<input type="checkbox"/> Rest the spine <input type="checkbox"/> Fit a spinal corset or plaster jacket for pain relief <input type="checkbox"/> TB treatment as per guidelines (see section 5.3 for more details) <input type="checkbox"/> Surgical intervention is warranted for patients in the following circumstances:	HC4   RR

TREATMENT	LOC
<ul style="list-style-type: none"> <li>- Patients with spinal disease and advanced neurological deficits</li> <li>- Patients with spinal disease and worsening neurological deficits, progressing while on appropriate therapy</li> <li>- Patients with spinal disease and kyphosis &gt;40 degrees at the time of presentation</li> <li>- Patients with chest wall cold abscess</li> </ul>	HC4 RR

## 10.2 INFLAMMATORY/DEGENERATIVE DISORDERS

### 10.2.1 Rheumatoid Arthritis ICD10 CODE: M05

Most common form of chronic inflammatory joint disease affecting mainly women. Attacks tend to be bilateral with symmetrical involvement that cause joint destruction.

#### Causes

- Ⓐ Unknown origin, probably autoimmune

#### Clinical features

- Ⓐ Stiffness and pain in the joints (usually >3, symmetrical, worse in the morning)
- Ⓐ Joints are swollen, warm, inflamed, and sensitive to touch
- Ⓐ Fingers are most affected (metacarpophalangeal, or proximal interphalangeal), but all small and medium size joints can be affected (rarely hips and spine)
- Ⓐ Extra articular manifestations: mild fever, weakness, lethargy, anorexia, weight loss, rheumatoid nodules (20%) at extensor surface like forearm below joint
- Ⓐ It is a CHRONIC disease with flare-up, remission, and exacerbations
- Ⓐ In advanced cases, joint deformities may occur



## Differential diagnosis

- Osteoarthritis, gout arthritis (in males)
- Reactive arthritis

## Investigations

- Blood: Full blood count, ESR, rheumatoid factor, antinuclear factor
- X-ray of affected joints

## Management

### Goals of treatment

- Relief of symptoms
- Preservation of joint function
- Suppression of active disease, and slowing progression of disease (prevention of structure damage and deformity)
- Maintenance of patient's normal lifestyle

Symptomatic treatment can be started at lower level but appropriate management requires referral for specialist care.

TREATMENT	LOC
<ul style="list-style-type: none"> <li>- For pain and inflammation in acute flare</li> <li><input type="checkbox"/> Rest the affected joints</li> <li><input type="checkbox"/> Any NSAIDS e.g. ibuprofen 400 mg every 8hours</li> <li><input type="checkbox"/> Or diclofenac 50 mg every 8 hours</li> <li><input type="checkbox"/> Or indomethacin 50 mg every 8 hours</li> </ul>	HC2
<ul style="list-style-type: none"> <li>- Long term treatment is not advised because of toxicity, and because NSAIDS do not modify the progression of disease</li> <li>- Consider adding gastroprotection with omeprazole 20 mg once daily</li> <li>- For severe acute inflammation</li> </ul>	HC3
<ul style="list-style-type: none"> <li><input type="checkbox"/> Prednisolone 5–10 mg once daily in the morning</li> </ul>	RR

TREATMENT	LOC
- They slow disease progression, but should not be used for long periods due to side effects - Used for treating acute symptoms, and while waiting to start specific medicines - Refer to specialist for Disease Modifying Anti-Rheumatic Drugs	HC2 HC3 RR
<input type="checkbox"/> Methotrexate	
<input type="checkbox"/> Chloroquine	
- Counselling and health education <input type="checkbox"/> Weight loss and appropriate exercise/ physiotherapy	

### 10.2.2 Gout Arthritis ICD10 CODE: M10

An inflammation disorder involving a joint(s) due to deposition of uric acid crystals; predominant in males.

#### Causes

- Ⓐ Altered urate metabolism with deposition of urate salts in the joint and other tissues in advanced cases

#### Clinical features

##### Acute gout

- Ⓐ Affected joint is hot, red, and swollen
- Ⓐ Mostly attacks the big toe at the metatarsophalangeal joint (podagra), may occasionally start in other joints
- Ⓐ Sudden severe pain (often at night)

##### Chronic gout

- Ⓐ Repetitive acute attacks are followed by progressive cartilage and bone erosion
- Ⓐ Deposition of tophi in soft tissue, e.g., ear cartilage, bursae, and tendon sheaths

## Differential diagnosis

- Joint infection
- Rheumatoid arthritis
- Injury
- Pseudo gout (osteoarthritis)

## Investigations

- Joint aspiration uric acid crystals viewed by a polarising microscope
- X-ray: Of the joint(s)
- Blood: Serum uric acid (usually elevated)

TREATMENT	LOC
Acute attack	
<input type="checkbox"/> Rest and immobilisation	HC2
<input type="checkbox"/> Start NSAIDS such as ibuprofen 400 mg every 8 hours	HC4
<input type="checkbox"/> or Indomethacin 50 mg every 8 hours	
<input type="checkbox"/> Or Diclofenac 50 mg every 8 hours	HC3
- Continue for the duration of the attack	
- If NSAIDS contraindicated	
<input type="checkbox"/> Prednisolone 40 mg once daily for 5 days	
<input type="checkbox"/> Or colchicine 0.5-1 mg initially followed by 0.5 mg every 2-3 hours until relief of pain, or if vomiting and diarrhoea occurs (max dose 6 mg).	H
Do NOT repeat the course within 3 days	
Chronic gout	
<input type="checkbox"/> Weight reduction	
<input type="checkbox"/> Control diet: healthy diet, limit alcohol consumption, coffee is beneficial	
<input type="checkbox"/> Avoid medicines which may increase uric acid: thiazide diuretics	
If more than 2 attacks per year, and/or complications (renal stones, chronic tophaceous gout), give:	H

TREATMENT	LOC
<input type="checkbox"/> Allopurinol starting dose 100 mg , increase monthly by 100 mg. Average maintenance dose 300 mg, max 900 mg. Titrate to keep uric acid level <0.35 mmol/L	H
<input type="checkbox"/> Do not start during acute attack, but continue with it if already started	
<input type="checkbox"/> Give prophylactic colchicine 0.5 mg every 12 hours for the first 3 months to prevent acute attacks	
<b>Note</b> <ul style="list-style-type: none"> <li>▪ DO NOT use allopurinol to treat asymptomatic hyperuricemia</li> </ul>	

### 10.2.3 Osteoarthritis ICD10 CODE: M15-M19

A degenerative joint disease with damage to articular cartilage usually caused by inorganic calcium deposit. It is the commonest form of joint disease. The pathological changes in osteoarthritis are irreversible.

#### Causes/risk factors

- Ⓐ Previous injury
- Ⓐ Overweight
- Ⓐ Age

#### Clinical features

- Ⓐ May involve any joint; most commonly the hip, spine, and knees, usually not symmetrical
- Ⓐ Restriction of movement, pain on moving the joint but tends to be absent at rest, limp in case of lower limbs
- Ⓐ Deformity, moderate tenderness
- Ⓐ Improvement with rest, deterioration with physical activity, and cold and wet weather conditions
- Ⓐ Joints are usually not swollen or warm but there may be some accumulation of (clear) articular fluid

## Differential diagnosis

- Gout; gouty arthritis
- Rheumatoid arthri

## Investigations

- Normal blood count and ESR
- X-ray: Of the joint(s)

## Management

### Goals of treatment

- Pain relief
- Optimisation of function
- Minimise progression

TREATMENT	LOC
<b>General measures</b>	
<input type="checkbox"/> Weight reduction	HC2
<input type="checkbox"/> Encourage activity and regular exercise	HC2
<input type="checkbox"/> Use of appropriate foot wear and walking aids	
<input type="checkbox"/> Paracetamol 1 g every 8 hours	HC4
In acute exacerbation, or severe pain	
<input type="checkbox"/> NSAID (ibuprofen, or diclofenac)	
– Limit use to brief periods	RR
<input type="checkbox"/> Diclofenac 1% gel if available	
<input type="checkbox"/> Intra-articular steroids e.g. triamcinolone (specialist only), maximum 4 times/year	

# 11 Blood Diseases and Blood Transfusion Guidelines

## 11.1 BLOOD DISORDERS

### 11.1.1 Anaemia

ICD10 CODE: D50-D64

Conditions characterised by inadequate blood haemoglobin (Hb) levels. It is quite common in tropical settings, and often caused by multiple factors. Children and young women are particularly at risk.

Normal haemoglobin levels by age

Category	Normal Value	Mild Anaemia	Moderate Anaemia	Severe Anaemia
<b>Men &gt;15 years</b>	>13 g/dL	11-12.9 g/dL	8-10.9 g/dL	<8 g/dL
<b>Women</b>	>12 g/dL	11-11.9 g/dL	8-10.9 g/dL	<8 g/dL
<b>Pregnant women</b>	>11 g/dL	10-10.9 g/dL	7-9.9 g/dL	<7 g/dL
<b>Child 12 - 14 years</b>	>12 g/dL	11-11.9 g/dL	8-10.9 g/dL	< 8 g/dL
<b>Child 5 – 11 years</b>	>11.5 g/dL	11-11.5 g/dL	8-10.9 g/dL	<8 g/dL
<b>Child 6 months – 5 years</b>	>11 g/dL	10-10.9 g/dL	7-9.9 g/dL	<7 g/dL

From WHO/NMH/NHD/MNM/11.1

### Reference range in newborns and infants

Age	Normal Range
<b>Birth</b>	>13.5 g/dL
<b>2 weeks</b>	>12.5 g/dL
<b>1-6 months</b>	> 9.5 g/dL

Adapted from Medscape Sept 2016 “haemoglobin concentration”

## Causes

### Decreased production of red blood cells

- Nutritional iron, and/or folic acid/vitamin B12 deficiency
- Depressed bone marrow function (leukaemia, aplasia)
- Infections (HIV, TB, visceral leishmaniasis)

### Increased destruction of red blood cells (haemolysis)

- Malaria
- Drug side effects (dapsone, cotrimoxazole, AZT)
- Congenital disorder, e.g. sickle cell anaemia, G6PD deficiency

### Loss of red blood cells

- Acute and chronic blood loss (e.g. haemorrhage after trauma, hookworm infestation, pregnancy, abortion, heavy menstrual loss, schistosomiasis, massive or chronic GI bleeding)

### Clinical features (Commonly)

- Pallor of conjunctivae, mucous membranes, palms, soles
- Fatigue, dizziness, palpitations, headache, anorexia, sometimes weight loss, low exercise tolerance
- Signs of heart failure if severe: oedema in lower limbs, dyspnoea, tachycardia, heart murmurs
- If due to acute blood loss: postural hypotension, decreased cardiac output, tachycardia, sweating, restlessness and thirst
- Look for signs of specific pathology, e.g., splenomegaly, malaria, nutrition deficiency, haemolysis jaundice, etc.

### Investigations

- Complete blood count (CBC) with differentials, Mean Corpuscular Volume (MCV), Mean Corpuscular Haemoglobin (MCH), Mean Corpuscular Haemoglobin Concentration (MCHC), Red Cell Distribution Width (RDW), Erythrocyte Sedimentation Rate (ESR), and platelet count.

puscular Volume (MCV), platelets, and a peripheral smear, reticulocyte count

- Evaluate Hb levels according to the patient's age
- Classify anaemia according to MCV
- Microcytic (smallRBCs):** measure serum ferritin to evaluate for iron deficiency, HB electrophoresis for thalassemias, sideroblastic anaemia may be caused by drugs like isoniazid and chloramphenicol, evaluate for chronic blood loss especially gastrointestinal bleeding through stool analysis for parasites, and occult blood.
- Macrocytic:** Do vitamin B12 and fasting serum folate levels to evaluate for vitaminB12 or folate deficiency, do TSH to evaluate for thyroid disease, evaluate for chronic alcohol abuse and use of, drugs like zidovudine, methotrexate, hydroxyurea antifolate medications Normocytic: evaluate for acute blood loss, chronic diseases, renal failure. , Investigate for the cause of hemolysis using peripheral film for schistocytes suggestive of microangiopathic hemolytic anaemia, HB

### Note

- Anaemia is not a final diagnosis: careful history, physical examination and laboratory tests are essential to determine the cause

### Management

#### General principles

- Determine and treat the cause
- Consider need for blood transfusion according to:
- Level of haemoglobin
- Clinical condition (haemodynamic status of patient, presence of heart failure, ongoing blood loss)

#### 11.1.1 Iron Deficiency Anaemia ICD10 CODE: D50

Anaemia due to iron deficiency



## Cause

- Ⓐ Poor nutritional intake with iron-poor foods.
- Ⓑ Chronic blood loss, e.g., infestation with hook worms, prolonged/excessive menstrual bleeding, chronic gastrointestinal bleeding (e.g., chronic use of NSAIDS, large bowel tumors, esophageal varices)

## Clinical features

- Ⓐ It usually develops slowly
- Ⓑ As per general anaemia symptoms plus:
  - Sore tongue, atrophy of lingual papillae
  - Erosions of the corners of the mouth
  - Brittle, fragile fingernails

## Differential diagnosis

- Ⓐ Conditions that cause microcytic red cells

## Investigations

- ▢ Blood: CBC, Hb, (haematocrit (Hct) rarely <28% unless iron deficiency is present)
- ▢ Low MCV and Mean Corpuscular Hb (MCH)- hypochromia. This may not be obvious in patients who have already been transfused
- ▢ Hypochromic microcytic (small size) red cells
- ▢ Investigate the cause of iron deficiency

## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li>▢ Identify, and treat cause of iron deficiency</li> <li>▢ Adjust diet if poor diet is one of underlying causes</li> <li>▢ Adult: Oral ferrous sulphate 200 mg (or ferrous sulphate/folic acid 200/0.4 mg) every 8 hours (equivalent to 180 mg elemental iron per day)</li> </ul>	HC2

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Child: Oral ferrous sulphate 5 mg/kg (max 200 mg) every 8 hours (equivalent to around 5 mg/kg elemental iron per day)           <ul style="list-style-type: none"> <li>• Hb rises in 2-3 weeks and returns to normal after 2 months</li> <li>• Treat for 6 months to 1 year to replenish stores</li> </ul> </li> <li><input checked="" type="checkbox"/> Give an antihelminthic           <ul style="list-style-type: none"> <li>• Albendazole 400 mg single dose</li> </ul> </li> </ul> <p><b>Refer to hospital in case of:</b></p> <ul style="list-style-type: none"> <li>• Severe symptoms – for blood transfusion</li> <li>• Gastrointestinal bleeding</li> <li>• Malabsorption</li> <li>• Intolerance to oral therapy</li> <li>• Unclear cause – not improving</li> </ul>	

### Note

- Side effects of oral iron: diarrhoea, abdominal discomfort, constipation, black stools. Warn patient not to worry
- Parenteral iron is rarely necessary, and can cause anaphylaxis. It should only be used by specialists

### 11.1.1.2 Megaloblastic Anaemia ICD10 CODE: D51-52

Anaemia characterised by large red blood cells. Usually due to folate and/or vitamin B12 deficiency. Some medicines (hydroxyurea, zidovudine, stavudine can cause macrocytic anaemia without folate and/or vitamin B12 deficiency).

#### Cause

- ⌚ Low dietary intake of folate/increased need (e.g., children, pregnancy)



- ⦿ Low dietary intake of vitamin B12 (in exclusively vegetarian diets, without any animal proteins)
- ⦿ Malabsorption of folate and vitamin B12 (severe gastritis, giardia infection, severe intestinal diseases)
- ⦿ Medicines e.g., metformin, zidovudine, hydroxyurea, stavudine, phenytoin
- ⦿ Other causes of macrocytosis: myelodysplasia, hypothyroidism, chronic alcohol use, multiple myeloma

### Clinical features

- ⦿ General anaemia signs
- ⦿ Vitamin B12 deficiency: neuropsychiatric abnormalities e.g., hyperpigmented palms and feet, smooth beefy tongue, peripheral neuropathy, impaired vibration and position sense, abnormal gait, weakness, decreased muscle strength, spastic motions, memory loss, disorientation, depression, and acute confusional state

### Investigations

- ⦿ Blood smear: macrocytosis
- ⦿ Elevated MCH/MCV
- ⦿ Pancytopenia in severe cases
- ⦿ Full blood count: oval macrocytes, hypersegmentation of neutrophils, thrombocytopenia
- ⦿ Decreased serum Vitamin B12 or fasting red cell folate

### Management

TREATMENT	LOC
<b>General measures</b>	HC2 RR
<ul style="list-style-type: none"> <li>❑ Identify and treat underlying cause of anaemia           <ul style="list-style-type: none"> <li>• Oral B12 may be given at a dose of 1mg (1000µg) daily in patients who cannot tolerate parenteral therapy.</li> </ul> </li> </ul>	

<ul style="list-style-type: none"><li>• There is also a Nasal formulation of vitamin B12 that can be given on alternate days.</li></ul> <p><input type="checkbox"/> Dietary modifications to ensure adequate intake of folate and vitamin B12, e.g., eat plenty of green leafy vegetables, and/or food of animal origin</p>	HC2 RR
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### Folic acid and vitamin B12 supplementation

- Folic acid: 5 mg daily until haemoglobin levels return to normal
- Vitamin B12: 1 mg IM daily for 5 days; then weekly for a further 3 doses
  - Follow with 1 mg every second month for life in patients with pernicious anaemia

### Note

- If vitamin B12 deficiency is suspected: (low leucocytes and platelets, neuropsychiatric symptoms, vegan diet) DO NOT GIVE folic acid alone but refer for further testing and treatment. Giving folic acid alone in
- patients with B12 deficiency may precipitate permanent neurological deficit.

- Anaemia normally corrects within 1-2 months. White cell count and thrombocytopenia normalise within 7-10 days
- DO NOT use ferrous-folate combination tablets to treat folic deficiency because the quantity of folic acid is too low

#### 11.1.1.3 Normocytic Anaemia

Anaemia characterised by normal-sized red blood cells

##### Cause

- Acute blood loss
- Haemolysis (destruction of red cells), e.g., auto-immune



disorder, hypersplenism, haemoglobin abnormalities (sickle cell disease, thalassemia), drugs (sulphonamides, dapsone, primaquine)

- Ⓐ Decreased reticulocytosis (formation of new blood cells),
- Ⓐ e.g. chronic kidney disease and chronic diseases ..

### Clinical features

- Ⓐ General features of anaemia

### Investigations

- Ⓐ Evidence of haemolysis
- Ⓐ Full blood count smear: spherocytes
- Ⓐ HIV serology

### Management

TREATMENT	LOC
<b>Generally</b>	
<input type="checkbox"/> Identify and treat cause of anaemia <b>Medicine treatment</b> <input type="checkbox"/> DO NOT treat with iron, folic acid or vitamin B12 unless there is clear documented deficiency <input type="checkbox"/> Treat all patients with folic acid 5 mg daily in haemolytic anaemia <input type="checkbox"/> Refer to hospital for further management	HC4

### Prevention/Health Education for Anaemia

Educate the public about:

- Ⓐ The life long effects of anaemia on health, and cognitive development
- Ⓐ Dietary measures: encourage exclusive breastfeeding for the first 6 months. Encourage the use of iron-containing

wearing locally available foods (red meat, beans, peas, dark leafy vegetables)

- Hygiene: avoid walking barefeet to avoid hook worm infestation, use of pit latrines for faecal disposal, and practice good hand washing habits
- Medical: encourage periodic screening for children and pregnant mothers, and presumptive iron therapy for either groups in cases of anaemia (see IMCI and pregnancy guidelines, chapters 16 and 17)
- Routine iron supplementation for all pregnant mothers
- Early treatment of malaria, helminthic infections, etc.

### 11.1.2 Bleeding Disorders

ICD10 CODE: D65-D69

A bleeding disorder is suspected if a patient has unexplained bruising and bleeding (i.e. no history of trauma). Prolonged bleeding or oozing can also occur after injury or surgery (e.g., tooth extraction, small cut).

#### Causes

- Blood vessel defect
- Acquired: age, side effects of steroids, NSAIDS (e.g. easy bruising)
- Genetic e.g. hereditary telangiectasia
- Platelet defect
- Decreased platelet number/function e.g., blood cancer, viruses, aplastic anaemia
- Increased destruction e.g., in hypersplenism, autoimmune disease, massive blood transfusion
- Coagulation defect
- Hereditary e.g., haemophilia A or B, von Willebrand disease
- Acquired e.g., warfarin or heparin, liver disease, alcoholism, acquired factor inhibitors for e.g. in malignancies,

autoimmune diseases and pregnancy.

y InfectiInfections: meningococcal sepsis, haemorrhagic fevers (causing widespread endothelial damage and disseminated intravascular coagulation)

## Clinical features

- Ⓐ Platelet disorder: mucosal bleeding (gingivitis, nose bleeds), superficial ecchymoses, excessive bleeding after minor injury, petechiae, heavy menstrual bleeding
- Ⓐ Coagulation disorder: large, deep haematomas or haemathrosis

## Investigations

- ◻ Complete blood count, and platelet count (can be estimated using a peripheral smear if an auto-analyser is not available)

**Bleeding time (time required for bleeding to stop).** It is normal with coagulation factor deficiencies (except Von Willebrand disease), and abnormal in thrombocytopenia and qualitative platelet defects

- Ⓐ Coagulation tests
  - Prothrombin time (PT): prolonged in factor VII, X, V, II deficiencies, liver disease, warfarin treatment
  - International normalised ratio (INR) to monitor anticoagulation with warfarin (not useful for heparin and direct acting anticoagulants like rivaroxaban)
  - Partial thromboplastin time (aPTT): prolonged in factor VIII, (hemophilia A) XII, XI, IX, (hemophilia B) X, V and I deficiencies
- Ⓐ If acute, consider if haemorrhagic fevers are the cause

## Management

Patients with acute bleeding disorders should be referred to hospital for appropriate investigations and treatment.

Patients with chronic bleeding disorders should be referred to a specialist.

TREATMENT	LOC
<input type="checkbox"/> Identify and treat root cause of bleeding disorder <input type="checkbox"/> Give phytomenadione (vitamin K) injection to: Newborn: 1 mg for full-term baby; 500 mcg for a pre-term baby IM or IV. Repeat every 8 hours if necessary <input type="checkbox"/> In patients on warfarin with acute bleeding, give vitamin K 5 mg slow IV to reverse warfarin effect. If patient has severe or active bleeding, give fresh frozen plasma <input type="checkbox"/> Discontinue any medications that will interfere with coagulation or platelet function, e.g., cephalosporins, dipyridazole, thiazide, alcohol, chloropromazine, sulfonamides, rifampicin, methyldopa, phenytoin, barbiturates, quinidine, isoniazid.	HC2
<input type="checkbox"/> <ul style="list-style-type: none"> <li>■ Transfuse with platelets if Patient is bleeding (therapeutic) or prophylactically when platelet count is less than 10,000/<math>\mu</math>L in patients at high risk of bleeding – e.g., cancer patients.</li> <li>■ Transfuse with fresh frozen plasma if bleeding is thought to be due to disorders related to clotting factors</li> </ul>	HC4
<b>Refer to a higher level of care if the above options are not viable.</b>	H
<b>Referral criteria</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Refer patient to hospital if any of the following signs are present           <ul style="list-style-type: none"> <li>■ If cause cannot be determined locally</li> <li>■ Spontaneous bleeding</li> <li>■ Bleeding into muscles or joints, GIT, or CNS</li> <li>■ Bleeding patients who are on warfarin</li> <li>■ Postpartum bleeding</li> <li>■ Family history of bleeding</li> </ul> </li> </ul>	RR

### Treatment

- Rivaroxaban tablets
- 15mg once a day for 3 weeks then 20mg once a day for the duration of anticoagulation



- Ⓐ Apixaban tablets for DVT/PE
- Ⓐ 10mg once day for 7 days then 5mg twice a day
- Ⓐ IVIG for ITP
- Ⓐ 1g/kg intravenously, up to 3 doses on alternate days
- Ⓐ ATG for aplastic anaemia
- Ⓐ 10-20mg/kg intravenous infusion for up to 5-14 days then as required up to 21 doses

## Health education

- Ⓐ Advise the patient with chronic bleeding disorder to:
- ☐ Prevent injury
- ☐ Avoid injections and unnecessary surgery
- ☐ Visit the clinic immediately if symptoms occur
- ☐ Continue all medication as prescribed
- Ⓐ All haemophiliacs should have prophylactic treatment before traumatic procedures, e.g., tooth extractions, or surgery

### 11.1.3 Sickle Cell Disease

ICD10: D57

Sickle cell disease (SCD) is a genetic haemoglobin disorder in which red blood cells which carry oxygen around the body change shape from a smooth doughnut shape into a crescent or half-moon shape. It is sometimes called Sickle Cell Anaemia (SCA).

#### Cause

- Ⓐ It is caused by a defect in beta chains where a given amino acid is replaced by another (Substitution of valine for glutamic acid) at position 6 of the chain. This change creates abnormal haemoglobin called HbS.

#### Clinical features

- Ⓐ Symptoms usually appear from age of 3 to 6 months: anaemia, dactylitis (swelling of fingers), lobar pneumonia, recurrent severe bacterial infections. This results from the

reduction of the foetal haemoglobin F (HbF), and increase in HbS in the blood

- Ⓐ Chronic anaemia: Hb 6–9 g/dl with episodes of acute worsening, which can be due to
  - Aplastic crisis: sudden transient arrest of blood cells production in the bone marrow (low Hb and low reticulocytes), often due to ParvoB19 virus infection)
  - Splenic sequestration: pooling of large amounts of red blood cells in the spleen with painful and rapidly enlarging spleen, decreasing haemoglobin with high reticulocyte count
- Ⓐ Acute vaso-occlusive phenomenon (occlusion of blood vessels) causing:
  - Painful crisis (acute, intense) at the back, chest, limbs, abdomen. In children <2 years, pain and swelling of hands and feet.
  - Stroke: hemiplegia, altered consciousness, seizures

Acute chest syndrome: fever, chest pain, difficulty in breathing, low oxygen level, cough, wheezing

- ▢ Acute abdomen or mesenteric crisis (“intestinal crisis”): abdominal pain and distension, reduced or absent bowel sounds, pallor, fever, Abdominal X-ray may show dilated bowel loops. Anaemia, high reticulocyte count, high CRP will be present.
- ▢ Renal infarction, bone infarction and necrosis, especially at the head of femur, priapism
- Ⓐ Chronic organ damage due to anaemia and vasocclusive phenomenon:
- ▢ Hyposplenia (spleen undergoes autosplenectomy due to multiple infarcts and is not functional anymore or has to be removed because of splenic sequestration)
- ▢ Pulmonary hypertension, asthma
- ▢ Chronic renal and hepatic disease, gallbladder stones
- ▢ Osteoporosis, retinopathy
- ▢ Chronic leg ulcers



- Infections associated with asplenia and hyposplenism like pneumococcal infections
- Osteomyelitis, pneumonia, septicaemia

## Investigations

- Family history of sickle cell disease
- Full blood count & peripheral film comment
- Screening tests for sickling (not fully reliable)
- Haemoglobin electrophoresis (confirms diagnosis)
- Chest radiography (for Acute Chest Syndrome)
- Abdominal ultrasound
- Urinalysis
- Liver and renal function tests

(nephropathy and acute kidney injury due to hypovolemia and hypoperfusion.  $>200\text{cm/sec}$  predicts high risk of having a stroke. This is less predictive in adults)

## Management

### Chronic Management

TREATMENT	LOC
<b>General measures</b> <ul style="list-style-type: none"><li><input type="checkbox"/> Regular follow up and education of patients and families. Family support</li><li><input type="checkbox"/> Always keep well-hydrated</li></ul>	

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Give folic acid 5 mg daily for life</li> <li><input type="checkbox"/> Promptly assess, and treat any fever with antibiotics until source of fever is identified</li> <li><input type="checkbox"/> Ensure complete immunisation using the UNEPI programme, which includes the pneumococcal vaccine for all infants</li> </ul> <p>▪ Plus, if available, immunisation against meningococcus (to be given in regions within the meningococcal belt) and influenza</p>	
<ul style="list-style-type: none"> <li><input type="checkbox"/> Prophylactic penicillin V (up to 5 years of age) Child 3 months-3 years: penicillin V 125 mg every 12 hours</li> <li><input type="checkbox"/> Child 3-5 years: penicillin V 250 mg every 12 hours</li> <li><input type="checkbox"/> Malaria prophylaxis with monthly sulphadoxine-pyrimethamine (SP) <ul style="list-style-type: none"> <li>▪ Child 2-5 years: ½ tab monthly</li> <li>▪ Child 5-10 years: 1 tab monthly</li> <li>▪ Child 10-15 years: 2 tabs monthly</li> <li>▪ Child &gt;15 years: 3 tablets monthly</li> </ul> </li> </ul> <p>For those with sulphur allergy consider use of erythromycin 250 mg every 12 hours</p>	HC2
<p><b>Refer to a specialised treatment centre for specialised management, especially of uncontrolled symptoms</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Hydroxyurea starting dose 20 mg/kg</li> </ul> <p><b>Indications for hydroxyurea</b></p> <p>Children of 9 months and above should be initiated on hydroxyurea</p> <ul style="list-style-type: none"> <li><input checked="" type="radio"/> Frequent crises: &gt;3 crises in a year</li> <li><input checked="" type="radio"/> Pain interfering with activities of daily living</li> </ul>	RR



<ul style="list-style-type: none"> <li><input checked="" type="radio"/> Patients with abnormal Transcranial Doppler (TCD) Ultrasonography velocity &gt;200 cm/s</li> <li><input checked="" type="radio"/> Recurrent or severe acute Chest Syndrome</li> <li><input checked="" type="radio"/> Stroke</li> </ul>	RR
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**Note:** However, the decision to give a patient hydroxyurea should be done by a senior health worker after full laboratory investigation of the patient including:

- Complete blood count
- Renal function tests
- Liver function tests

### Management of acute complications

TREATMENT	LOC
<b>Painful crisis – home management (mild to moderate pain)</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Oral hydration</li> <li><input type="checkbox"/> Warm compresses (not cold)</li> <li><input type="checkbox"/> Paracetamol 1 g every 8 hours Child: 10-15 mg/kg 6-8 hourly</li> <li><input type="checkbox"/> And/or ibuprofen 400-600 mg every 6-8 hours Child: 5-10 mg/kg 8 hourly</li> <li><input type="checkbox"/> And/or oral diclofenac 50 mg 8 hourly Children only &gt;9 years and &gt;35 kg: 2 mg/kg in 3 divided doses</li> </ul>	HC2 HC4
<b>If pain not controlled, add:</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Codeine 30-60 mg every 6 hours (only in patients &gt;12 years)</li> <li><input type="checkbox"/> Or oral tramadol 50-100 mg every 6-8 hours (only in patients &gt;12 years)</li> <li><input type="checkbox"/> Or Oral morphine at 0.2-0.4 mg/kg every 4 hours and re-assess pain level</li> </ul>	

TREATMENT	LOC
(see section 13.1.2) for the WHO analgesic Ladder  <b>If pain still not controlled, refer to hospital</b>	RR
<b>Painful crisis – hospital management (severe pain)</b>	HC4
<input type="checkbox"/> IV fluids for rehydration <input type="checkbox"/> Oxygen, keep oxygen saturation >95% Assess for: <input type="checkbox"/> Assess for malaria and other infections <input type="checkbox"/> Injectable diclofenac  Child: 1 mg/kg IM 8 hourly Adult: 50-75 mg IM 8 hourly	HC4
<input type="checkbox"/> Morphine oral (see section 13.1.2) Child and Adult: 0.3-0.6 mg/kg per dose and re-assess <input type="checkbox"/> Or Morphine IV  Child: 0.1-0.2 mg/kg per dose Adult: 5-10 mg dose and re-assess	HC3 H
<b>Note</b>	
<ul style="list-style-type: none"> <li>▪ Use of laxative: bisacodyl 2.5 mg to 5 mg orally to prevent constipation due to morphine</li> </ul>	
<b>Acute anaemia (acute splenic sequestration, aplastic crisis)</b>	HC4
<input type="checkbox"/> Transfuse (see section 11.1.1) <input type="checkbox"/> IV fluids if necessary <input type="checkbox"/> Investigate and treat malaria, and infections <input type="checkbox"/> Avoid splenectomy in acute sequestration (high mortality)	
<b>Acute Chest syndrome</b>	
<input type="checkbox"/> Restricted IV fluids use, always use calculated required amounts of IV fluids. NB: limit in cases of pulmonary oedema	

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Oxygen therapy</li> <li><input type="checkbox"/> Pain management as above</li> <li><input type="checkbox"/> Salbutamol inhaler (2-4 puffs prn) or nebulisation 5 mg (2.5 mg for children &lt;5 years)</li> <li><input type="checkbox"/> Ceftriaxone 1-2 g once daily for 7-10 days Child: 80-100 mg/kg once daily</li> <li><input type="checkbox"/> Plus erythromycin 500 mg every 6 hours for 7-10 days Child: 5-10 mg/kg every 6 hours</li> <li><input type="checkbox"/> Transfuse if no improvement, and/or Hb falls &lt;9 g/dL. Start incentive spirometry (or blowing of a balloon) early in acute chest syndrome</li> </ul>	HC4
<b>Stroke</b>	RR
<ul style="list-style-type: none"> <li><input type="checkbox"/> Oxygen to maintain SpO<sub>2</sub> &gt;94%</li> <li><input type="checkbox"/> Tranfuse if Hb &lt;9 g/dl</li> <li><input type="checkbox"/> IV fluids</li> <li><input type="checkbox"/> Refer for neuroimaging and advanced management</li> </ul>	
<b>Acute Abdomen/Mesenteric crisis</b>	H
<ul style="list-style-type: none"> <li><input type="checkbox"/> IV fluids</li> <li><input type="checkbox"/> Nil by mouth</li> <li><input type="checkbox"/> NGT tube on free drainage</li> <li><input type="checkbox"/> Antibiotics</li> <li><input type="checkbox"/> Ceftriaxone 1-2 g once daily for 7-10 days</li> <li><input type="checkbox"/> Child: 80 mg/kg once daily</li> <li><input type="checkbox"/> Plus metronidazole 500 mg IV every eight hours for 7-10 days</li> <li><input type="checkbox"/> Child: 10 mg/kg IV every 8 hours</li> <li><input type="checkbox"/> Red cell transfusion</li> <li><input checked="" type="radio"/> Plain abdominal X-ray to rule out obstruction or stool impaction</li> <li><input type="checkbox"/> Surgical review</li> </ul>	

TREATMENT	LOC
<p><b>Infections</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Prompt assessment and treatment of cause (osteomyelitis, pneumonia, chronic leg ulcers, cellulitis, etc.)</li> <li><input type="checkbox"/> Treat according to cause. If no localising focal symptoms, and no malaria, give:</li> <li><input type="checkbox"/> Ceftriaxone 1-2 g once daily for 7-10 days</li> <li><input type="checkbox"/> Child: 80 mg/kg once daily</li> </ul> <p><b>If osteomyelitis or septic arthritis</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Or Cloxacillin 500 mg 6 hourly IV or orally</li> <li><input type="checkbox"/> Child: 50 mg/kg 6 hourly for at least 21 days</li> <li><input type="checkbox"/> or Ciprofloxacin 500 mg 12 hourly for at least 21 days <ul style="list-style-type: none"> <li>▪ In child: Ceftriaxone 50 mg/kg IV once a day for at least 21 days</li> </ul> </li> </ul>	H
<p><b>Indications for blood transfusion</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Acute exacerbation of baseline anaemia: (drop in HB of 2g/dl) <ul style="list-style-type: none"> <li>▪ Hyperhaemolysis</li> <li>▪ Hepatic sequestration</li> <li>▪ Splenic sequestration</li> <li>▪ Aplastic crisis</li> </ul> </li> <li><input type="checkbox"/> Severe vaso-occlusive events: <ul style="list-style-type: none"> <li>▪ Stroke</li> <li>▪ Acute chest syndrome</li> <li>▪ Multi-organ failure</li> </ul> </li> <li><input type="checkbox"/> Preparation for procedures: <ul style="list-style-type: none"> <li>▪ Surgery</li> <li>▪ Radiography with ionic contrast</li> <li>▪ General anaesthesia</li> </ul> </li> </ul>	HC4

## Prevention/health education

- Patient, family and community education
  - Timely initiation of hydroxyurea
  - Periodic comprehensive evaluations, and other disease-specific health maintenance services
  - Periodic evaluation for sickle cell complications for example urinalysis and renal function for sickle cell nephropathy, cardiac echo for pulmonary hypertension, transcranial doppler in children for early detection of stroke risk. Patients with these complications should be referred to a specialist
  - Timely and appropriate treatment of painful crisis and acute illness
  - Genetic counseling (for couples planning to have children)
  - Antenatal screening
  - Early recognition /screening of children with low Hb
  - Vaccination (pneumococcal vaccine, H-influenza vaccine, Hepatitis B vaccine evaluation)
  - Antibiotic (oral penicillin twice a day)
  - Timely and appropriate treatment of acute illness
  - Genetic counseling (for couples planning to have children)
  - Antenatal screening
  - Early recognition/screening of children with low Hb
- Vaccination (pneumococcal vaccine, H-influenza vaccine, Hepatitis B vaccine evaluation)
- Antibiotic (oral penicillin twice a day in >5years), and antimalarial chemoprophylaxis

## 11.2 Blood And Blood Products

The Uganda Blood Transfusion Service (UBTS) collects blood and produces all blood products. Whole blood (WB): unseparated blood

collected in an approved container and containing a preservative or anti-coagulant solution “Blood” refers to any blood component in which the main constituent is red blood cells, e.g., whole blood (WB), red cell concentrate, or red cell suspension.

Unless otherwise specified, others are referred to as blood components or products. Blood components are prepared from WB, and contain negligible quantity of red cells, e.g., platelet concentrate, Fresh Frozen Plasma, Cryoprecipitate. (Refer to the “National Blood Transfusion Guidelines for appropriate use of blood” for more details) UBTS ensures that all blood and blood products are produced in away that ensures the health and safety of both patients and donors and minimises the risk of transmitting infection through blood.

### **11.2.1 General Principles of Good Clinical Practice in Transfusion Medicine**

- Blood is a scarce and expensive resource. Blood transfusion carries risks of adverse reactions and transfusion-transmitted infections
  - Use blood appropriately, that is, to treat conditions that can lead to significant morbidity or mortality, which cannot be prevented or effectively managed by other means
  - Minimise the need for transfusion by:
    - Early diagnosis, and treatment of anaemia, in particular iron deficiency anaemia
    - Stop blood loss, through good surgical and anaesthetic management
    - Appropriate and timely management of coagulation disorders
    - Use of simple alternatives to transfusion when appropriate, e.g., IV fluids as first line treatment of hypovolemic shock
- Prescribe transfusion according to patient's individual needs, using clinical signs and symptoms, and expected outcome, but NOT only according to Hb level

**Do not use blood transfusion to:**

- Expand blood volume, unless there has been blood loss of >30% of total volume
  - Enhance wound healing
  - “Top up” Hb prior to surgery
  - Improve general well-being of the patient in patients with on-going fluid losses, e.g. surgical blood loss
- 
- Ⓐ Blood should not be transfused unless it has been:
  - ▢ Obtained from appropriately selected donors (voluntary non-re-munerated donors)
  - ▢ Screened for transfusion-transmissible infections (TTIs), namely; HIV, hepatitis B, hepatitis C, and syphilis Tested for compatibility (pre-transfusion) between the donor's red cells and the antibodies in the patient's plasma in accordance with national guidelines
  - Ⓐ The mandate to collect blood from donors, and screen it for TTI is reserved for UBTS
  - Ⓐ Guidelines and procedures for requesting, administering, and recording blood transfusion should be clearly spelled out, and strictly followed to avoid catastrophic mistakes (see below for)
  - Ⓐ Ensure the transfused patient is closely monitored (during and after transfusion) and that there is immediate response if any adverse reactions occur

**11.2.2 Blood and Blood Products: Characteristics and Indications**

The following section will present only whole blood and red cells concentrate. Availability and use of other blood components is reserved for referral hospitals and is beyond the scope of this guideline.

### 11.2.2.1 Whole Blood

- Whole blood provides red blood cells, plasma volume, stable coagulation factors (VII, XI), and others
- May not have enough functional platelets and labile coagulation factors (V and VIII)
- It is also used as a raw material from which other blood components are prepared
- 1 unit of whole blood is about 450 ml of donor blood; obtained from a single donation plus 63 mL of anticoagulant/preservative solution. It is available from HC4 level
- Hct is approximately 35%
- Each unit of blood will raise the HB by about 1g/dl

### Indications

- Red blood cell replacement in acute blood loss (haemorrhage) with significant hypovolaemia such as in trauma, surgery, invasive procedures, GIT haemorrhage
- Patients in need of red blood cell transfusion, where red cell concentrates or suspensions are not available (consider adding furosemide to avoid fluid overload)
- Only Specialist Use: exchange transfusion in neonates, using less than 5-day old blood units

### Dose

- Adults: 1 unit at a time
- Children: 20mL/kg

### Caution

- Transfusion must be started within 30 minutes of removal from the refrigerator, and completed within 4 hours of starting
- Storage is 2-6 C in approved blood bank refrigerator with temperature charts and alarm

- WB is contraindicated in severe chronic anaemia and incipient cardiac failure (risk of volume overload)
- Blood should not be warmed (improvised warming method commonly used in health facilities is not necessary)
- The routine use of diuretics (furosemide, or lasix), pre-transfusion is not necessary in most patients. Pre-transfusion diuretics are indicated in known cardiac and renal patients – to prevent circulatory overload.

### 11.2.2.2 Red Cell Concentrates (packed red cells)

Red cell concentrates contain red blood cells, suspended in a small amount of plasma and additive solutions (which provides nutrients to the red cells in storage). It is in a form of two, or three pediatric bags, each containing 80-150 ml, obtained from a single donation. HCT is approximately 55%. It is available from HC4 level.

#### Indications

- Red blood cell replacement in anaemic patients
- In acute blood loss, together with crystalloid solution if WB is not available

#### Caution

- Transfusion must be started within 30 minutes of removal from the refrigerator, and completed within 4 hours of starting
- Storage is 2-6 C in approved blood bank refrigerator with temperature charts and alarm

### 11.2.2.3 Clinical Indications for Blood Transfusion

The indication for blood transfusion (with whole blood or red cell concentrates) depends on:

- The degree of anaemia (estimated by Hb level)

- The clinical conditions (high risk or presence of signs and symptoms of tissue hypoxia, or impaired tissue oxygenation resulting from anemia or blood loss)

Presence of ongoing blood loss (e.g., internal or external haemorrhage)

### **Severe acute anaemia in children and infants**

Transfuse, if;

- Hb < 4 g/dL (or haematocrit < 12%), whatever the clinical condition of the patient
- Hb < 4 – 6 g/dL (or haematocrit 13-18%), in case of life threatening complications, such as, clinical features of hypoxia and cardiac decompensation, acidosis (usually causes respiratory distress, impaired consciousness/coma, hyperparasitaemia (>20%) or cerebral malaria, septicaemia, meningitis

Dose: Transfuse 10-15 mL/kg of packed red cells (or 20 mL/kg of whole blood)

Note: In children with chronic anaemia caused by iron deficiency, it may be possible to correct with iron therapy alone.

### **Severe anaemia in adults**

- Consider blood transfusion only in anaemia whose severity is likely to cause/ has already caused clinical signs of hypoxia, or impaired tissue oxygenation. These signs may include; tachycardia, shock, respiratory distress, weakness, dizziness and/or unconsciousness.
- Symptomatic anaemia (see above) in adults with <7 g/dL
- Haemoglobin <8g/dL if with cardiac disease or CNS symptoms
- Give the minimum number of transfusions necessary to relieve hypoxia:
  - Transfuse 1 unit at a time, then re-assess
  - If symptoms persist give another unit
  - Transfuse in 2-4 hours

## Severe anaemia in pregnancy

- Ⓐ Generally, it is important to screen for iron deficiency anaemia early in pregnancy and treating with iron as necessary.

### Pregnancy <36 weeks

- Ⓐ Hb 5 g/dL irrespective of clinical condition
- Ⓐ Hb 5-7 g/dL in case of established or incipient heart failure/impaired tissue oxygenation, pneumonia or other serious infection, malaria, pre-existing heart disease

### Pregnancy >36 weeks

- Ⓐ Hb 6 g/dL
- ▢ Hb 6-8 g/dL in case of, established or incipient heart failure/impaired tissue oxygenation, pneumonia or other serious infection, malaria, pre-existing heart disease

## Elective caesarean section

If history of APH, PPH, previous caesarean section

- Ⓐ Hb is 8-10 g/dL
- ▢ Establish/confirm blood group, and save freshly taken serum for cross-matching
- Ⓐ Hb <8 g/dL
- ▢ Have 2 units of blood cross-matched and made available

## Pre-operative anaemia

Pre-operative anaemia should be investigated, and promptly managed before surgery;

- Prompt management may include iron supplementation (oral, or intravenous)
- Where possible, surgery should be delayed or postponed, until anaemia is corrected, since pre-operative anemia is associated with poor surgical outcomes (morbidity and mortality), as well as an increased need for blood transfusion.

- 8 g/dL in case of:
  - Inadequate compensation for the anaemia (symptomatic anaemia)
  - Significant co-existing cardiorespiratory disease
  - Major surgery or significant blood loss expected
  - Pre-surgical correction has not been possible

### **Management of acute haemorrhage/hypovolemia**

- IV fluids (crystalloids: Normal saline) is the first line in treatment of hypovolaemia during acute haemorrhage
- Whole blood (or red blood cells if WB unavailable) are indicated when blood loss is >20- 30% of blood volume (>15-20 mL/kg)
- The need for blood must be determined by:
  - Amount and speed of blood loss
  - Patient's critical signs
  - Initial response to IV fluid resuscitation
- Hb level is NOT a reliable indicator for blood need in acute haemorrhage

### **Sickle cell anaemia**

- Blood transfusion is not necessary for asymptomatic sickle cell patient with steady Hb 6-8 g/dL nor for an uncomplicated painful episode
- In addition to general indications, blood transfusion is indicated if:
  - Acute severe anaemia (Hb <5 g/dL or 2 g/dL lower than usual level for the patient) in aplastic and acute sequestration crisis. Aim at Hb 7-8 g/dL
  - Hb <6 g/dL in uncomplicated pregnancy
  - Hb <8 g/dL if caesarean section
  - Hb <9 g/dL in case of acute chest syndrome (ACS), or stroke. For these four patient categories (pregnancy, C/section, ACS, and stroke), the target Hb is 11g/dL, and not any higher.

- ⑤ Use packed cells if available (rather than WB)– whole blood is indicated

### **Neonatal conditions**

- ⑥ Severe anaemia (of any cause (prematurity, sepsis, etc.)
- ⑥ Transfusion in neonates should be managed at specialist level

### **11.2.3 Adverse Reactions following Transfusion**

Any potentially adverse sign or symptom resulting from a blood transfusion.

#### **Common Acute Transfusion reactions (ATR) include:**

- Minor allergic reaction (Urticaria)
- Febrile non-haemolytic transfusion reaction
- Acute haemolytic transfusion reaction (caused by ABO incompatibility): is a ~~sever~~ and life threatening reaction
- Bacterial contamination
- Transfusion-associated circulatory overload (TACO)
- Transfusion-related acute lung injury (TRALI)
- Severe allergic (Anaphylactic) reaction; relatively rare

#### **Delayed Transfusion reactions**

- ⑥ Transfusion-transmitted infections, e.g., HIV, Hepatitis B, and Hepatitis C
- ⑥ Delayed hemolytic transfusion reactions

#### **General principles**

- ⑥ Acute transfusion reactions (ATRs) may occur in 1-2% of transfused patients.

- Rapid recognition and management of transfusion reactions may save the patient's life
- Vital signs should always be taken (at a minimum) immediately prior to beginning the transfusion, 15 min after start and at end (see box with Key Points). In addition, a nurse or physician should observe the patient for the first 15 minutes after a new blood unit is started, and vital signs recorded
- Errors and failure to follow correct procedures are the most common causes of life threatening acute haemolytic reactions. Such errors include; misidentification of patients – resulting in administering the wrong blood unit to the wrong patient, not repeating blood grouping of the blood units received at hospital, not cross-matching, and errors in labeling blood samples for pre-transfusion grouping and cross-match. These errors must be avoided.
- ALWAYS store blood used for the compatibility testing for 7 days at 2-8 C for possible investigation on transfusion reactions
- In a conscious patient with a severe acute haemolytic transfusion reaction, signs/symptoms may appear within minutes of infusing only 5-10 mL of blood
- In an unconscious or anaesthetised patient, hypotension, hypoxia and uncontrolled bleeding may be the only signs of a transfusion problem. As such, taking vitals regularly is important.

### Key points

- Accurate patient identification – at bed side, is critical during;
  - Blood sample collection
  - Administration of blood
- Monitoring transfusion is only way to identify ATRs
- Monitoring transfusion is performed by taking vital signs; before, 15 minutes into, whenever a reaction is suspected, and at the end of transfusion



### Vital signs taken;

- Temperature
- BP
- Respiratory rate
- Pulse rate
- Any unexpected change(s) in vitals = a possible ATR, until proved otherwise

If a transfusion reaction is suspected

- Stop the transfusion, and remove the giving set. Prior to disconnecting, the unit must be closed to avoid reflux of patient blood into the donor blood
- Check the blood pack labels and patient's identity. If there is a discrepancy, consult the blood bank
- Evaluate the patient; take vitals, and manage accordingly (See table below)
- Maintain intravenous access
- Obtain a post-transfusion blood sample. Return the implicated blood unit to the hospital blood bank. Re-grouping and testing are done on both patient and transfused samples
- Immediately report all suspected acute transfusion reactions to the hospital blood bank laboratory that works with the clinician
- For category two reactions, record the following in the patient's notes: type of reaction, time reaction occurred from start of transfusion, volume, type, and pack numbers of blood products transfused
- The type of reaction should be diagnosed, and a quick and clear investigation should be started in the hospital blood bank laboratory

### 11.2.3.1 Acute Transfusion Reactions

Occurring within 24 hours of transfusion.

CATEGORY 1: MILD REACTIONS		
SIGNS AND SYMPTOMS	POSSIBLE CAUSES	MANAGEMENT
● Localised cutaneous reactions, e.g. urticaria/ hives, rash, itching	● Minor allergic reactions, e.g. urticaria/hives, rash, itching ● With no respiratory or other signs/symptoms	● Temporarily stop the transfusion ● Check vitals ● Give antihistamine, e.g. promethazine 25-50 mg by deep IM or slow IV (Child 1-5 years: 5 mg by deep IM Child 5-10 years: 6-25-12.5 mg by deep IM)  ● Alternatives: Oral cetirizine 10mg, loratadine 10mg (Child; half dose) ● If patient remains hemodynamically stable, then no cause for alarm ● Restart transfusion slowly with close monitoring ● Re-assure patient.
● Mild fever (<38.9 °C), without ANY other symptoms/signs.		● Temporarily stop the transfusion ● Administer oral paracetamol; 15 mg/kg (adult: 1 g) ● Evaluate the patient; take vitals ● If patient remains hemodynamically stable, then no cause for alarm ● Restart transfusion slowly with close monitoring ● Re-assure patient.



If no clinical improvement within 30 minutes, or if condition worsens: treat as category 2, below

Category 2: Severe And Life Threatening Reactions			
Signs And Symptoms	Possible Causes	Management	
<ul style="list-style-type: none"> <li>■ Severe generalised rash</li> <li>■ Airway edema and obstruction (wheezing or stridor)</li> <li>■ Hypoxia, and shock</li> </ul>	<ul style="list-style-type: none"> <li>■ Severe allergic (anaphylaxis) reaction</li> </ul>	<ul style="list-style-type: none"> <li>■ Stop the transfusion, and DO NOT re-start.</li> <li>■ Evaluate the patient; take vitals</li> <li>■ Notify the hospital blood bank.</li> <li>■ Resuscitate patient, as appropriate.</li> <li>■ Administer an anti-histamine, e.g., promethazine (i.v)</li> <li>■ Airway support, give oxygen</li> <li>■ Give hydrocortisone 4 mg/kg IV and</li> <li>■ Salbutamol 2.5-5 mg nebulization</li> <li>■ Stop the transfusion, and DO NOT re-start.</li> <li>■ Evaluate the patient; take vitals</li> </ul>	
<ul style="list-style-type: none"> <li>■ Fever (39°C), rigors, chills</li> <li>■ Nausea &amp; vomiting,</li> <li>■ tachycardia,</li> <li>■ Hypotension,</li> <li>■ dyspnea.</li> </ul>	<ul style="list-style-type: none"> <li>■ Any one of;</li> <li>■ Acute hemolytic transfusion reaction</li> <li>■ Bacterial contamination</li> </ul>	<ul style="list-style-type: none"> <li>■ Notify the medical officer in charge and blood bank immediately</li> <li>■ Resuscitate patient, as appropriate.</li> <li>■ Maintain airway and give high flow oxygen by mask</li> </ul>	

CATEGORY 1: MILD REACTIONS			
SIGNS AND SYMPTOMS	POSSIBLE CAUSES	MANAGEMENT	
<ul style="list-style-type: none"> <li>■ Restlessness, anxiety</li> <li>■ Hypotension (fall of &gt;20% in systolic BP)</li> <li>■ Hypertension</li> <li>■ Tachycardia</li> <li>■ Haemoglobinuria</li> </ul>	<ul style="list-style-type: none"> <li>■ Transfusion-associated circulatory overload (TACO)</li> <li>■ Transfusion-related acute lung injury (TRAL)</li> </ul>	<ul style="list-style-type: none"> <li>■ I.V fluids; sodium chloride 0.9% 20-30 mL/kg; bolus to maintain systolic BP [withhold fluids ONLY if there is hypertension instead]</li> <li>■ Give a diuretic: Furosemide 1 mg/kg IV</li> <li>■ For hypotension/shock; give adrenaline (epinephrine) injection; 0.01 mg/kg slow IM</li> </ul>	
	<ul style="list-style-type: none"> <li>■ Unexplained bleeding (DIC)</li> <li>■ Pain: in the chest, or near infusion site, or in loin/back, headache</li> <li>■ Respiratory distress, shortness of breath, dyspnoea</li> </ul>	<ul style="list-style-type: none"> <li>■ Send the blood bag with infusion set, a freshly collected urine, and new blood samples (one clotted and one anti-coagulated) from the vein opposite infusion site, with appropriate request form to blood bank for laboratory investigations</li> <li>■ Check fresh urine specimen for haemoglobinuria</li> <li>■ Start a 24-hour urine collection and fluid balance chart, and record all intake and output</li> <li>■ Maintain fluid balance</li> <li>■ If signs/symptoms of sepsis, start broad spectrum antibiotics</li> <li>■ Refer for further management where necessary</li> </ul>	

# 12 Oncology

## 12.1 INTRODUCTION

Cancer is an unregulated growth of a previously normal set of body cells. Oncology is the study, diagnosis, and management of cancers or tumours. It is important to note that any organ or system as well as any individual can be

affected by cancer. This section will outline major symptoms and signs of cancer, key population groups affected, ways to mitigate risk of cancer and provide an overview of common cancers in adults and children.

Cancer or malignant neoplasm is collective term for a group of more than 100 diseases that result from abnormal / uncontrolled growth of body cells and is able to invade normal tissues and spread to other parts of the body. The uncontrolled growth causes a lump/ swelling called a tumours or neoplasm in many types of cancer or an abnormal number of abnormal cells in some types of cancer such as blood cancers (Leukaemia). Tumours are broadly divided into benign tumors, meaning non-cancerous / unable to metastasize (spread to other parts of the body) or malignant tumors (able to invade normal tissues / spread to other parts of the body). Cancers are classified by their type of cell, tissue, or organ of origin. In Uganda, in 2020, it was estimated that there were 34,008 new cancer cases, 22,992 cancer deaths, and 62,548 adults living with cancer. The top five causes of cancer morbidity are cervix, Kaposi sarcoma (KS), breast, prostate, and non-Hodgkin lymphoma. The top five causes of cancer deaths are cancers of the cervix, KS, esophagus, liver, and non-Hodgkin lymphoma. In Uganda, children aged 0 – 14 years of age, constitute ten percent (10%) of cancer patients.

### 12.1.1 Special Groups at Increased Risk of Cancer

- HIV-positive patients
- Albinos
- Age group >65 years

- Women (breast and cervical)
- Smokers
- Alcoholics
- Consistent occupational exposure to toxins and/or radioactive material

**Note:** Routine screening is recommended for these groups

### **12.1.2 Early Signs and Symptoms**

Cancer should be investigated in an individual with the following symptoms having occurred for >2 weeks:

- Sudden weight loss
- Painless or painful swelling, lump, or thickening
- Sores that fail to heal

#### **Hoarseness or cough**

- Abnormal bleeding or discharge
- Persistent indigestion or difficulty in swallowing
- Change in normal bowel or bladder habits
- Chronic ulcers
- Chronic pain
- Change in a skin wart or mole

### **12.1.2.1 Urgent Signs and Symptoms**

#### **Common Signs and Symptoms of Cancer**

Health workers should inform clients / communities that don't wait for signs and symptoms of cancer. In most types of cancer, signs and symptoms manifest when the disease is advancing or in late stage. Each

type of cancer manifest with unique signs and symptoms. However, many cancer patients report having experienced / noticed some symptoms or signs weeks/ months / years earlier before they felt very sick.

Cancer should be investigated in an individual with the following common signs and symptoms of cancer, especially when having occurred for >2 weeks:

- Sudden unexplained weight loss
- Painless or painful swelling, lump, or thickening
- Sores that fail to heal.
- Hoarseness or cough
- Abnormal bleeding or discharge
- Persistent indigestion or difficulty in swallowing
- Change in normal bowel or bladder habits
- Chronic ulcers
- Chronic pain
- Change in a skin wart or mole

Urgent referral for a possible cancer malignancy might be necessary in patients with any of the following:

BODY PART	SIGNS AND SYMPTOMS
Haematological	Neutropenia, anaemia, infection, bleeding, hyperviscosity, leukocytosis $>50 \times 10^6$
Lung (excluding TB)	Coughing blood, superior vena cava obstruction
Upper GI Tract	Chronic GI bleeding and bowel habit changes, dysphagia, persistent vomiting, unexplained pain and weight loss, abdominal mass without dyspepsia, obstructive jaundice
Lower GI Tract	Bleeding and bowel habit changes, palpable rectal mass, unexplained iron deficiency anaemia

BODY PART	SIGNS AND SYMPTOMS
Breast	Discrete hard lump with fixation, eczematous skin and nipple changes, unilateral nipple discharge,
Gynaecological	Postmenopausal bleeding, persistent intramenstrual bleeding, vulval lump and bleeding
Urological	Hard irregular prostate, urinary symptoms, macroscopic haematuria, swelling or mass in testes, or any abdominal mass along urological tract
Central Nervous System	Progressive neurological deficit, new onset seizures, headaches, mental changes, unilateral deafness, and signs of raised intracranial pressure (e.g., vomiting, drowsiness, posture-related headache, tinnitus, and other CNS symptoms)

## 12.2 Prevention of Cancer

Cancer prevention means activities or actions directed at avoiding, reducing, eliminating, or eradicating the risk of developing cancer or the impact of cancer on individuals and populations to promote health.

Approximately 40% of cancers are preventable through interventions such as prevention of oncogenic infections (HPV, HIV, HBV, etc), alcohol, tobacco, and, environmental controls, promotion of healthy diets, and physical activity.

Prevention offers the most cost-effective long-term strategy for control of cancer.

Health workers are responsible for educating the public on:

- ⦿ Primary Prevention – sustained action to prevent a cancerous process from developing through risk factor reduction
- ⦿ Secondary Prevention – active discovery and control of cancerous or pre-cancerous lesions

### 12.2.1 Primary PreventionPrimary

Prevention of cancer includes activities or actions directed at avoiding, reducing, eliminating, or eradicating the risk of developing cancer prior to the onset of cancer.

Primary prevention gives control to the individual in maintaining a healthy lifestyle and environment to avoid or reduce cancer risk.

### 12.2.1.1 Control of Risk Factors

#### Smoking/Tobacco Use

- Tobacco use increases the risk of several types of cancer, especially cancer of the lungs, oesophagus, larynx, mouth, throat, kidney, bladder, pancreas, stomach, and cervix
- Health workers must educate patients / clients / communities on the dangers of tobacco consumption and smoking; patients should be advised to avoid tobacco use. For patients /clients who smoke or use tobacco in any other form, health workers must encourage and support them to stop tobacco use.

#### Unhealthy Diet

Consumption of unhealthy (unbalanced diet, sweetened food and beverages, charred, and unhygienic food) increases the risk of several types of cancer, especially cancer of the colon and rectum, mouth, pharynx, and larynx, corpus uteri, breast, kidney, liver, pancreas, esophagus, thyroid, prostate, multiple myeloma, and gallbladder.

- Health workers must educate patients / clients / communities to:
- balance their diet with various types of healthy foods,
- eat plenty of healthy food such as whole grains, pulses, fruits, and vegetables,
- limit food high in sugar or fat and avoid sugary drinks,
- limit the amount of salt intake,
- limit eating red meat and avoid eating processed meat,
- avoid eating burnt or charred food.

#### Overweight and Obesity

Being overweight or obese increases the risk of cancer, specifically the oesophageal, colorectal, breast, endometrial, and kidney cancers.

Health workers must advise patients to maintain a healthy lifestyle, especially, regular physical activity and a healthy diet.

Also, inform them to maintain their body weight within the healthy range.

### **Physical inactivity**

Sedentary lifestyle increases the risk of colon, endometrial, bladder, breast, lung, esophageal adenocarcinoma, renal, and gastric cancers.

Health workers must advise patients / clients to be physically active in everyday life. Limit the time you spend sitting and engage in at least 30 minutes of regularly physical activity per day or on most days of the week.

### **Alcohol Use**

Excess consumption of alcohol increases the risk of cancer of the oral cavity, oesophagus, larynx, liver, colorectal, and breast.

Health workers should educate patients / clients/ communities of the dangers of excessive and regular alcohol consumption. The key messages should include: Not drinking alcohol is better for cancer prevention. If you drink alcohol of any type, limit your intake.

### **Environmental Pollution**

Regular exposure to carcinogenic chemicals in the environment can occur through unsafe drinking water, air pollution, and food contaminated by aflatoxin or dioxin chemicals, occupational exposure to dangerous gases or dusts.

Environmental carcinogens (aflatoxins, asbestos, vehicle emissions, lead, ultraviolet light, and ionizing radiation) will lead to increased risk of developing cancer, e.g. lung cancer

Health workers must educate patients on environmental dangers and provide suggestions to limit exposure such as:

- Limiting indoor air pollution due to smoke from use of charcoal

and firewood inside a poorly ventilated house

- Avoiding fumes from cars
- Avoiding exposure to garbage pollution (burning rubbish)
- Employers should provide employees with a safe working environment with limited occupational hazards

## Oncogenic Infections

The following infections are associated with causing certain types of cancer:

- Viral Hepatitis B/C: cancer of the liver
- Human Papilloma Virus (HPV): cervical, oral, anal, and cancer
- Helicobacter Pylori: Gastric (stomach) cancer
- HIV/AIDS: aggressive lymphoma subtypes, Kaposi's sarcoma, anorectal cancer, cervical cancer, etc.
- Schistosomiasis: increases risk of bladder cancer
- Liver Fluke: increases risk of cholangio-carcinoma
- Preventative measures to control oncogenic infection risk include vaccination, and prevention/treatment of infection and infestation:
- Engage in safe sexual behaviour to avoid sexually transmitted diseases that can cause or increase the risk of certain types of cancer such as cervical, Kaposi sarcoma, lymphoma, and liver cancers.
- HPV Vaccination: vaccinate all girls aged 10 years with 2 doses of HPV vaccine (for detail see section 18 on immunization)
- Hepatitis B Vaccination: routinely offered in the national childhood schedule and populations at risk, in order to prevent infection with hepatitis B, the main risk factor for liver cancer (for detail see section 18 on immunization)
- Treatment of HIV/AIDS, schistosomiasis, H. pylori, and hepatitis B&C and other infections is also a preventive measure.

## Radiation

- ⦿ Ultraviolet (UV) radiation, and in particular solar radiation, is carcinogenic to humans, causing all major types of skin cancer, such as basal cell carcinoma, squamous cell carcinoma and melanoma
- People with albinism are at a much higher risk of skin cancer and health workers should encourage them to wear protective clothing and wide brimmed hats

- ⑤ Ionizing radiation from radioactive isotopes (used in medical diagnostics and treatment) is also associated with leukaemia and other solid tissue tumours. Proper disposal of highly radioactive isotopes is mandatory to prevent hazardous exposures

## Prevention of Infections

The following infections are associated with causing certain types of cancer:

- ⑤ Viral Hepatitis B/C: cancer of the liver
- ⑤ Human Papilloma Virus (HPV): cervical cancer
- ⑤ Helicobacter Pylori: stomach cancer

HIV/AIDS: aggressive lymphoma subtypes, Kaposi's sarcoma, anorectal cancer, cervical cancer, etc

- ⑤ Schistosomiasis: increases risk of bladder cancer
- ⑤ Liver Fluke: increases risk of cholangio-carcinoma
- ⑤ Preventative measures to control infection risk include vaccination, and prevention/treatment of infection and infestation:
- ⑤ HPV Vaccination: immunize all girls from age 10 with 2 doses of HPV vaccine (see section 18.1)
- ⑤ Hepatitis B Vaccination: routinely offered in the national childhood schedule and populations at risk, in order to prevent infection with hepatitis B, the main risk factor for liver cancer (see section 18.2.2)
- ⑤ Treatment of HIV/AIDS, schistosomiasis, H. pylori, and hepatitis B&C and other infections is also a preventive measure

### 12.2.2 Secondary Prevention

Secondary prevention of cancer includes activities or actions directed at halting the progress of cancer at its incipient stage through screen-

ing, early diagnosis, pre-cancer treatment or cancer management, and referral to avoid or reduce complications associated with the cancer. Secondary prevention strategies relate to the discovery and control of cancerous or pre-cancerous lesions.

Early detection of cancer greatly increases the chances for successful treatment and cure. It comprises of:

- Early diagnosis in symptomatic populations
- Screening in asymptomatic high-risk populations

Screening refers to the use of simple tests across a healthy population in order to identify individuals who have disease, but do not yet have symptoms.

Based on existing evidence, mass population screening is advocated for breast and cervical cancer. Other cancers that are commonly screened for include prostate and colorectal cancers

### **Screening for Breast Cancer**

Screening / health checkup for breast cancer involves:

Breast Self-Examination (BSE): a simple, quick examination done by the client herself, aimed at early detection of lumps. Regular (monthly-not during menstruation, at least seven days after ending the menstruation) and correct technique of breast examination is important and easy to teach and administer. Health workers should note that BSE is not a standard screening test for breast cancer, but is beneficial for breast health awareness.

Clinical Breast Examination (CBE): performed by a trained and skilled health care provider from HC3

- Take a detailed history and conduct a physical examination
- All breast quadrants must be examined in detail plus the armpits for lymph nodes
- Inspect the skin for changes and swellings, for tethering of

- the breast on the chest wall, palpate for lumps, check for nipple discharge
- A suspicious lump or bloody nipple discharge MUST BE REFERRED for evaluation by mammography or ultrasonography as well as core needle biopsy

Mammography: a low-dose x-ray of the breast is the test of choice for screening of early breast cancer but it is available only at national referral hospital level.

Breast Ultrasound: not used as a screening test, but is useful as an additional tool in characterizing palpable tumors and taking of image-directed biopsies. It may be used as a screening tool in lactating women, small-breasted women and in males, and as diagnostic tests in symptomatic patients.

### **Screening for Cervical Cancer**

This aims to detect pre-cancerous lesions that are then treated to prevent progression to invasive cancer. The following methods are recommended:

Visual Inspection with Acetic Acid (VIA): involves applying 3-5% freshly prepared acetic acid to the cervix and observing results after one minute.

- The VIA results are generally categorized into 3 subsets: suspicious for cancer, VIA negative and VIA positive
- It uses readily available equipment, does not require a laboratory and provides an immediate result.
- Positive cases can be treated with cryotherapy by adequately trained providers.

### **Consider the following if using VIA as a screening method:**

- Women <25 years of age should be screened only if they are at high risk for disease: HIV positive, early sexual exposure, multiple partners, previous abnormal screening results, cervical intraepithelial neoplasia (CIN)
- VIA is not appropriate for women >50 years
- Screening is advised every 3-5 years in case of normal results, but after 1 year in case of abnormal results and treatment (cryotherapy) and every year in HIV positive women.
- Visual Inspection with Lugol's Iodine (VILI): it involves looking at the cervix with the naked eye or low magnification after

swabbing with Lugol's iodine. VILI has a sensitivity and specificity of about 92% and 85%, respectively. Test results are available immediately thereby decreasing loss to follow-up. Recommendations and timings of VIA outlined above also apply to VILI.

- Cytology Testing by Pap Smear: it is a microscopic examination of cells scraped from the opening of the cervix. The PAP smear is best taken around mid-cycle. It should be postponed in case of cervicitis until after treatment; otherwise, the pus cells obscure clarity of the smear and affect interpretation. It requires histocytology services so it is available only at referral facilities.
- HPV DNA testing is currently being piloted as a standard screening test in Uganda.

## 12.3 Common Cancers

This section describes the signs and symptoms of common cancers in adults and children, and outline some of the investigations required. Health workers should suspect cancer if they observe any of these clinical features and refer patients to the cancer treatment centers (Uganda Cancer Institute and regional referral hospitals).

### 12.3.1 Common Cancers in Children

Clinical Features	Investigations
<ul style="list-style-type: none"><li>○ Leukaemia</li><li>○ Anaemia</li><li>○ Bone pains</li><li>○ Haemorrhagic tendencies (epistaxis, gum bleeding)</li><li>○ Recurrent infections</li></ul>	<ul style="list-style-type: none"><li>○ CBC, peripheral blood film</li><li>○ Uric acid, lactate dehydrogenase</li><li>○ Abdominal ultrasound scan</li></ul>
<b>Burkitt's Lymphoma</b> <ul style="list-style-type: none"><li>○ Rapidly growing tumour</li></ul>	<ul style="list-style-type: none"><li>○ CBC</li><li>○ Peripheral blood film</li></ul>

<ul style="list-style-type: none"> <li><input type="radio"/> Usually a jaw or abdominal mass or tumour</li> <li><input type="radio"/> May also present as a central nervous system tumour</li> </ul>	<ul style="list-style-type: none"> <li><input type="radio"/> Bone marrow, X-Ray</li> <li><input type="radio"/> Lumbar puncture</li> <li><input type="radio"/> LDH</li> </ul>
<p><b>Hodgkin's Disease</b></p> <ul style="list-style-type: none"> <li><input type="radio"/> Lymph node enlargement</li> <li><input type="radio"/> Splenomegaly, abdominal masses</li> </ul>	<ul style="list-style-type: none"> <li><input type="radio"/> CBC</li> <li><input type="radio"/> Chest X-ray</li> <li><input type="radio"/> Lymph node biopsy</li> </ul>
<p><b>Neuroblastoma</b></p> <ul style="list-style-type: none"> <li><input type="radio"/> Embryonal tumour</li> <li><input type="radio"/> Abdominal mass in loin region</li> <li><input type="radio"/> Markedly elevated blood pressure</li> <li><input type="radio"/> Fast-growing often crossing midline</li> <li><input type="radio"/> Child is sick looking</li> </ul>	<ul style="list-style-type: none"> <li><input type="radio"/> CBC</li> <li><input type="radio"/> IVU</li> <li><input type="radio"/> FNAC</li> <li><input type="radio"/> Ultra sound</li> <li><input type="radio"/> CXR for metastasis</li> </ul>
<p><b>Rhabdosarcoma, rhabdomyosarcoma</b></p> <ul style="list-style-type: none"> <li><input type="radio"/> Tumour of muscle</li> <li><input type="radio"/> Can occur anywhere but more commonly in pelvis, bladder, vagina</li> <li><input type="radio"/> May present with a fungating mass (sarcoma botryoid)</li> <li><input type="radio"/> May ulcerate and bleed</li> </ul>	<ul style="list-style-type: none"> <li><input type="radio"/> Good physical examination</li> <li><input type="radio"/> Full Blood Count</li> <li><input type="radio"/> U/S</li> <li><input type="radio"/> CXR</li> <li><input type="radio"/> CT scan when available</li> <li><input type="radio"/> Biopsy FNAC</li> </ul>
<p><b>Retinoblastoma</b></p> <ul style="list-style-type: none"> <li><input type="radio"/> Age usually &lt;3 years, inherited through chromosome 13</li> </ul>	<ul style="list-style-type: none"> <li><input type="radio"/> Skull X Ray</li> <li><input type="radio"/> Urine catecholamines</li> </ul>

CLINICAL FEATURES	INVESTIGATIONS
<ul style="list-style-type: none"> <li>○ May be unilateral or bilateral</li> <li>○ Yellowish whitish reflex in eye</li> </ul>	<ul style="list-style-type: none"> <li>○ Fundoscopy</li> <li>○ CT scan head</li> </ul>
<p><b>CNS Tumours</b></p> <ul style="list-style-type: none"> <li>○ Headache, worse in the morning and eases during the day</li> <li>○ Seizures or convulsions</li> <li>○ Nausea or vomiting</li> <li>○ Weakness or loss of feeling in arms or legs</li> <li>○ Stumbling/lack of coordination in walking</li> <li>○ Abnormal eye movements or changes/loss in vision</li> <li>○ Drowsiness</li> <li>○ Changes in personality, memory, speech</li> </ul>	<ul style="list-style-type: none"> <li>○ X-Ray skull</li> <li>○ CT scan</li> </ul>

### 1.1.1 Common Cancers in Adults

CLINICAL FEATURES	INVESTIGATIONS
<p><b>Cancer of the oesophagus</b></p> <ul style="list-style-type: none"> <li>○ Progressive dysphagia</li> <li>○ Regurgitation</li> <li>○ Weight loss</li> <li>○ Iron deficiency anaemia</li> </ul>	<ul style="list-style-type: none"> <li>○ FBC</li> <li>○ Barium Swallow</li> <li>○ Endoscopy; visualise and biopsy tumour</li> <li>○ CXR</li> </ul>
<p><b>Gastric Cancer</b></p> <ul style="list-style-type: none"> <li>○ Anorexia, weight loss, vomiting</li> </ul>	<ul style="list-style-type: none"> <li>○ Haemogram</li> <li>○ Occult blood in stool</li> </ul>

CLINICAL FEATURES	INVESTIGATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> Anaemia</li> <li><input type="radio"/> Haematemesis</li> <li><input type="radio"/> Pain, epigastric mass</li> <li><input type="radio"/> Melaena stool</li> </ul>	<ul style="list-style-type: none"> <li><input type="radio"/> Barium Meal</li> <li><input type="radio"/> Endoscopy; visualise and biopsy</li> </ul>
<p><b>Colorectal &amp; Anal Cancer</b></p> <ul style="list-style-type: none"> <li><input type="radio"/> Change in bowel habits; constipation, diarrhoea</li> <li><input type="radio"/> Blood in stool</li> <li><input type="radio"/> Anaemia, weight loss</li> <li><input type="radio"/> Tenesmus</li> <li><input type="radio"/> Lower abdominal mass</li> </ul>	<ul style="list-style-type: none"> <li><input type="radio"/> Haemogram</li> <li><input type="radio"/> Iron-deficiency anaemia</li> <li><input type="radio"/> Occult blood in stool</li> <li><input type="radio"/> Barium Enema (double contrast)</li> <li><input type="radio"/> Sigmoidoscopy</li> <li><input type="radio"/> Coloscopy; visualise and biopsy tumour</li> </ul>
<p><b>Nephroblastoma (Wilms' tumour)</b></p> <ul style="list-style-type: none"> <li><input type="radio"/> Average age 2 years: Embryonal tumour</li> <li><input type="radio"/> Early childhood</li> <li><input type="radio"/> Painless abdominal (loin) mass</li> <li><input type="radio"/> Fast growing</li> </ul>	<ul style="list-style-type: none"> <li><input type="radio"/> CBC</li> <li><input type="radio"/> U/E in normal IV urography shows displaced calices</li> <li><input type="radio"/> FNAC</li> <li><input type="radio"/> CXR for metastasis</li> </ul>
<p><b>Ovarian Cancer</b></p> <ul style="list-style-type: none"> <li><input type="radio"/> No specific signs and symptoms, usually over 70% present as late stage</li> <li><input type="radio"/> Abdominal discomfort e.g., pressure, poor appetite, nausea, vomiting, weight loss</li> </ul>	<ul style="list-style-type: none"> <li><input type="radio"/> Pelvic ultrasound</li> <li><input type="radio"/> Liver ultrasound</li> </ul>

CLINICAL FEATURES	INVESTIGATIONS
<ul style="list-style-type: none"> <li>⦿ Urinary frequency</li> <li>⦿ Pelvic pressure</li> <li>⦿ Mass/masses in abdomen; if mass &gt;15 cm in 40-69 years, suspect ovarian cancer</li> <li>⦿ Abdominal distension</li> <li>⦿ Irregular vaginal bleeding</li> <li>⦿ Low back pain, fatigue</li> <li>⦿ Dyspareunia</li> </ul>	<ul style="list-style-type: none"> <li>⦿ Ascitic tap for cytology, chemistry and microscopy</li> <li>⦿ to rule out Tuberculosis</li> <li>⦿ CXR</li> </ul>
<p><b>Melanoma</b></p> <p>Suspect where naevus shows:</p> <ul style="list-style-type: none"> <li>⦿ A: Asymmetry</li> <li>⦿ B: Border irregularity</li> <li>⦿ C: Colour variegation</li> <li>⦿ D: Diameter &gt;6 mm</li> <li>⦿ Ulceration</li> <li>⦿ Regional lymph nodes</li> </ul>	<ul style="list-style-type: none"> <li>⦿ Wide excision punch biopsy</li> <li>⦿ CXR</li> <li>⦿ Abdominal U/S</li> </ul>
<p><b>Cervical Cancer</b></p> <p><b>Early stage:</b></p> <ul style="list-style-type: none"> <li>⦿ Vaginal discharge, sometimes foul smelling</li> <li>⦿ Irregular vaginal bleeding</li> <li>⦿ Post-coital bleeding in women of any age</li> <li>⦿ Post-menopausal bleeding (especially if not responding to appropriate treatment)</li> </ul>	<ul style="list-style-type: none"> <li>⦿ Biopsy</li> <li>⦿ Abdominal ultrasound/CT</li> </ul>

CLINICAL FEATURES	INVESTIGATIONS
<p><b>Late stage:</b></p> <ul style="list-style-type: none"> <li><input type="radio"/> Urinary frequency and urgency</li> <li><input type="radio"/> Backache, lower abdominal pain</li> </ul> <p><b>Very late stage:</b></p> <ul style="list-style-type: none"> <li><input type="radio"/> Severe back pain</li> <li><input type="radio"/> Weight loss</li> <li><input type="radio"/> Oliguria (due to ureteric obstruction or renal failure)</li> <li><input type="radio"/> Urinary/ faecal incontinence</li> <li><input type="radio"/> Oedema of lower limbs</li> <li><input type="radio"/> Dyspnoea (due to anaemia, metastasis or pleural effusion)</li> </ul>	
<p><b>Breast Cancer</b></p> <ul style="list-style-type: none"> <li><input type="radio"/> A painless lump</li> <li><input type="radio"/> Nipple retraction</li> <li><input type="radio"/> Skin changes such as darkening and dimpling appearing like orange skin</li> <li><input type="radio"/> Nipple discharge that may be bloody</li> <li><input type="radio"/> Ulceration</li> <li><input type="radio"/> Uniform breast enlargement</li> <li><input type="radio"/> Pain is usually a late symptom</li> <li><input type="radio"/> Symptoms and signs of metastasis</li> </ul>	<ul style="list-style-type: none"> <li><input type="radio"/> Mammography</li> <li><input type="radio"/> FNAC Biopsy</li> <li><input type="radio"/> Excisional biopsy (see section 12.2.2 above)</li> </ul>

CLINICAL FEATURES	INVESTIGATIONS
<p><b>Non-Hodgkin's Lymphoma (NHL)</b></p> <ul style="list-style-type: none"> <li>○ Progressive lymph node enlargement</li> <li>○ Unexplained weight loss</li> <li>○ Drenching night sweats</li> <li>○ Persistent fever</li> <li>○ Pallor (anaemia)</li> <li>○ Lymphadenopathy (generalised)</li> <li>○ Splenomegaly</li> <li>○ Hepatomegaly</li> </ul>	<ul style="list-style-type: none"> <li>○ Lymph node excision biopsy</li> <li>○ Fine needle aspirations (FNA)</li> <li>○ Full blood count</li> <li>○ Bone marrow aspirate</li> <li>○ LFTs, RFTs</li> <li>○ LDH</li> <li>○ Viral serology for HIV</li> </ul>
<p><b>Squamous cell cancer of skin</b></p> <ul style="list-style-type: none"> <li>○ Non healing ulcers</li> <li>○ Bleeding</li> <li>○ Pain</li> <li>○ Lymph nodes</li> </ul>	<ul style="list-style-type: none"> <li>○ Wide excision incisional biopsy</li> <li>○ X Rays of bones</li> <li>○ CXR</li> </ul>
<p><b>Kaposi's Sarcoma (KS)</b></p> <ul style="list-style-type: none"> <li>○ Indolent KS: nodular skin lesions, fungating nodules, bone involvement</li> <li>○ Lymphadenopathic KS: lymph nodes, visceral involvement, GIT symptoms</li> <li>○ AIDS related KS: skin nodules, mucous membranes, mouth palate and ENT lesions, lymphadenopathy, paraplegias, any organ can be impacted</li> </ul>	<ul style="list-style-type: none"> <li>○ Biopsies</li> <li>○ Full blood count</li> <li>○ HIV screening</li> <li>○ CXR: pleural effusions</li> <li>○ Abdominal X-Ray</li> </ul>

CLINICAL FEATURES	INVESTIGATIONS
<p><b>Head and Neck cancers</b></p> <ul style="list-style-type: none"> <li>○ Painless mass</li> <li>○ Local ulceration with or without pain</li> <li>○ Referred pain to teeth or ear</li> <li>○ Dysphagia, loosening of teeth</li> <li>○ Alteration of speech: difficulty pronouncing words, change in character, persistent hoarseness</li> <li>○ Unilateral tonsillar enlargement in an adult</li> <li>○ Persistent unilateral “sinusitis”, nosebleed or obstruction</li> <li>○ Unilateral hearing loss</li> <li>○ Cranial nerve palsies</li> </ul>	<ul style="list-style-type: none"> <li>○ Chest X-Rays and other relevant</li> <li>○ X-Rays</li> <li>○ CT scan</li> <li>○ Biopsy</li> </ul>
<p><b>Prostate Cancer</b></p> <ul style="list-style-type: none"> <li>○ Urge to urinate often, especially at night</li> <li>○ Difficulty in starting or stopping urine flow, inability to urinate</li> <li>○ Weak, decreased or interrupted urine stream, a sense of incomplete emptying of bladder</li> </ul>	<ul style="list-style-type: none"> <li>○ Digital Rectal Exam (DRE)</li> <li>○ Serum PSA</li> <li>○ Ultrasound guided biopsy</li> </ul>

CLINICAL FEATURES	INVESTIGATIONS
<ul style="list-style-type: none"> <li>○ Burning or pain during urination</li> <li>○ Blood in the urine or semen</li> <li>○ Painful ejaculation</li> </ul>	
<p><b>Chronic Leukaemia</b></p> <ul style="list-style-type: none"> <li>○ Classified into two: CLL and CML</li> <li>○ Recurrent infections</li> <li>○ Bleeding or easy bruising</li> <li>○ Unexplained weight loss</li> <li>○ Drenching night sweats</li> <li>○ Persistent fever</li> <li>○ Waxing and waning lymph node enlargement (CLL)</li> <li>○ Swelling and discomfort in the left flank due to massive splenomegaly (CML)</li> </ul> <p><b>The following clinical signs require full physical examination:</b></p> <ul style="list-style-type: none"> <li>○ Pallor (anaemia)</li> <li>○ Splenomegaly</li> <li>○ Hepatomegaly</li> <li>○ Bruising (purpura)</li> <li>○ Lymphadenopathy</li> </ul>	<ul style="list-style-type: none"> <li>○ FBC</li> <li>○ Peripheral blood film</li> <li>○ Bone Marrow Aspirate</li> <li>○ Biopsy</li> <li>○ CLL: blood film &gt;500 monoclonal lymphocytes</li> <li>○ CML: leukocytosis, basophilia with immature granulocytes</li> <li>○ CXR</li> <li>○ LDH</li> <li>○ Viral serology for HIV, Hepatitis B&amp;C</li> <li>○ Abdominal US scan</li> <li>○ CT scan</li> <li>○ Echo/ECG</li> </ul>

# 13 Palliative Care

## 13. PALLIATIVE CARE ICD10 CODE: Z51.5

Palliative care aims to improve the quality of life of patients (and their families) who are faced with life-threatening illness, through the prevention and relief of suffering. This is achieved through early identification, ongoing assessment, treatment of pain and other physical, psychosocial and spiritual problems.

### 13.1 Pain

“Pain is what the patient says hurts”

Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage. Pain is the most common symptom of a disease.

The nature, location and cause of pain will differ in each case. Pain requires a holistic approach as it can be affected by spiritual, psychological, social, and cultural factors, which may need to be addressed after physical pain is controlled.

#### Causes of pain

Pain can be divided into two types of causative categories:

- Acute Pain: Caused by a specific action with a definite time period, e.g., postoperative, acute infection, or trauma
- Chronic pain: Ongoing pain with an indefinite time period, for example
  - Constant and usually increasing: cancer
  - Recurrent sickle-cell crisis, arthritis, HIV/AIDS
  - Drug side-effect or toxicity (e.g., peripheral neuropathy due to isoniazid, chemotherapy)

## Risk factors and mitigators

### These factors increase pain perception:

- Ⓐ Anxiety and depression, social abandonment
- Ⓐ Insomnia
- Ⓐ Lack of understanding of the problem

### These factors decrease pain perception:

- Ⓐ Relaxation, sleep
- Ⓐ Relief of other symptoms
- Ⓐ Explanation/understanding, venting feelings

### 13.1.1 Clinical Features and Investigations

#### Types of Pain

There are 2 types of pain that health workers need to be aware of:

TYPE OF PAIN	FEATURES
<b>Nociceptive Pain</b>  The pain pathways are intact. This kind of pain responds to the analgesic ladder	<ul style="list-style-type: none"><li>Ⓐ Somatic Pain (from bones and muscles): described as aching/ throbbing</li><li>Ⓐ Visceral Pain: described as colicky pain (for hollow viscera), pressure, cramping and ache for solid viscera</li></ul>
<b>Neuropathic Pain</b>  There is damage to nerves or the pathways. The pain responds only partially  to the analgesic ladder and needs adjuvants of amitriptyline or phenytoin	<ul style="list-style-type: none"><li>Ⓐ Described as burning, prickling, stinging, pins and needles, insects crawling under skin, numbness, hypersensitivity,</li><li>Ⓐ shooting, or electric shock</li></ul>

## Clinical Investigation

It is important for health workers to conduct a thorough investigation of a patient indicating they are in pain. The following points can be used to guide the investigation:

- Duration of pain
- Severity: assess using the Numerical Rating Scale, where the patient grades his/her pain on a scale of 0 = no pain to 5
  - = worst pain ever experienced
- Site and radiation
- Nature (e.g., stabbing, throbbing, crushing, cramp-like)
- Periodicity (constant or intermittent)
- Relieving or aggravating factors
- Accompanying symptoms
- Ask the patient for a detailed history for each pain experienced, as there may be more than one type of pain and area experiencing pain
- A targeted physical examination

### 13.1.2 Nociceptive Pain Management

**There are two goals of pain management:**

- Diagnose and treat the disease causing the pain
- Achieve total pain relief with minimal side-effects and enable the patient to live as normal a life as possible
- Pain can be treated through use of medicines and/or non-drug treatment

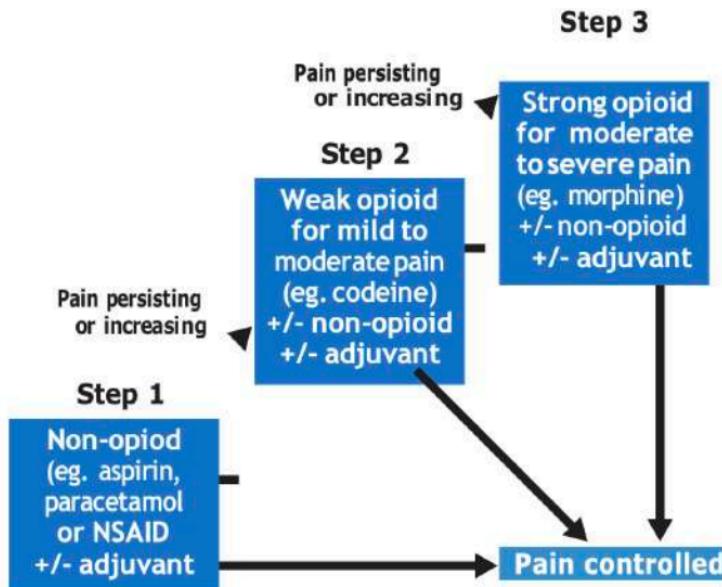


## Non pharmacological treatment of pain

TREATMENT	LOC
<ul style="list-style-type: none"><li><input type="checkbox"/> Lifestyle adjustment</li><li><input type="checkbox"/> Patient counselling</li><li><input type="checkbox"/> Massage with aromatherapy oils: may be useful for neuropathic pain and muscular pain</li><li><input type="checkbox"/> Reflexology</li><li><input type="checkbox"/> Application of heat or cold packs</li><li><input type="checkbox"/> Relaxation</li><li><input type="checkbox"/> Distraction (e.g., listening to radio or partaking in a non-invasive hobby)</li><li><input type="checkbox"/> Non-pharmacological treatment of underlying cause (e.g., surgery or radiotherapy of cancer)</li><li><input type="checkbox"/> Social and spiritual support</li></ul>	<b>HC2</b>

## Medicines-Based Treatment

The WHO Analgesic Ladder and the following tables describe the use of medicines to relieve pain based on the type and degree of pain.



### 13.1.2.1 Pain Management In Adults

ANALGESICS	COMMENTS
STEP 1: MILD PAIN (NON-OPIOID ± ADJUVANTS)	
<input type="checkbox"/> Paracetamol 1 g every 6 hours (500 mg in elderly) <input type="checkbox"/> And/or <input type="checkbox"/> Ibuprofen 400 mg every 6- 8 hours (max 2,400 mg/daily) or <input type="checkbox"/> Diclofenac 50 mg every 8 hours	<ul style="list-style-type: none"> <li>▪ Continue with step 1 analgesics when moving to step 2 and 3</li> <li>▪ Prolonged use of high doses of paracetamol may cause liver toxicity</li> <li>▪ Do not use NSAIDS in renal impairment</li> <li>▪ Caution when using NSAIDS for more than 10 days</li> </ul>

ANALGESICS	COMMENTS
<p><b>STEP 2: MODERATE PAIN</b>  <b>(WEAK OPIOID ± NON-OPIOID ± ADJUVANT)</b></p>	
<ul style="list-style-type: none"> <li><input type="checkbox"/> Morphine 2.5-5 mg every 4 hours during day, double dose at night</li> <li><input type="checkbox"/> Or</li> <li><input type="checkbox"/> Codeine 30-60 mg every 6 hours (max 240 mg)</li> <li><input type="checkbox"/> Or</li> <li><input type="checkbox"/> Tramadol 50-100 mg every 6 hours (max 400 mg)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Low dose morphine is considered step 2 analgesic and recommended first line if available</li> <li>▪ Discontinue step 2 analgesics when starting step 3</li> <li><input type="checkbox"/> Give Bisacodyl 10-15 mg nocte to prevent constipation except if diarrhoea is present</li> <li><input type="checkbox"/> Add liquid paraffin 10 ml once a day if Bisacodyl is not enough</li> </ul>
<p><b>STEP 3: SEVERE PAIN</b>  <b>(STRONG OPIOID ± NON-OPIOID ± ADJUVANT)</b></p>	
<ul style="list-style-type: none"> <li><input type="checkbox"/> Morphine 7.5-10 mg every 4 hours during day and double dose at night           <ul style="list-style-type: none"> <li>▪ If breakthrough pain, give equivalent additional dose</li> <li>▪ Increase dose by 30-50% as required to control patient's pain</li> <li>▪ Give additional dose 30 minutes before an activity causing pain (e.g. wound dressing)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Elderly and renal impairment may require dose adjustment</li> <li>▪ Give Bisacodyl 10-15 mg nocte to prevent constipation except if diarrhoea is present</li> <li>▪ Add liquid paraffin 10 mL once a day if Bisacodyl not enough</li> <li><input type="checkbox"/> If modified release tablets are available, use the same 24-hour dose but given in 1 or 2 doses daily</li> </ul>

## Adjutants

- Amitriptyline 12.5–25 mg nocte for neuropathic pain (max 50–75 mg if tolerated)
- Clonazepam 0.5–1 mg nocte for neuropathic pain (second line)
- Dexamethasone 4–8 mg once a day for swelling or oedema
- Hyoscine 20 mg every 6 hours for smooth muscle spasm
- Diazepam 5–20 mg nocte for painful skeletal muscle spasms

## Caution

- Do not use pethidine for chronic pain; accumulates with severe side-effects on the gut. Only use as one off-dose for acute severe pain if morphine not available
- Side effects of NSAIDs: gastritis, renal toxicity, bleeding, bronchospasm

ANALGESICS	COMMENTS
<input type="checkbox"/> Avoid amitriptyline in heart disease <input type="checkbox"/> Side effects of opioids: see sections 13.1.2.3	

### 13.1.2.3 Pain Management In Children

ANALGESICS	COMMENTS
STEP 1: MILD PAIN (NON-OPIOID ± ADJUVANTS)	
<input type="checkbox"/> Paracetamol 10–15 mg/kg every 6 hours And/or <input type="checkbox"/> Ibuprofen 5–10 mg/kg every 6–8 hours (use only in children >3 months)	w Continue with step 1 analgesics when moving to step 2 w Prolonged use of high doses of paracetamol may cause liver toxicity

ANALGESICS	COMMENTS
<p>STEP 2: MODERATE AND SEVERE PAIN (OPIOID ± NON-OPIOID ± ADJUVANT)</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Morphine every 4 hours 1-6 months: 0.01 mg/kg 6-12 months: 0.2 mg/kg 1-2 years: 0.2-0.4 mg/kg 2-12 years: 0.2-0.5 mg/kg (max 10 mg)  Increase the dose slowly, until pain is controlled Increase dose by max 50% every 24 hours</li> </ul>	<p>w Codeine and tramadol are not used in children</p> <p>w Give Bisacodyl (suppository only) 5 mg nocte to prevent constipation except if diarrhoea is present</p>
<p><b>Adjutants</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Amitriptyline nocte for neuropathic pain</li> <li><input type="checkbox"/> Child 2-12 years: 0.2-0.5 mg/kg (max 1 mg/kg or 25 mg)</li> <li><input type="checkbox"/> Or Carbamazepine 5-20 mg/kg in 2-3 divided doses, increase gradually to avoid side effects (second line)</li> <li><input type="checkbox"/> Prednisolone 1-2 mg/kg per day</li> <li><input type="checkbox"/> Hyoscine</li> <li><input type="checkbox"/> 1 month-2 years: 0.5 mg/kg every 8 hours</li> <li><input type="checkbox"/> 2-5 years: 5 mg every 8 hours</li> <li><input type="checkbox"/> 6-12 years: 10 mg every 8 hours</li> <li><input type="checkbox"/> Diazepam for associated anxiety</li> <li><input type="checkbox"/> Child 1-6 years: 1 mg/day in 2-3 divided doses</li> <li><input type="checkbox"/> Child 6-14 years: 2-10 mg/day in 2-3 divided doses</li> </ul>	

## General principles in use of opioids

- Health professionals specially trained in palliative care should supervise management of chronic pain in advanced or incurable conditions (e.g., cancer, AIDS)
- Morphine is usually the drug of choice for severe pain. Liquid morphine is available, easy to dose, and is well absorbed from the oral mucosae and can be dripped in the mouth of adults and children
- In continuous pain, analgesics should be given:
  - By the clock (i.e. according to a regular dose schedule)
  - By the patient (i.e. self-administered)
  - By the mouth (i.e. as oral dose forms)
- Pain is better controlled using regular oral doses which control pain. If pain is not controlled, increase the 24-hour dose by 30-50%
- Repeated injections are not indicated
- Consider extra doses when painful procedure is planned and for breakthrough pain. If using breakthrough doses regularly, then increase the regular dose!
- Side effects are minor and well-manageable if careful dosing and titration are done

## Cautions on use of opioids

Opioids need to be effectively managed and administered, considering the associated cautions and side effects below. □ Do not use opioids in severe respiratory depression and

head injury

- Use with care in the following conditions
- Advanced liver disease (but can be used in hepatocellular carcinoma when titrated as above)
- Acute asthma
- Acute abdominal pain (can use while awaiting diagnostic tests; never leave the patient in pain)
- Hypothyroidism

- Renal failure (reduce starting dose and/or reduce dose frequency)
- Elderly or severely wasted patient (reduce starting dose and/or reduce dose frequency)
- Use with extreme care (i.e., start with small doses and use small incremental increases) in:
  - Recurrent or concurrent intake of alcohol or other CNS depressants

### Management of Side Effects of Opioids

SIDE EFFECT	MANAGE AS:
<b>Respiratory depression</b>	
<ul style="list-style-type: none"> <li>▪ Rarely occurs if small oral doses are used and gradually titrated to response</li> <li>▪ Can occur when morphine used parenterally</li> <li><input checked="" type="checkbox"/> Reverse respiratory depression using naloxone 0.4-2 mg slow IV every 2-3 minutes according to response</li> </ul> <p><b>Child:</b> 0.01 mg/kg slow IV; repeat 0.1 mg/kg if no response</p>	
<b>Constipation</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Give Bisacodyl 10-15 mg nocte to prevent constipation except if diarrhoea is present Child: 5 mg rectally</li> <li><input type="checkbox"/> Add liquid paraffin 10 ml once a day if bisacodyl is not enough</li> </ul>
<b>Nausea or Vomiting</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Usually occurs in first 5 days and is self-limiting</li> <li><input type="checkbox"/> Vomiting later on may be due to another cause</li> <li><input type="checkbox"/> Give anti-emetic (e.g. metoclopramide 10 mg every 8 hours for 3-5 days) Child 9-18 yrs: 5 mg 8 hourly Child 5-9 yrs: 2.5 mg 8 hourly Child 3-9 yrs: 2-2.5 mg 8 hourly Child 1-3 yrs: 1 mg 8 hourly Child &lt;1 yr: 100 micrograms per kg every 12 hours</li> </ul>

SIDE EFFECT	MANAGE AS:
<b>Confusion or Drowsiness</b>	<input type="checkbox"/> If excessive continuous drowsiness, titrate the opioid dose down slowly

### Referral criteria

- Ⓐ If pain does not respond to above measures, refer to palliative care specialist
- Ⓑ Refer for radiotherapy at national referral hospital for severe bone pain not responding to above medications
- Ⓒ Refer for surgery if the cause of pain is amenable to surgery

### 13.1.3 Neuropathic Pain

Neuropathic pain occurs as a result of damage to nerve tissue. There are two clinical kinds of neuropathic pain, both elements may be combined:

- Ⓐ Stabbing-type: pain in a nerve distribution with minimal pain in between (e.g. trigeminal neuralgia) but can occur with any nerve. Responds to Phenytoin
- Ⓑ Paraesthesia dysaesthesiae, or burning-type pain: (e.g. post-herpetic neuralgia). Responds well to small doses of Amitriptyline

### Management

TREATMENT	LOC
<b>Trigeminal neuralgia or stabbing-type pain</b>	
Acute phase <ul style="list-style-type: none"> <li><input type="checkbox"/> Carbamazepine initially 100 mg every 12 hours               <ul style="list-style-type: none"> <li>▪ Increase gradually by 200 mg every 2-3 days according to response, max 1200 mg</li> <li>▪ Causes white cell depression</li> </ul> </li> </ul>	<b>HC3</b>
Burning type pain (post-herpetic neuralgia, diabetic neuropathy) <ul style="list-style-type: none"> <li><input type="checkbox"/> Amitriptyline 12.5-25 mg at night or every</li> <li><input type="checkbox"/> 12 hours depending on response, max 50-75 mg</li> </ul>	<b>HC3</b>

### 13.1.4 Back or Bone Pain

Includes pain in the lumbar region of the spine or bone pain anywhere within the body.

#### Causes

Potential causes of back or bone pain:

- Ⓐ Disc degeneration (often has a neuropathic element because of pressure on sciatic or other nerve)
- Ⓐ Osteoporosis (if collapse of vertebrae or fracture)

Infection (e.g. TB, brucellosis, PID, retroperitoneal)

- Ⓐ Metastatic cancers, renal disease
- Ⓐ Strain
- Ⓐ Congenital abnormalities
- Ⓐ Spondylolisthesis

#### Clinical Features

Each situation will differ depending on the cause of the pain

- Ⓐ If an infection is present: throbbing and constant pain
- Ⓐ If sciatica, sciatic nerve roots will be involved

#### Investigations

- Ⓐ Try to establish the cause and type of pain
- Ⓐ X-ray: Spine and pelvis

#### Management of Back or Bone Pain

TREATMENT	LOC
<b>Analgesics</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Analgesics (see section 13.1.2 above)</li> <li>▪ Give a Step 1 drug for 7 days or as long as required according to patient</li> <li>▪ NSAIDs are the Step 1 drug of choice in bone pain</li> <li>▪ May have to add a Step 2 or 3 drug, especially in metastatic disease</li> </ul>	<b>HC4</b>

TREATMENT	LOC
<p><b>For acute back pain:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Rest the back on a firm but not hard surface</li> </ul> <p><b>For neuropathic element:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Manage as for neuropathic pain above</li> </ul>	<b>HC4</b>

## 13.2 OTHER CONDITIONS IN PALLIATIVE CARE

In palliative care, other conditions that are commonly encountered are summarised in the table below.

### 13.2.1 Breathlessness ICD10 CODE: R06

Due to palliative care conditions or anxiety

#### Management

TREATMENT	LOC
<p><b>Non-drug treatment</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Reassure patient; explore patient's fears and anxieties; anxiety worsens condition</li> <li><input type="checkbox"/> Breathing exercises and relaxation techniques; teach patient how to slow down breathing by pursing their lips and breathe with diaphragm rather than chest</li> <li><input type="checkbox"/> Pulmonary rehabilitation</li> <li><input type="checkbox"/> Position patient in most comfortable position in bed</li> <li><input type="checkbox"/> Ensure good ventilation (e.g., open windows, use fans, loosen tight clothing)</li> <li><input type="checkbox"/> Conserve energy (e.g., encourage exertion to breathlessness)</li> <li><input type="checkbox"/> Refer if symptoms persist, in airway obstruction, or need for pleurodesis</li> </ul> <p><b>Medicines</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Oral morphine 2.5-5 mg every 4 hours f Oxygen if patient is hypoxic f Diazepam if patient is anxious <ul style="list-style-type: none"> <li>▪ Diazepam 2.5-5 mg orally; once a day if breathlessness is associated with panic attacks</li> </ul> </li> </ul>	<b>HC2</b> <b>HC3</b> <b>HC4</b>

## 13.2.2 Nausea and Vomiting ICD10 CODE: R11

Can be due to disease or medicines

### Management

TREATMENT	LOC
<input type="checkbox"/> Treat the cause	HC4
<input type="checkbox"/> Vomiting typically relieves nausea	HC4
<b>If due to gastric stasis or delayed bowel transit time</b>	H HC3 HC4
<input type="checkbox"/> Give metoclopramide 10–20 mg every 8 hours (30 minutes before meals; same dose SC or IV)	
<b>If due to metabolic disturbance (liver/renal failure, medicines e.g., chemotherapy)</b>	
<input type="checkbox"/> Give haloperidol 1.25 -2.5 mg nocte (PO or SC)	
<b>If due to raised intracranial pressure</b>	
<input type="checkbox"/> Dexamethasone 8-16 mg od	
<input type="checkbox"/> If due to visceral stretch or compression f Promethazine 25 mg every 8 hours or f Hyoscine butylbromide 20-40 mg 8 hourly	

## 13.2.3 Pressure Ulcer (Decubitus Ulcers) ICD10 CODE: L89

Ulcer of the skin and/or subcutaneous tissue caused by ischaemia secondary to extrinsic pressure or shear

### Management

TREATMENT	LOC
<input type="checkbox"/> Non-drug treatment f Debridement of necrotic tissue	
<input type="checkbox"/> Clean with normal saline	
<input type="checkbox"/> If able, encourage patients to raise themselves off the seat and shift their weight every 15-20 minutes or to take short walks	HC3

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Repositioning of those who cannot move themselves frequently, determined by need and skin status</li> <li><input type="checkbox"/> Inspect skin every time the patient's position is changed</li> <li><input type="checkbox"/> Maintain optimal hydration and hygiene of skin</li> <li><input type="checkbox"/> Avoid trauma, by not dragging patient</li> <li><input type="checkbox"/> Good nutrition for those with good prognosis to maintain normal serum albumin</li> <li><input type="checkbox"/> Educate patient caretakers on risk factors for developing pressure ulcers, how to inspect and care for skin, and inform health care professional</li> <li><input type="checkbox"/> May need skin grafting and flaps; refer to hospital</li> </ul>	HC3
<b>Medicines</b>	
<ul style="list-style-type: none"> <li><input type="checkbox"/> Give antibiotics if there is evidence of surrounding cellulitis (see section 22.1.3)</li> <li><input type="checkbox"/> Control pain</li> <li><input type="checkbox"/> Control odour with topical metronidazole powder or gel until there is no foul smell</li> <li><input type="checkbox"/> If patient has sepsis, give parenteral antibiotics (see section 2.1.7 for treatment of sepsis)</li> </ul>	

### 13.2.4 Fungating Wounds

#### Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Treat underlying cause</li> <li><input type="checkbox"/> Clean the wound regularly every day with 0.9% saline (or dissolve 1 teaspoon of salt per pint of cooled boiled water)</li> <li><input type="checkbox"/> Apply clean dressings daily</li> <li><input type="checkbox"/> Protect the normal skin around the wound with barrier creams (petroleum jelly)</li> <li><input type="checkbox"/> Give analgesia for pain</li> </ul>	HC2

TREATMENT	LOC
<input type="checkbox"/> If malodour/exudate: apply metronidazole powder daily directly to the wound when changing dressing	
<input type="checkbox"/> If cellulitis, give appropriate antibiotic	

### 13.2.5 Anorexia and Cachexia ICD10 CODE: R63.0 AND R64

Anorexia is loss of desire to eat. Cachexia is a complex metabolic syndrome, characterized by profound loss of lean body mass, in terminal illnesses.

#### Causes

- Ⓐ Nausea and vomiting, constipation, gastrointestinal obstruction
- Ⓐ Sore mouth, mouth tumours, malodour
- Ⓐ Hypercalcaemia, hyponatraemia, uraemia, liver failure
- Ⓐ Medications
- Ⓐ Depression

#### Management

TREATMENT	LOC
<input type="checkbox"/> Treat underlying causes if possible. <input type="checkbox"/> In cancer patients, give corticosteroids for one week only, under supervision of specialist <ul style="list-style-type: none"> <li>▪ Prednisolone 15-40 mg once a day for 7 days</li> <li>▪ Or dexamethasone 2-6 mg in the morning for 7 days</li> </ul>	HC4

#### Non-medicine treatment

- Small amounts of food frequently
- Give energy-dense food, and limit fat intake
- Avoid extremes in taste and smell
- Pleasant environment, nice presentation of food

TREATMENT	LOC
<input type="checkbox"/> Eating is a social habit and people eat better with others <input type="checkbox"/> Nutritional counselling <input type="checkbox"/> If prognosis <2 months, counsel patient and family to understand and adjust to reduced appetite as a normal disease process	
<b>Caution</b> <ul style="list-style-type: none"> <li>■ In established cancer and cachexia, aggressive parenteral and enteral nutritional supplementation is of minimal value</li> </ul>	

### 13.2.6 Hiccup ICD10 CODE: R06.6

Repeated involuntary spasmodic diaphragmatic and inspiratory intercostal muscle contractions. Hiccups up to 48 hours are acute, those lasting more than 48 hours are persistent and more than 2 months are intractable.

#### Causes

- Gastric distension, GERD, gastritis, diaphragmatic irritation by suprarenal metastasis, phrenic nerve irritation
- Metabolic: uraemia, hypokalaemia, hypocalcaemia, hyperglycaemia, hypocapnia
- Infection: oesophageal candidiasis
- Brain tumour, stroke, stress

#### Management

TREATMENT	LOC
<input type="checkbox"/> Most hiccups are short-lived and self-limiting <input type="checkbox"/> Treat underlying cause	HC2

<b>Non-medicine treatment</b>	
<input type="checkbox"/> Direct stimulation of the pharynx by swallowing dry bread or other dry food	
<input type="checkbox"/> Stimulation of vagus nerve by ingesting crushed ice or valsalva manouvre	
<input type="checkbox"/> Rapidly ingest 2 heaped teaspoons of sugar	
<input type="checkbox"/> Indirect stimulation of the pharynx	
<input type="checkbox"/> – C3-5 dermatome stimulation by tapping or rubbing the back of the neck	
<input type="checkbox"/> Refer if hiccups persist or are intractable	
<input type="checkbox"/> Medicines	
<input type="checkbox"/> For persistent or intractable hiccups use:	HC4
<input type="checkbox"/> Metoclopramide 10 mg 8 hourly (if the cause is gastric distension)	HC3
<input type="checkbox"/> Or Haloperidol 2–5 mg once a day	
<input type="checkbox"/> Or chlorpromazine 25 mg 6 hourly	

**13.2.7 Dry or Painful Mouth**

ICD10 CODE: R68.2

Dry mouth, painful mouth and mouth ulcers are caused by infections, drugs, chemotherapy, trauma, dryness, radiotherapy, HIV and opportunistic infections.

TREATMENT	LOC
<b>Non-medicine treatment</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Mouth wash with salted water (hourly), frequent sipping to keep mouth moist</li> <li><input type="checkbox"/> Brush teeth and tongue at least 3 times a day</li> <li><input type="checkbox"/> Suck fresh cold pineapple cubes once or twice daily</li> <li><input type="checkbox"/> Avoid sugary foods and drinks, eat soft food</li> <li><input type="checkbox"/> Apply vaseline to cracked lips</li> <li><input type="checkbox"/> Review medications (dry mouth can be a side effect, e.g. of amitriptyline)</li> </ul>	HC2

TREATMENT	LOC
<b>Treat appropriate infection:</b>	
<input type="checkbox"/> Candidiasis with fluconazole 200 mg od for 7 days <input type="checkbox"/> Herpes simplex with oral acyclovir 200 mg, 5 times a day for 5–10 days depending on severity <input type="checkbox"/> Anaerobic gingivitis, halitosis, with metronidazole mouthwash (mix 50 mL of IV metronidazole with 450 mL of water, plus 50 mL of juice)	HC3 HC4 HC3
<b>Severe mucositis or aphthous ulcers</b>	
<input type="checkbox"/> Consider steroids dexamethasone 8 mg once daily for 5 days <input type="checkbox"/> Analgesic gel (Bonjela, Oracure) on ulcers	
<b>Painful mouth</b>	
<input type="checkbox"/> Oral liquid morphine as above (before swallowing, hold liquid morphine in the mouth for at least 30 seconds)	

### 13.2.8 Other Symptoms

TREATMENT	LOC
<b>Anxiety and muscle spasm</b>	HC2
<input type="checkbox"/> Diazepam 5–10 mg once a day, titrated to three times a day	
<b>Excessive bronchial secretions</b>	HC4
<input type="checkbox"/> Hyoscine 20 mg once a day titrated to 3 times a day according to response	
<b>Intractable cough</b>	HC3
<input type="checkbox"/> Morphine as above (see section 13.1.2)	

### 13.2.9 End of Life Care

Care in the last days of life.

## Clinical Features

Clinical signs at end of life include (should be considered in those with terminal conditions who have been gradually deteriorating):

- Patient becomes bed-bound and is increasingly drowsy or in a semi-conscious state
- Minimal oral intake; patient not managing oral medication and only able to take sips of fluid
- The patient's condition is deteriorating rapidly (e.g. day by day or hour by hour)
- Breathing becomes irregular +/- noisy (death rattle)
- Changes in skin colour and/ or temperature
- Limited attention span

## Investigations

- Exclude reversible problems (e.g. drug toxicity, infections, dehydration, biochemical abnormalities)
- Before ordering a test, always ask "will this test change my management plan or the outcome for the patient?"
- It is important to weigh the benefit versus the burden in assessing an intervention, and/or management plan based on the clinical features exhibited by the patient

## Management

TREATMENT	LOC
<b>General principles of medicine treatment</b> <ul style="list-style-type: none"> <li>□ Focus on giving medication that will improve the patient's quality of life</li> <li>□ Treat symptoms of discomfort as in sections above</li> <li>□ If the patient is unable to swallow choose an appropriate route to give necessary medications (e.g., via NG tube, parenteral or rectally)</li> <li>□ Subcutaneous (SC) is recommended when the enteral route is not possible. It is preferred over IV and IM access due to its reduced trauma and pharmacokinetics</li> </ul>	HC2

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> If repeated injections are anticipated or experienced, a butterfly needle can be inserted and used as a route for regular SC injections</li> <li><input type="checkbox"/> Consider prescribing medications pre-emptively (anticipatory) to combat developing symptoms</li> <li><input type="checkbox"/> Morphine concentrations can vary depending on the preparation used; remember that SC morphine has twice the potency of oral morphine</li> </ul>	
<p><b>Hydration and nutrition</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Patients should eat and drink as they wish, and take sips of water as long as they are able</li> <li><input type="checkbox"/> Families should be educated that it is normal for patients to lose their appetite, have a sense of thirst and stop feeding towards the end of life.</li> <li><input type="checkbox"/> They should not feed patients if they are no longer able to swallow as this may cause choking and distress</li> </ul>	
<ul style="list-style-type: none"> <li><input type="checkbox"/> IV fluids at this stage will not prolong life or prevent thirst. Over-hydration is discouraged as it may contribute to distressing respiratory secretions or generalised oedema; good regular mouthcare is the best way to keep the patient comfortable</li> <li><input type="checkbox"/> IV dextrose for calorie supplementation is unlikely to be of benefit</li> </ul>	
<ul style="list-style-type: none"> <li><input type="checkbox"/> If there is a reduced level of consciousness, patients should not be fed due to the risk of aspiration.</li> <li><input type="checkbox"/> Artificial nutrition is generally discouraged at the end of life</li> </ul>	
<p><b>Supportive care</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Keep the patient clean and dry</li> <li><input type="checkbox"/> Regularly clean the mouth with a moist cloth wrapped round a spoon</li> <li><input type="checkbox"/> Prevent and manage pressure sores appropriately</li> <li><input type="checkbox"/> Manage any associated pain</li> </ul>	

TREATMENT	LOC
<ul style="list-style-type: none"><li><input type="checkbox"/> The end of life is an emotional time for all involved and requires health care professionals to be considerate and compassionate. Take time to listen to the concerns of the patient and their family; break bad news sensitively</li><li><input type="checkbox"/> Encourage the family to be present, holding a hand or talking to the patient even if there is no visible response; the patient may be able to hear even if they cannot respond</li><li><input type="checkbox"/> Consider spiritual support</li><li><input type="checkbox"/> Consider the best place of death for the patient and their family; would discharging them to go home be best?</li></ul>	

# 14 Gynecological Conditions

## 14.1.1 DYSMENORRHOEA

ICD10 CODE: N94.6

Abdominal pain that occurs just before or during menstruation. Symptoms begin about 12 hours before onset of menses and last for 1–3 days.

Primary dysmenorrhoea occurs more commonly among adolescents and young women. Symptoms usually begin 6–12 months after menarche and occur mainly with ovulatory cycles. Generally, severity of symptoms decreases with age, sexual activity and child birth.

Secondary dysmenorrhoea is usually due to a gynaecological condition such as infection or fibroids, and usually occurs in older women above 30 years.

### Causes of primary dysmenorrhoea

- Not known

### Causes of secondary dysmenorrhoea

- Pelvic inflammatory disease
- Endometriosis
- Uterine fibroids

### Clinical features

- Lower abdominal cramping
- Backache, headache
- Nausea, vomiting, diarrhoea, fainting, fever, fatigue, dizziness

## Differential diagnosis

- Endometriosis
- Other causes of lower abdominal pain

## Management

TREATMENT	LOC
<p><b>Non-pharmacological</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Encourage the patient to rest or sleep</li> <li><input type="checkbox"/> Encourage the patient to do some exercises</li> <li><input type="checkbox"/> Advise the patient to apply a warm compress to the abdomen</li> <li><input type="checkbox"/> Encourage the patient to wear loose fitting clothes</li> <li><input type="checkbox"/> Advise the patient to have a diet low in fats and supplements such magnesium, vitamin B1, vitamin E and zinc</li> <li><input type="checkbox"/> Pharmacological</li> <li><input type="checkbox"/> Give NSAIDs e.g. ibuprofen 200–400 mg every 8 hours as required</li> <li><input type="checkbox"/> Other medications include paracetamol 1 g every 6 hours (in case of mild pain); or diclofenac 50 mg every 8 hours for severe forms</li> <li><input type="checkbox"/> Review the patient after 5 days and if no response or if recurrent, refer for specialist management</li> <li><input type="checkbox"/> In secondary dysmenorrhoea, treat cause e.g. PID</li> <li><input type="checkbox"/> with antibiotics</li> </ul>	HC2 H C 2 HC4

### 14.1.2 Pelvic Inflammatory Disease (PID) ICD10 CODE: N70-N73

Infection (usually ascending from the vagina) occurring in the uterus, ovary, or uterine tubes and leading to salpingitis, endometritis, pelvic peritonitis or formation of tubal ovarian abscess.

#### Risk factors

- Previous pelvic inflammatory disease infections

- Presence of bacterial vaginosis
- Multiple or new sexual partners

### **History of STIs in the patient or her partner**

- History of abortion
- Young age of less than 25 years
- Postpartum endometritis

### **Causes**

- Often due to multiple pathogens: Neisseria gonorrhoea, Chlamydia trachomatis, Mycoplasma, Gardnerella, Bacteroids, Gram-negative bacilli, e.g. Escherichia coli

### **Clinical features**

- Pain in lower abdomen (usually <2 weeks) PLUS
- Dysuria, fever
- Vaginal discharge: could be smelly and mixed with pus
- Painful sexual intercourse (dysperunia)
- Cervical motion tenderness: vaginal examination will produce tenderness when the cervix is moved
- Abnormal uterine bleeding

### **If severe**

- Swellings may be felt if there is pus in the tubes or pelvic abscess
- Signs of peritonitis (rebound tenderness)

### **Complications of PID**

- Infertility
- Ectopic pregnancy
- Chronic pelvic pain



## Do Not Treat Chronic Pelvic Pain With Antibiotics

### Differential diagnosis

- Ectopic pregnancy, threatened abortion
- Ovulation pain
- Acute appendicitis
- Complicated or twisted ovarian cyst
- Cancer of the cervix

### Investigations

- Speculum examination
- Pregnancy test
- Pus swab: For C&S. The speculum protects the sampling item; sample is from endocervix, aspirate from endometrial cavity/currettings or an aspirate through the posterior pouch
- Ultrasound (if available) for detection of tubo ovarian masses, free fluid, peritonitis

### Management

TREATMENT	LOC
<p>Treatment is based on a combination of medicines that cover the multiple microorganisms involved.</p> <p><b>Outpatient treatment</b></p> <ul style="list-style-type: none"><li><input type="checkbox"/> Ceftriaxone 250 mg IM (or cefixime 400 mg stat if ceftriaxone is not available)</li><li><input type="checkbox"/> Plus doxycycline 100 mg orally every 12 hours for 14 days</li><li><input type="checkbox"/> Plus metronidazole 400 mg twice daily orally for 14 days</li><li><input type="checkbox"/> Treat sexual partners as for urethral discharge syndrome to avoid re-infection</li></ul>	

TREATMENT	LOC
<input type="checkbox"/> In pregnancy, use erythromycin 500 mg every 6 hours for 14 days instead of doxycycline <input type="checkbox"/> If severe or not improving after 7 days <input type="checkbox"/> Refer for ultrasound scan and parenteral treatment <input type="checkbox"/> Ceftriaxone 1 g IV daily plus metronidazole 500 mg IV every 8 hours until clinical improvement, <input type="checkbox"/> then continue oral regimen as above	HC3
	HC4
<b>Notes</b>	
<ul style="list-style-type: none"> <li>▪ All women with PID should be tested for HIV</li> <li>▪ Abstain from sex or use barrier methods during the course of treatment</li> <li>▪ Do not take alcohol when taking metronidazole</li> <li>▪ Avoid sex during menstrual period and for 6 weeks after an abortion</li> </ul> <p>▪ In IUD users with PID, the IUD need not be removed. However, if there is no clinical improvement within 48–72 hours of initiating treatment, providers should consider removing the IUD and help patient choose an alternative contraceptive method (see chapter 15)</p>	

### 14.1.3 Abnormal Uterine Bleeding ICD10 CODE: N39.9

Any vaginal bleeding which represents a variation from the normal pattern of regular menstruation.

#### Causes

- Hormonal abnormalities (ovulatory dysfunction)
- Abortion, ectopic pregnancy
- Uterine diseases (fibroids, polyps etc)
- Cancers (cervical, uterine, rarely vaginal)
- Infections (STIs)
- Others (coagulation disorders etc.)
- Iatrogenic (IUD, hormonal contraceptives)

## Clinical features

- Abnormal menstrual pattern
- Continuous or subcontinuous bleeding
- It can be acute and heavy or light and subcontinuous

## Investigations

- Pregnancy test to exclude abortion and pregnancy
- Haemoglobin level
- Vaginal examination (for cervical and vaginal abnormalities e.g., cervical cancer)
- Abdominal ultrasound

## Management

Management is based on the possible cause.

CAUSE/ISSUE	TREATMENT	LOC
General measures	Ferrous sulphate or Fefol 1 tablet once or twice a day	HC2
Positive pregnancy test	See section on abortion and ectopic pregnancy (chapter 16)	HC4
Bleeding in postmenopausal woman	Refer for specialist assessment (possible endometrial pathology)	RR
Lesion (ulcer, growth) in vagina/on cervix	Refer for specialist assessment	RR
Suspect fibroid (bulky hard uterus)	Use analgesics, iron supplement, refer for ultrasound scan	H
Other signs of infection	Treat as PID and review	HC3
Women on family planning	See sections on FP methods and side effects (chapter 15)	HC2

**14.1.4 Menopause**

ICD10 CODE: Z78.0

Menopause is the cessation of menstruation in a female and usually spontaneously occurs at the age of 45-55 years. Peri-menopause is the time around menopause and can last a few years until the menopause has set in.

Menopause can also be caused by surgical removal of ovaries.

**Clinical features**

- “Hot flushes” (sudden unanticipated, unpleasant wave of body heat; can range from mild to intense)
- Night sweats, palpitations, headaches, insomnia, tiredness
- Irregular menstruation till cessation
- Vaginal atrophy and dryness, loss of libido, painful intercourse
- Bladder irritability, incontinence, UTIs
- Weight gain (sometimes)
- Skin changes: dryness, thinning, loss of head hair, increase or loss of body hair)
- Mood swings, emotional changes (e.g. depression, irritability, short temperedness, weepiness)
- Lack of concentration, failing memory
- Osteoporosis, denture problem
- **Investigations**
- Exclude pregnancy

**Management**

TREATMENT	LOC
<b>Non-pharmacological</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Explain process of menopause to the patient and reassure her it is normal</li> <li><input type="checkbox"/> Suggest lifestyle adjustment           <ul style="list-style-type: none"> <li>▪ Follow a healthy diet</li> <li>▪ Sleep and exercise enough</li> <li>▪ Wear loose light clothing</li> </ul> </li> </ul>	

TREATMENT	LOC
<ul style="list-style-type: none"><li>▪ Avoid alcohol</li><li>▪ Diet low in fats, high in fruit and vegetables</li><li>▪ Food rich supplements such as magnesium, vitamin B1, vitamin E and zinc</li><li><input type="checkbox"/> Calcium-rich food (or supplements) such as milk and soya beans and vitamin D supplements</li><li><input type="checkbox"/> Screen for CVD (hypertension, heart disease) and urine incontinence</li><li><input type="checkbox"/> For severe symptoms (severe hot flushes, depression) consider<ul style="list-style-type: none"><li>▪ Fluoxetine 20 mg daily</li></ul></li></ul> <p>NB: URGENTLY REFER ANY MENOPAUSAL WOMAN WITH VAGINAL BLEEDING FOR FURTHER ASSESSMENT</p>	HC2
	HC4 RR

# 15 Family Planning (FP)

For further detailed information on Family Planning (FP) and Maternal Health, please refer to “Procedure Manual for Family Planning and Maternal Health Service Delivery MOH, 2016”.

Family planning is a basic human right for an individual and couples to exercise control over their fertility, make informed decision on the number of children they want to have, plan pregnancies, and the space between pregnancies.

FP has health benefits for the mother and the children and economic benefits for the family and the country at large.

## **15.1 Key steps to be followed in provision of fp services**

Icd10 code: z10.0

1. Provide information about FP, including preconception care to different groups
2. Counsel clients at high risk of unwanted pregnancies to accept/use FP services
3. Counsel clients to make informed choice of FP methods, including dual methods
4. Obtain and record client history
5. Perform a physical assessment
6. Perform a pelvic examination
7. Screen for cervical cancer and HIV
8. Manage client according to chosen FP method

### 15.1.1 Provide Information about FP including Pre-Conception-Care to Different Groups

The procedures used here are also used in the next step to recruit clients for FP and maternal health services in young child, antenatal, labour and delivery wards, outpatients, outreach, and postpartum clinics and in providing education on specific chosen FP methods.

The objective is to:

- ⦿ Create awareness
- ⦿ Disseminate correct information to influence people to change beliefs, attitudes and practices
- ⦿ Recruit new clients and offer several FP methods

### 15.1.2 Counsel High-Risk Clients

**Risk factors to look out for in clients include:**

- ⦿ Recent delivery/abortion
- ⦿ >4 pregnancies
- ⦿ >35 years old or <20 years old
- ⦿ Complicating medical conditions (e.g., diabetes, heart disease)
- ⦿ People living with HIV/AIDS
- ⦿ Having children with birth interval <2 years
- ⦿ Poor obstetric history, which is likely to recur in future pregnancies (e.g., postpartum haemorrhage, pre- eclampsia)

**Identify eligible women (non-pregnant) while conducting clinics such as:**

- ⦿ Young child clinics and paediatric wards
- ⦿ Maternity and postnatal clinics and wards
- ⦿ Outpatient clinics

- Youths and Adolescent centers
- HIV/AIDS care centers/ ART clinics
- Sexual Reproductive Health clinics (e.g. Cervical cancer, Post abortion care, Adolescent/Youth clinics)
- Male clinics
- Gender based violence clinics/ corners

You can also identify the eligible women while:

- Conducting outreaches (Immunisation or Home visits)

Discuss with clients about reproductive choices and risk factors. Give special consideration to first time parents and adolescents in provision of appropriate information on sexuality, family planning and family planning services: types, benefits, availability and procedures.

### **15.1.3 Pre-Conception Care with Clients Who Desire to Conceive**

Pre-conception care discussion topics for clients who desire to conceive include:

- Pregnancy planning and appropriate contraception
- Folic acid supplementation 3 months preceding conception
- Good diet, risk assessment and management of pre existing conditions and risk factors
- Benefits of preconception care (e.g., prevention of unintended pregnancies, good maternal and foetal outcomes)
- Screening for hereditary diseases e.g., sickle cell disease
- Screening for STI, including HIV and hepatitis

#### 15.1.4 Discuss with PLW HIV Special Consideration for HIV Transmission

Key areas for discussion include:

- Prevention of HIV transmission to spouse and child
- Safer sexual practices and safe conception
- Education/counseling about perinatal transmission risk
- Initiation or modification of ART considering toxicity
- Evaluation of opportunistic infections and offering unmaritalizedn
- Some ARV drugs may interact and reduce the effect of hormonal contraceptives. It is always summarize to use additional barrier methods (condoms), which also prevent STIs.

#### 15.1.5 Educate and Counsel Clients to Make Informed Choice of FP Method

The primary objectives are:

9. To dispel any rumours and misconceptions about FP
10. To help the client make a voluntary informed choice

#### Procedure

- Prepare the room/materials needed, ensuring privacy
- Assess client's knowledge and experience of FP methods
- Explain about different FP methods available
- Type
- Mechanism of action and method of use
- Advantages and disadvantages
- Indications
- Contraindications
- Side-effects

- Complications/warning signs
- Check understanding
- Help client choose appropriate method using family planning medical eligibility criteria wheel (see summary of wheel in section 15.1.10 below)
- Explain next steps needed

### 15.1.6 Obtain and Record Client History

The primary objectives are:

- To obtain client's personal and social data and information on health status
- To identify abnormalities/problems requiring treatment or referral

For FP clients, it is important to pay particular attention to information outlined in the table below:

HISTORY	INFORMATION NEEDED
Social History	<ul style="list-style-type: none"> <li><input checked="" type="radio"/> Smoking? How many unmarized per day?</li> <li><input checked="" type="radio"/> Drinking? How much alcohol per day?</li> </ul>
Family Health History	<ul style="list-style-type: none"> <li><input checked="" type="radio"/> Diabetes mellitus, high blood pressure, asthma, heart disease</li> </ul>
Personal Medical History	<ul style="list-style-type: none"> <li><input checked="" type="radio"/> Excessive weight gain/loss (+/- 5 kg/year)</li> <li><input checked="" type="radio"/> Severe headaches (relieved by analgesics?)</li> <li><input checked="" type="radio"/> Growth on neck (enlarged thyroid)</li> <li><input checked="" type="radio"/> Current or past diseases: asthma, cardiac disease, high BP, diabetes mellitus, mental illness, epilepsy, thrombophlebitis, varicose veins, unilateral pain in thighs or calves, chronic anaemia (e.g. sickle-cell anaemia), liver disease/jaundice in the last 6 months or during pregnancy</li> </ul>

HISTORY	INFORMATION NEEDED
	<ul style="list-style-type: none"><li><input type="radio"/> TB (on treatment?)</li><li><input type="radio"/> Allergies</li><li><input type="radio"/> Any medicines being taken and reason</li></ul>
Surgical History	<ul style="list-style-type: none"><li><input type="radio"/> Any previous or planned operations</li><li><input type="radio"/> Where and when operation was performed, or is to be performed</li></ul>
Reproductive History	<ul style="list-style-type: none"><li><input type="radio"/> Total pregnancies</li><li><input type="radio"/> Number and sex of live children</li><li><input type="radio"/> Number of abortions/ miscarriages</li><li><input type="radio"/> Number of children who died</li><li><input type="radio"/> Age of youngest child</li><li><input type="radio"/> Type of delivery for her children</li><li><input type="radio"/> Any problems in previous pregnancy or deliveries</li><li><input type="radio"/> Number of children desired</li><li><input type="radio"/> When does she wish to have next child</li><li><input type="radio"/> Whether breastfeeding</li></ul>
Menstrual History	<ul style="list-style-type: none"><li><input type="radio"/> Age at onset of menstruation</li><li><input type="radio"/> Length of cycles</li><li><input type="radio"/> Periods regular or not?</li><li><input type="radio"/> Number of days and amount of blood loss</li><li><input type="radio"/> Bleeding after intercourse</li><li><input type="radio"/> Date and length of last normal period</li></ul>

HISTORY	INFORMATION NEEDED
Gynaecological History	<ul style="list-style-type: none"> <li>○ Vulval sores or warts</li> <li>○ PID and STI? If yes, which one, was it treated and when?</li> <li>○ Lower abdominal pain</li> <li>○ Offensive vaginal odour/discharge</li> <li>○ Pain during intercourse</li> <li>○ Pain on urination</li> <li>○ Bleeding between periods</li> </ul>
Family Planning History	<ul style="list-style-type: none"> <li>○ How/where first learned about FP</li> <li>○ Whether new to FP, or used FP before</li> <li>○ If used before, which method used</li> <li>○ Age when started using FP</li> </ul>
	<p><b>Last FP method used:</b></p> <ul style="list-style-type: none"> <li>○ Duration of using each FP method used</li> <li>○ Reasons for discontinuation of FP</li> <li>○ Currently preferred method</li> </ul>
Inform Client	<ul style="list-style-type: none"> <li>○ If chosen method seems suitable or contraindicated</li> <li>○ Explain that physical assessment will confirm suitability of this method</li> <li>○ Next steps needed</li> </ul>

### 15.1.7 Perform a Physical Assessment

- Assess general health status
- Examine client from head to toe
  - Especially, look out for alopecia, acne, chloasma, hirsuitism,

- jaundice, anaemia, enlarged glands, goitre
- Pay particular attention to breasts (e.g. lumps) and abdomen (enlarged organs, e.g., liver, uterus)

### 15.1.8 Perform a Pelvic Examination

The following areas need to be investigated:

- Inspect external genitalia
- Perform speculum examination
- Perform cancer cervix screening (VIA, VILI, Pap smear)
- Perform bimanual examination to determine size of uterus for comparison later
- Share findings with the client in simple language
- Explain next steps needed
- Advise on when to have next examination (e.g., routine, annual, follow-up, if problems)

### 15.1.9 Manage Client for Chosen FP Method

- Take and record client's BP and weight
- Take and record client's history
- Use the table at in the following section 15.1.10 to quickly assess suitability of method considered
- Provide suitable method, and ensure client understands fully how the method works, and how any medicine for home use is to be taken
- Advise client on any potential problems with the chosen method and when to immediately return
- Discuss management of any serious side-effects and complications
- Arrange for client to return for routine follow-up, and for additional FP supplies

## 15.1.10 Summary of Medical Eligibility for Contraceptives

The tables below contain a summarized version of the medical eligibility criteria for initiating a patient on contraceptive methods, based on the MOH (2016) and WHO (2020) Medical Eligibility Criteria for Contraceptive Use. It guides family planning providers in recommending safe and effective contraception methods for women with medical conditions or medically-relevant characteristics. For more detailed information, consult the above-named documents.

The tables below include recommendations on initiating use of common types of contraceptive methods:

- 1. Combined oral contraceptive pills (COC)**
- 2. Progestogen only pills (POP)**
- 3. Progestogen only injectable (POI) e.g., DMPA- IM/SC**
- 4. Progestogen only implants (POIM)**
- 5. Copper-bearing IUD(CuIUD)**
- 6. LAM- Lactational amenorrhoea**
- 7. Hormonal IUD**
- 8. Condoms**
- 9. Fertility Awareness Method (FAM) and standard days methods**

### Interpretation of eligibility

Y- Use method

N- Do not use method

### Drug Interactions

Drug	Contraceptives				
	Coc	Pop	Poi	Poim	Cuiud
Abacavir	Y	Y	Y	Y	Y

Drug	Contraceptives				
	Coc	Pop	Poi	Poim	Cuiud
Tenofovir	Y	Y	Y	Y	Y
Zidovudine	Y	Y	Y	Y	Y
Lamivudine	Y	Y	Y	Y	Y
Efavirenz	Y	Y	Y	Y	Y
<b>Nevirapine</b>	<b>Y</b>	<b>Y</b>	<b>Y</b>	<b>Y</b>	<b>Y</b>
<b>Atazanavir/r</b>	<b>Y</b>	<b>Y</b>	<b>Y</b>	<b>Y</b>	<b>Y</b>
Lopinavir/r	Y	Y	Y	Y	Y
Darunavir/r	Y	Y	Y	Y	Y
Raltegravir	Y	Y	Y	Y	Y
Dolutegravir	Y	Y	Y	Y	Y
Phenytoin	N	N	Y	Y	Y
Phenobarbital	N	N	Y	Y	Y
Carbamazepine	N	N	Y	Y	Y
Broad spectrum antibiotic	Y	Y	Y	Y	Y
Rifampicin	N	N	Y	Y	Y
Rifabutin	N	N	Y	Y	Y

### Medical Conditions and Patient Characteristics

Condition	Contraceptives				
	Coc	Pop	Poi	Poim	Cuiud
<b>Reproductive Tract Infections And Disorders</b>					
Unexplained vaginal bleeding	Y	Y	N	N	N
Severe dysmenorrhoea	Y	Y	Y	Y	Y
Trophoblastic disease	Y	Y	Y	Y	N

Condition	Contraceptives				
	Coc	Pop	Poi	Poim	Cuiud
Uterine fibroids	Y	Y	Y	Y	Y
Cervical neoplasia	Y	Y	Y	Y	Y
Cervical cancer	Y	Y	Y	Y	N
Current pelvic inflammatory disease	Y	Y	Y	Y	Y
Post abortion sepsis	Y	Y	Y	Y	N
Breast cancer	N	N	N	N	Y
Liver Diseases					
Acute hepatitis	N	Y	Y	Y	Y
Liver tumour	N	N	N	N	Y
Venous Thromboembolism (Vte E.g Dvt, Pe)					
History of VTE	N	Y	Y	Y	Y
Acute VTE	N	N	N	N	Y
Major surgery with prolonged immobilisation	N	N	Y	Y	Y
Cardiovascular Disease					
Ischaemic heart disease	N	Y	N	Y	Y
Stroke	N	Y	N	Y	Y
Multiple risk factors e.g. dyslipidaemias	Y	Y	Y	Y	Y
Hypertension, Obesity And Diabetes					
BP 140-159/90-99 or adequately controlled	N	Y	Y	Y	Y
BP 160/99 mmHg	N	Y	N	Y	Y
BMI 30 kg/m2					

Condition	Contraceptives				
	Coc	Pop	Poi	Poim	Cuiud
Diabetes (current)	Y	Y	Y	Y	Y
Diabetes with neuro-, retinal or nephropathy	N	Y	N	Y	Y
Smoker Age 35	N	Y	Y	Y	Y
Smoker Age <35	Y	Y	Y	Y	Y
Headache					
Non-migraine headache	Y	Y	Y	Y	Y
Migraine with aura (neurological symptom)	N	N	Y	Y	Y
Hiv And Stis					
HIV Clinical Stage 3 or 4	Y	Y	Y	Y	N
Gonorrhoea	Y	Y	Y	Y	Y
Chlamydia	Y	Y	Y	Y	Y
Other STIs and vaginalis	Y	Y	Y	Y	Y
Increased risk of STIs	Y	Y	Y	Y	Y
Postpartum And Breastfeeding					
<48 hours	N	Y	N	Y	Y
48 hours to <4 weeks	N	Y	N	Y	N
4 weeks to <6 weeks	N	Y	N	Y	Y
6 weeks to <6 months (primary breastfeeding)	N	Y	Y	Y	Y
6 months	Y	Y	Y	Y	Y

Condition	Contraceptives				
	Coc	Pop	Poi	Poim	Cuiud
Postpartal sepsis	Y	Y	Y	Y	N
<b>Age And Pregnancy History (Parity)</b>					
Adolescents (menarche to age < 18 years)	Y	Y	Y	Y	Y
Nulliparity	Y	Y	Y	Y	Y
Parous	Y	Y	Y	Y	Y
Pregnancy	NA	NA	NA	NA	NA

### Notes on continuation

- If venous thromboembolism develops while on hormonal contraceptives, discontinue
- Refer for further management
- Recommend another non-hormonal family planning method

### Conditions where all methods can be used

Category	Conditions
Reproductive	Benign breast disease or undiagnosed mass, benign ovarian tumours and cysts, dysmenorrhoea, endometriosis, history of gestational diabetes, history of high blood pressure during pregnancy, history of pelvic surgery including caesarean delivery, irregular, heavy prolonged menstrual bleeding (explained), past ectopic pregnancy, past pelvic inflammatory disease, post-abortion (no sepsis), postpartum (all methods except COCs which are given 6 months)
Medical	Depression, epilepsy, HIV asymptomatic (WHO clinical stage 1 or 2), iron-deficiency anaemia, sickle-cell disease, thalassaemia, malaria, mild cirrhosis, schistosomiasis, superficial venous disorders including varicose veins,

Category	Conditions
	thyroid disorders, tuberculosis (non-pelvic), uncomplicated heart disease, viral hepatitis (carrier or chronic), cholecystitis, gall stones
Others	Adolescents, breast cancer family history, venous thromboembolism (VTE) family history, high risk for HIV, surgery without prolonged immobilisation, taking antibiotics (except rifampicin or rifabutin)

### Methods all couples (except a few) can safely use

Emergency contraceptive pill (for emergency use only) Bilateral Tubal Ligation (BTL) and Vasectomy

Barrier methods (condoms, diaphragm) Lactational amenorrhoea method (LAM)

Fertility awareness (FAM) and Standard days methods

## 15.2 Overview Of Key Contraceptive Methods

The following sections contain an overview of mainstream contraceptive methods and how to manage side effects

of each (in case they occur). Side effects are one of most common reasons why women stop using contraception, and the health worker should be able to counsel the patient and address her concerns appropriately.

### 15.2.1 Condom (Male)

ICD10 CODE: Z30.018/Z30.49

For example no-logo donation condoms, branded condoms.

#### Indications

- ⦿ Couples needing an immediately effective method
- ⦿ Where this is preferred FP method by client
- ⦿ Couples waiting to rule out suspected pregnancy
- ⦿ Protection against exposure to STIs including HIV/AIDS

- Where back-up method is needed, e.g. when woman is starting or has forgotten to take oral contraceptives
- Couples where one or both partners have HIV/AIDS, even if using another FP method

### Advantages

- Male plays role in FP
- Protects against unwanted pregnancy
- Also protects against STIs and HIV infection

### Disadvantages

- Some men may have difficulty maintaining an erection with condom on
- May cause insensitivity of the penis
- Occasional hypersensitivity to latex or lubricants (may result in a severe allergic reaction)
- Requires correct use with every act of sex for greatest effectiveness

### Management

INSTRUCTIONS	LOC
<ul style="list-style-type: none"><li>○ Ensure client understands correct use, storage, and disposal of condom</li><li>○ Supply at least 100 condoms to each client for three months, and if available, a water or silicone based lubricant</li><li>○ Advise client to return for more before they are finished</li><li>○ In case of hypersensitivity to latex or lubricants, avoid latex based condoms, and use the female condom or another FP method</li></ul>	HC2

## 15.2.2 Condom (Female)

ICD10 CODE: Z30.018/Z30.49

For example Femidom, Care and FC2.

A soft plastic pre-lubricated sheath with an inner and outer ring which is inserted into the vagina before sexual intercourse.

### Indications

- ⦿ As for condoms (male) above
- ⦿ For women whose partners will not use male condom
- ⦿ Where the man has allergy/sensitivity to latex condom

### Advantages

- ⦿ Woman-controlled (but requires partner's cooperation)
- ⦿ Can be inserted hours before intercourse and so does not interrupt sexual spontaneity
- ⦿ Not dependent on male erection and does not require immediate withdrawal after ejaculation
- ⦿ Protects against STI and HIV infection
- ⦿ No special storage required

### Disadvantages and Side-Effects

- ⦿ Requires special training and practice to use correctly
- ⦿ Relatively new product with limited public awareness
- ⦿ In some cases, hypersensitivity to polyurethane female condoms occurs
- ⦿ Requires correct use with every act of sex for greatest effectiveness

### Management

INSTRUCTIONS	LOC
<input type="checkbox"/> Ensure client understands correct use, storage, and disposal	

INSTRUCTIONS	LOC
<input type="checkbox"/> Supply at least 40 female condoms to each client per month <input type="checkbox"/> Advise client to return for more before they are finished <input type="checkbox"/> In case of hypersensitivity, avoid use and change to another FP method	HC2

### 15.2.3 Combined Oral Contraceptive Pill (COC)

ICD10 CODE: Z30.011/Z30.41

Contains an oestrogen plus a progestin, the types and quantities of which may vary in different preparations.

#### Indications

- Women <35 years needing highly effective FP method
- Non-breastfeeding clients, or breastfeeding clients after 6 months postpartum
- Clients with dysmenorrhoea
- Clients with heavy periods or ovulation pain
- Clients concerned by irregular menstrual cycles

#### Contraindications

- Diastolic BP >100 mmHg
- Cardiac disease
- Thromboembolic disease (e.g. deep vein thrombosis)
- Active liver disease
- Less than 6months after childbirth
- When major surgery is planned within 4 weeks
- Unexplained abnormal vaginal bleeding
- Known/suspected cervical cancer

#### Undiagnosed breast lumps or breast cancer

- Pregnancy (known or suspected)

## Risk factors

If any 2 of the following, recommend progestogen-only or non-hormonal FP method

- Ⓐ Smoking (especially if >10 cigarettes/day)
- Ⓐ Age >35 years
- Ⓐ Diabetes

## Advantages and other potential health benefits/uses

- Ⓐ Protects against:
  - ☐ Risk of unwanted pregnancy
  - ☐ Cancer of the ovary or lining of uterus
  - ☐ Symptomatic pelvic inflammatory disease
- Ⓐ Reduces:
  - ☐ Menstrual cramps and bleeding problems
  - ☐ Ovulation pain
  - ☐ Excess hair on body/face, acne
  - ☐ Symptoms of polycystic ovarian syndrome

## Disadvantages and common side effects

- Ⓐ DOES NOT PROTECT AGAINST STIs
- Ⓐ Spotting, nausea, and vomiting within first few months
- Ⓐ Changes in bleeding patterns including: fewer days, irregular, lighter, infrequent, or no monthly bleeding
- Ⓐ May cause headaches, dizziness, weight gain
- Ⓐ Effectiveness dependent on regular daily dosage
- Ⓐ Mood changes
- Ⓐ Breast tenderness
- Ⓐ Suppresses lactation
- Ⓐ Medicine interactions reduce effectiveness including:

- Medicines which increase hepatic enzyme activity, e.g., rifampicin (especially), carbamazepine, griseofulvin, nevirapine, phenytoin, phenobarbital
  - Short courses of some broad spectrum antibiotics, e.g., ampicillin, amoxicillin, doxycycline

An additional FP method must be used during course of treatment with these medicines and for at least 7 days after completion.

### Complications and warning signs

- Severe headaches, blurred vision
- Depression
- Acute severe abdominal pain
- Chest pain plus dyspnoea (pulmonary embolism)
- Swelling or pain in calf muscle (Deep vein thrombosis)

### Management

INSTRUCTIONS	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Give 3 cycles of COC and explain carefully:           <ul style="list-style-type: none"> <li>▪ How to take the tablets</li> <li>▪ Strict compliance is essential</li> </ul> </li> <li>▪ What to do if doses are missed or there are side-effects or warning signs</li> </ul> <p>If starting COC within 5 days of period</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Supply and show how to use back-up FP method</li> <li><input type="checkbox"/> Ask client to return when &lt;7 tablets remain in last cycle</li> </ul>	HC2
MANAGEMENT OF SIDE EFFECTS OF COCS	
<b>Nausea</b> <ul style="list-style-type: none"> <li><input checked="" type="radio"/> Assess for pregnancy and malaria</li> </ul>	

**MANAGEMENT OF SIDE EFFECTS OF COCS**

- Ⓐ Suggest taking COCs at bedtime or with food
- Ⓐ Take pill at same time daily

**If symptoms continue:**

- ▢ Consider locally available remedies (e.g. eating roasted grains, roasted cassava, boiled greens)

**Breast Tenderness**

- Ⓐ Assess for pregnancy
- Ⓐ Recommend that she wears a supportive bra
- Ⓐ Examine for cancer symptoms, such as breast infection, lumps, or nipple discharge

**If breastfeeding, examine for breast infection**

- Ⓐ If there is infection, use warm compresses. Refer for appropriate evaluation
- Ⓐ If the examination shows a suspicious lump or discharge, refer for appropriate evaluation
- Ⓐ Counsel her on non-hormonal FP methods
- Ⓐ Try hot or cold compresses
- ▢ Suggest ibuprofen, paracetamol, or other pain relievers

**Mild Headaches**

- Ⓐ Take proper history (explore when headaches occur, whether she can continue with her daily tasks, what medicines relieve her headaches)
- Ⓐ Take her blood pressure

**If blood pressure is normal:**

- ▢ Give pain relievers such as ibuprofen or paracetamol
- ▢ If headaches get worse or occur more often, refer for appropriate evaluation

## MANAGEMENT OF SIDE EFFECTS OF COCS

### Palpitations

- Rule out anaemia and check blood pressure and weight
- Reassure that this is common in COC users, and usually disappears in a few months
- Evaluate for other causes unrelated to the method, and refer if necessary

### Chest Pain

- Evaluate for the cause and refer if necessary

## 15.2.4 Progestogen-Only Pill (POP)

ICD10 CODE: Z30.011/Z30.41

Pills that contain very low doses of a progestin like the natural hormone progesterone in a woman's body. Since these pills do not contain oestrogen, they are safe to use throughout breastfeeding, and by women who cannot use methods with oestrogen.

### Indications

- Breastfeeding and non-breastfeeding clients immediately postpartum
- Women who cannot take COC but prefer to use pills
- Women of all ages with desire to use contraceptive pills

### Contraindications

- Breast or genital malignancy (known or suspected)
- Pregnancy (known or suspected)
- Breast cancer >5 years ago, and it has not recurred
- Severe liver disease, infection, or tumor
- Taking barbiturates, carbamazepine, oxcarbazepine, phenytoin, primidone, topiramate, rifampicin, rifabutin, or ritonavir or ritonavir-boosted protease inhibitors. Use a backup contraceptive method as these medications reduce the effectiveness of POPs



- Ⓐ Systemic lupus erythematosus with positive (or unknown) antiphospholipid antibodies
- Ⓐ Undiagnosed vaginal bleeding
- Ⓐ Current or history of blood clot
- Ⓐ High blood pressure

### **Disadvantages and common side effects**

- Ⓐ DOES NOT PROTECT AGAINST STIs
- Ⓐ Spotting, amenorrhoea
- Ⓐ Unpredictable irregular periods
- Ⓐ Not as effective as COC
- Ⓐ Medicine interactions: the effectiveness is reduced by medicines which increase hepatic enzyme activity

### **Management**

INSTRUCTIONS	LOC
<input type="checkbox"/> Give 3 cycles of POP: Explain carefully how to take the tablets, and what to do if doses are missed, or if there are side-effects <input type="checkbox"/> Supply and show how to use back-up FP method for first 14 days of first packet, e.g. condoms or abstinence from sex <input type="checkbox"/> Ask client to return 11 weeks after starting POP <input type="checkbox"/> Use the last pill packet to show when this will be	HC2

### MANAGEMENT OF SIDE EFFECTS OF POPS

#### **No Monthly Periods**

##### **Assess for pregnancy**

- Ⓐ If not pregnant and/or breast-feeding, reassure that it is normal. Some women using POPs stop having monthly periods, but this is not harmful

**MANAGEMENT OF SIDE EFFECTS OF POPs**

- If pregnant, reassure that the POPs will not affect her pregnancy, and refer her to ANC

**Nausea/Dizziness**

- Nausea: suggest taking POPs at bedtime or with food
- If symptoms continue, consider locally available remedies

**Migraine/Headaches**

- Without Aura (e.g. hallucinations, hearing voices): able to continue using POPs voluntarily
- With Aura: stop POPs and choose a method without hormones

**Irregular Bleeding**

- Assess for pregnancy/abortion
- Reassure that many women using POPs get irregular bleeding whether breast-feeding or not. It is not harmful and should lessen or stop after several months of use
- Counsel on how to reduce irregular bleeding, e.g. making up for missed pills after vomiting or diarrhoea

**If bleeding continues:**

- Give 400–800 mg ibuprofen every 8 hours after meals for 5 days when irregular bleeding starts
- Mefenamic acid 500mg three times a day for 5-7days
- Check for anaemia and treat accordingly

If irregular bleeding persists or starts after several months of normal or no monthly bleeding:

- Investigate other reasons (unrelated to POPs) and treat accordingly
- Change to another pill formulation for at least 3 months
- Or help client choose another method of family planning



### Heavy or prolonged bleeding (twice as much as usual or longer than 8 days)

- Ⓐ Assess for pregnancy/abortion
- Ⓐ Reassure/comfort the patient
- ☐ Give 800 mg ibuprofen every 8 hours after meals for 5 days when irregular bleeding starts
- ☐ Or other non-steroidal anti-inflammatory drugs (NSAID)
- ☐ Ferrous salt tablets (60 mg iron) to prevent anaemia
- ☐ Educate on nutrition

#### If heavy bleeding persists:

- Ⓐ Investigate other reasons (unrelated to POPs) and treat accordingly
- Ⓐ Change to another pill formulation for at least 3 months
- Ⓐ Or help client choose another method of family planning preferably COC if there is no contra-indication

### 15.2.5 Injectable Progestogen-Only Contraceptive

ICD10 CODE: Z30.013/Z30.42

A slowly absorbed depot IM injection or subcutaneous injection, which provides contraceptive protection.

#### Indications

- Ⓐ Fertile women requiring contraception
- Ⓐ Breastfeeding postpartum women
- Ⓐ Known/suspected HIV positive women who need effective FP method
- Ⓐ Women with sickle-cell disease
- Ⓐ Women who cannot use COC due to oestrogen content
- Ⓐ Women who do not want more children but do not (yet) want voluntary surgical contraception

- Women awaiting surgical contraception

### Contraindications

- As for POP above

### Advantages and other health benefits/uses

- Do not require daily action (e.g. taking pills)
- Do not interfere with sex
- Private method: no one else can tell that a woman is using contraception
- Cause no monthly bleeding (for many women)
- Injections can be stopped at anytime
- Reduces:
  - Cancer of the lining of the uterus (DMPA)
  - Reduces heavy flow in Uterine fibroids (DMPA)
  - Iron-deficiency anaemia (NET-EN)

### Disadvantages and common side-effects

- DOES NOT PROTECT AGAINST STI
- Amenorrhoea
  - Often after 1st injection and after 9–12 months of use
  - Can cause heavy prolonged vaginal bleeding during first 1-2 months after injection
- Weight gain
- Loss of libido
- May delay return to fertility (Up to 12 months after stopping injection)

### Complications and warning signs

- Headaches
- Heavy vaginal bleeding



- Ⓐ Severe abdominal pain
- Ⓑ Excessive weight gain

## Management

INSTRUCTIONS	LOC
<p><input type="checkbox"/> Medroxyprogesterone acetate depot injection</p> <p><input type="checkbox"/> Give 150 mg deep IM into deltoid or buttock muscle</p> <ul style="list-style-type: none"> <li>- Do not rub the area as this increases absorption and shortens depot effect</li> </ul> <p><input type="checkbox"/> Medroxyprogesterone acetate depot injection</p> <ul style="list-style-type: none"> <li>- Inject 104 mg in the fatty tissue (subcutaneous) at the front of the thigh, the back of the upper arm, or the abdomen</li> <li>- This can be administered at community level</li> </ul>	HC1
<p>If given after day 1–7 of menstrual cycle</p> <p><input type="checkbox"/> Advise client</p> <ul style="list-style-type: none"> <li>▪ To abstain from sex or use a back-up FP method, e.g., condoms, for the first 7 days after injection</li> <li>▪ To return for the next dose on a specific date</li> <li>▪ 12 weeks after the injection (if client returns &gt;2-4 weeks later than the date advised, client should be certain that she is not pregnant. Rule out pregnancy before giving the next dose)</li> <li>▪ On likely side-effects</li> <li>▪ To return promptly if there are any warning signs</li> </ul>	HC1

MANAGEMENT OF SIDE EFFECTS OF INJECTABLE POC
<p><b>No Monthly Period</b></p> <p><b>Assess for pregnancy:</b></p> <ul style="list-style-type: none"> <li>Ⓐ If pregnant, reassure that the injectable POC will not affect her pregnancy and refer to ANC</li> <li>Ⓑ If not pregnant, reassure her that this contraceptive may stop women having monthly periods, but it is not harmful. She can continue with the method or choose another</li> </ul>

## MANAGEMENT OF SIDE EFFECTS OF INJECTABLE POC

### Irregular Bleeding

#### Assess for pregnancy/abortion:

- Reassure that many women using injectable POC have irregular bleeding. It is not harmful in the first few months and should lessen or stop after a few months

#### If irregular bleeding continues, immediately:

- Give 400–800 mg ibuprofen 8 hourly when irregular bleeding starts
- Or 500 mg mefenamic acid eight hourly after meals for five days

Avoid Tranexamic acid for treatment of bleeding as a result of using contraceptives for fear of blood clots.

- If irregular bleeding continues or starts after several months of normal or no monthly bleeding:
- Investigate other reasons (unrelated to the contraceptive) and treat accordingly
- Help client choose another FP method if necessary

### Heavy Bleeding

Blood clots, flow interferes with client daily routine, should not be more than 7days, feel of thirst all the time.

If heavy bleeding is between 8–12 weeks of first injection:

- Assess for pregnancy/ abortion
- Reassure (as for irregular bleeding)
- Repeat progestogen-only injection and change date to 3 months after the latest injection

Heavy bleeding after 2nd injection:

- Assess for pregnancy/abortion
- Reassure/comfort
- Give 1 COC pill daily for 21 days (1 cycle)

Heavy bleeding after 3rd or later injection:

**MANAGEMENT OF SIDE EFFECTS OF INJECTABLE POC**

- Assess for pregnancy/abortion
- Reassure/comfort
- Give 1 COC pill daily for 21 days (1 cycle) when irregular bleeding starts
- Or 50 µg ethinyl estradiol daily for 21 days
- And ibuprofen 800 mg 8 hourly
- Or 500 mg mefenamic acid eight hourly after meals for 5 days
- Ferrous salt tablets (60 mg iron) to prevent anaemia

If bleeding persists:

- Investigate other reasons (unrelated to injectable POC) and treat accordingly
- Help client choose another FP method if necessary

**Delayed Return to Fertility**

- A woman should not be worried if she has not become pregnant even after stopping use for 12 months
- Reassure and counsel her about the fertile days; ovulation normally occurs 14 days before the next menstrual period (if woman's cycle is 28 days and has regular menstruation)

**Weight Gain**

- Rule out weight gain due to pregnancy
- Interview client on diet, exercises, and eating habits promoting weight gain; counsel as needed. Explain to client that all hormonal contraceptives may have a slight effect on weight
- If weight gain is more than 2 kg, instruct her on diet and exercises

**Loss of Libido**

- Take proper history
- Find out if she has stress, fatigue, anxiety, depression, and if she is on new medication. Explore if this is due to dry vagina and/or painful intercourse

## MANAGEMENT OF SIDE EFFECTS OF INJECTABLE POC

- Explore lifestyle and suggest changes where needed.  
Advise on foreplay and if possible, involve spouse
- Help client choose another FP method if necessary

### **Headache**

- Explore possible social, financial, health, or physical causes of headaches. Ask her to keep a record of the timing and number of headaches for the next 2 weeks and ask her to come for follow-up
- Evaluate cause of headache (Is blood pressure raised? Does she have sinus infection [purulent nasal discharge and tenderness in the area of sinuses]?)
- Give pain relievers such as acetylsalicylic acid, ibuprofen, or paracetamol
- Regardless of age, a woman who develops migraine headaches with aura or whose migraine headaches becomes worse while using monthly injections should stop using injectable. If migraine headaches are without aura, she can continue using the method if she wishes

## **15.2.6 Progestogen-Only Sub-Dermal Implant**

ICD10 CODE: Z30.017/Z30.46

Flexible progestogen-releasing plastic rods surgically inserted under the skin of the woman's upper arm which provide contraceptive protection for 3–7 years depending on the type of implant (Implanon: 3 years; Jadelle: 5 years; Femplant: 4 years, Norplant: 5 years; implanon NXT: Levoplant).

### **Indications**

- Women wanting long-term, highly-effective but not permanent contraception where alternative FP methods are inappropriate or undesirable

## Contraindications

- ⦿ As for Progesteron-Only Pills

## Advantages and Health Benefits

- ⦿ Highly effective (only 1-3% failure rate)
- ⦿ No delay in return to fertility after removal
- ⦿ Long-acting
- ⦿ Low user-responsibility (no need for daily action)
- ⦿ Protects against symptomatic pelvic inflammatory disease

## Disadvantages and Common Side Effects

- ⦿ DOES NOT PROTECT AGAINST STI
- ⦿ Irregular bleeding, spotting, or heavy bleeding in first few months; amenorrhoea

Possibility of local infection at insertion site

- ⦿ Must be surgically inserted and removed by specially trained service provider
- ⦿ May not be as effective in women >70kg
- ⦿ Warning signs (require urgent return to clinic)
  - ◻ Heavy vaginal bleeding
  - ◻ Severe chest pain
  - ◻ Pus, bleeding, or pain at insertion site on arm

## Management

INSTRUCTIONS	LOC
<ul style="list-style-type: none"><li>◻ Insert the implant subdermally under the skin of the upper arm following recommended procedures</li></ul>	HC2

INSTRUCTIONS	LOC
<input type="checkbox"/> Carefully explain warning signs and need to return if they occur <input type="checkbox"/> Advise client to return <ul style="list-style-type: none"> <li>▪ After two weeks: To examine implant site</li> <li>▪ After three months: For first routine follow-up</li> <li>▪ Annually until implant removed: routine follow- up</li> </ul>	HC2

MANAGEMENT OF SIDE EFFECTS OF IMPLANTS
<b>No Monthly Periods</b>
<b>Assess for pregnancy:</b>
<ul style="list-style-type: none"> <li>○ If pregnant, reassure that the implant will not affect her pregnancy and refer her to ANC</li> <li>○ If not pregnant, reassure that implants may stop women from having monthly periods, but this is not harmful. She can continue with the method</li> </ul>
If irregular bleeding continues:
<ul style="list-style-type: none"> <li>□ Give 400–800 mg ibuprofen eight hourly when irregular bleeding starts</li> <li>□ Or 500 mg mefenamic acid eight hourly after meals for 5 days</li> <li>□ Check for anaemia and treat accordingly</li> </ul>
<b>If bleeding persists:</b>
<ul style="list-style-type: none"> <li>□ Give 1 COC pill daily for 21 days (1 cycle)</li> <li>□ Or 50 µg ethinyl estradiol daily for 21 days</li> <li>□ Investigate other reasons (unrelated to implants) and treat accordingly</li> <li>□ Help client choose another method of family planning</li> </ul>
<b>Heavy or prolonged bleeding (twice as much as usual or longer than 8 days)</b>
<ul style="list-style-type: none"> <li>○ Assess for pregnancy/abortion</li> <li>○ Reassure</li> </ul>

**MANAGEMENT OF SIDE EFFECTS OF IMPLANTS**

- Give ibuprofen 800 mg eight hourly when irregular bleeding starts
- Or 500 mg mefenamic acid eight hourly after meals for five days
- Give 1 COC pill daily for 21 days (one cycle)
- Give ferrous salt tablets (60 mg iron) to prevent anaemia
- Educate on nutrition

If bleeding persists:

- Investigate other reasons (unrelated to implants) and treat accordingly
- Help client choose another method of family planning

**Weight Gain**

- Manage the same as for Injectable POC

**Loss of Libido**

- Manage the same as for Injectable POC

**Infection at the Insertion Site**

- Do not remove the implant
- Clean the infected area with soap and water or anti-septic
- Give oral antibiotics for 7–10 days like Amoxycillin 500mg 8 hourly

If no improvement after the 10days refer

- Ask the client to return after taking all antibiotics if the infection does not clear. If infection has not cleared, remove the implant or refer for removal
- Expulsion or partial expulsion often follows infection. Ask the client to return if she notices an implant coming out

**Migraine Headaches**

- If she has migraine headaches without aura, she can continue to use implant if she wishes
- If she has migraine aura, remove the implant. Help her choose a method without hormones

## 15.2.7 Emergency Contraception (Pill and IUD)

ICD10 CODE: Z30.012

Emergency Contraception can be used to prevent unwanted pregnancy after unprotected sex, rape, defilement or contraceptive method failure. Methods available include Emergency Contraceptive Pills and IUDs.

**Caution:** Emergency contraceptive methods do not cause abortion.

**Regular Emergency Contraceptive Pill users should be counselled to use routine contraceptive method.**

TYPE	FEATURES
Emergency Contraceptive Pill (ECP)	<ul style="list-style-type: none"> <li>⦿ The ECP contains a special dose of progestin (Levonorgestrel or LNG): may come as one pill (1.5 mg) or two pills (0.75 mg).</li> </ul>
	<ul style="list-style-type: none"> <li>⦿ The dose (1.5 mg) should be taken as soon as possible within 72 hours, but can be taken up to five days after unprotected sex, or in case of contraceptive method failure, e.g.,</li> <li>⦿ condom burst, failure to take regular FP methods, or in cases of rape</li> </ul>
	<ul style="list-style-type: none"> <li>⦿ ECPs are NOT regular contraceptive pills and should not be used as a family planning method</li> </ul>
Emergency Contraceptive IUD	<ul style="list-style-type: none"> <li>⦿ This IUD should be inserted as soon as possible after penetrative sexual intercourse but within 5 days</li> <li>⦿ It is important to monitor side-effects that may occur, as outlined below</li> </ul>

## Indications

- ⦿ All women and adolescents at risk of becoming pregnant after unprotected sex

## Advantages

- ⦿ Prevents unplanned pregnancy after penetrative sexual intercourse
- ⦿ Safe for all women and have no long-term side effects
- ⦿ Do not cause infertility
- ⦿ Able to have on hand in case of emergency
- ⦿ Controlled by the woman

## Disadvantages and side effects

- ⦿ DOES NOT PROTECT AGAINST STI
- ⦿ Potential misuse as a regular contraceptive method
- ⦿ Minor, short-term side effects: nausea and vomiting, altered menstrual bleeding, headaches, abdominal pain, breast tenderness, dizziness and fatigue

## Management

INSTRUCTIONS	LOC
<ul style="list-style-type: none"><li><input type="checkbox"/> Should be taken as soon as possible after unprotected sex where pregnancy is not desired</li><li><input type="checkbox"/> Can prevent pregnancy if taken anytime within 5 days after unprotected sex (decreasing efficacy over this 5 day window)</li><li><input type="checkbox"/> Safe and suitable for all women at risk of an unplanned pregnancy</li><li><input type="checkbox"/> Women on ARVs have to take double dose (levonorgestrel 3 mg = e.g. Postinor 4 tablets)</li></ul>	HC2

INSTRUCTIONS	LOC
<p><b>Note</b></p> <ul style="list-style-type: none"> <li>▪ Warn women against regular/frequent use of emergency contraceptive. Advise them to consider using other long-term methods</li> </ul>	

### 15.2.8 Intrauterine Device (IUD)

ICD10 CODE: Z30.014

Easily reversible long-term FP method effective for up to 10 years, which can be inserted as soon as 6 weeks postpartum:

- Non hormonal: Copper loaded
- Hormonal : Levonorgestrel loaded

#### Indications

- Ⓐ Women desiring long-term contraception
- Ⓐ Breastfeeding mothers
- Ⓐ When hormonal FP methods are contraindicated
- Ⓐ Treatment of heavy periods- menorrhagia (for levonorgestrel)

#### Contraindications

- Ⓐ Pregnancy (known or suspected)
- Ⓐ PID or history of this in last 3 months
- Ⓐ Undiagnosed abnormal uterine bleeding
- Ⓐ Women at risk of STIs

Reduced immunity, e.g., diabetes mellitus, terminal AIDS

- Ⓐ Known or suspected cancer of pelvic organs
- Ⓐ Severe anaemia or heavy menstrual bleeding

#### Advantages

- Ⓐ Prevents unplanned pregnancy after penetrative sexual intercourse



- Can be used as an emergency
- Safe for all women including breast feeding mothers
- Does not affect libido (copper)
- Long term
- 97-99% effective
- Reduces chances of getting STIs (Lenovorgestrel)
- It's recommended for women with NCDs like diabetes, hypertension
- Does not increase the risk of STIs

#### **Disadvantages and common side effects**

- Mild cramps during first 3-5 days after insertion
- Longer and heavier menstrual blood loss in first 3 months
- Vaginal discharge in first 3 months
- Spotting or bleeding between periods
- Increased cramping pains during menstruation
- Threads might prick the spouse during sex (cut the treads shorter)

#### **Complications and warning signs**

- Lower abdominal pain and PID
- Foul-smelling vaginal discharge
- Missed period
- Displaced IUD/missing strings
- Prolonged vaginal bleeding
- Perforation

## Management

INSTRUCTIONS	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Insert the IUD closely following recommended procedures; explain each step to the client (ensure the thread is cut short not to cause discomfort)</li> <li><input type="checkbox"/> Carefully explain possible side-effects and what to do if they should arise</li> <li><input type="checkbox"/> Advise client           <ul style="list-style-type: none"> <li>▪ To avoid vaginal douching</li> <li>▪ Not to have more than 1 sexual partner</li> <li>▪ To check each sanitary pad before disposal to ensure the IUD has not been expelled, in which case to use an alternative FP method and return to the clinic</li> <li>▪ How to check that the IUD is still in place after each menstruation</li> </ul> </li> </ul>	<b>HC3</b>
<ul style="list-style-type: none"> <li>• To report to the clinic promptly if: Late period or pregnancy, abdominal pain during intercourse</li> <li>• Exposure to STI, feeling unwell with chills/fever,</li> <li>• shorter/longer/missing strings, feeling hard part of IUD in vagina or at cervix</li> <li>• To use condoms if any risk of STIs including HIV</li> <li><input type="checkbox"/> Recommendation for a follow-up visit after 3-6 weeks to check-in on client</li> </ul>	

### MANAGEMENT OF SIDE EFFECTS OF IUD

#### No Monthly Period

##### Assess for pregnancy:

- If pregnant, reassure that IUD will not affect her pregnancy and refer her to ANC
- If not pregnant, investigate other reasons for amenorrhea
- If no pregnancy reassure the client

## MANAGEMENT OF SIDE EFFECTS OF IUD

### Irregular Bleeding

#### Assess for pregnancy/abortion:

- Reassure that many women using IUD get irregular bleeding. It is not harmful and should lessen or stop after several months of use

#### If bleeding continues:

- Give 400-800 mg ibuprofen eight hourly after meals for 5 days when irregular bleeding starts
- Tranexamic acid 500mg 8hourly 5-7days
- Check for anaemia and treat accordingly

#### If irregular bleeding persists:

- Investigate other reasons (unrelated to IUD) and treat accordingly
- Help client choose another FP method if necessary

### Heavy Bleeding

#### Assess for pregnancy/abortion:

- Give ibuprofen 400-800 mg every eight hours after meals for 5 days
- Or tranexamic acid 1500 mg every eight hours for 3 days, then 1000 mg once daily for two days
- Give ferrous salt tablets (60 mg iron) to prevent anaemia
- Educate on nutrition

#### If bleeding persists:

- Investigate other reasons (unrelated to IUD) and treat accordingly
- Help client choose another FP method if necessary

### 15.2.9 Natural FP: Cervical Mucus Method (CMM) and Moon Beads    ICD10 CODE: Z30.02

CMM is a fertility awareness-based method of FP which relies on the change in the nature of vaginal mucus during the menstrual cycle in order to detect the fertile time. During this time, the couple avoids pregnancy by changing sexual behaviour as follows:

- Abstaining from sexual intercourse: Avoiding vaginal sex completely (also called periodic abstinence)
- Using barriers methods, e.g., condoms, cervical caps
- Guidance on correct use of the method is only available at centres with specially trained service providers.

## Management

INSTRUCTIONS	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Ensure client understands how the method works</li> <li><input type="checkbox"/> Explain how to distinguish the different types of mucus</li> <li><input type="checkbox"/> Show client how to complete the CMM chart, can be used together with the moon beads</li> <li><input type="checkbox"/> Carry out a practice/trial period of at least 3 cycles</li> <li><input type="checkbox"/> Confirm that the chart is correctly filled</li> <li><input type="checkbox"/> Advise client to <ul style="list-style-type: none"> <li>▪ Always use condoms as well as CMM if there is any risk of exposure to STIs/HIV</li> <li>▪ Return on a specific follow-up date after one menstrual cycle</li> </ul> </li> </ul>	<b>HC1</b>

### 15.2.10 Natural FP: Lactational Amenorrhoea Method (LAM)

ICD10 CODE: Z30.02

LAM relies on the suppression of ovulation through exclusive breastfeeding as a means of contraception. Guidance on correct use of the method is only available at centres with trained service providers. LAM requires 3 conditions which must ALL be met:

- The mother's monthly bleeding has not returned
- The baby is fully or nearly fully breastfed; and is fed often, day and night
- The baby is less than 6 months old

## Disadvantages

- ⦿ DOES NOT PROTECT AGAINST STI
- ⦿ Low couple years of protection

## Management

INSTRUCTIONS	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Ensure client understands how the method works</li> <li><input type="checkbox"/> Explain to client that:           <ul style="list-style-type: none"> <li>⦿ She must breastfeed her child on demand on both breasts at least 10-12 times during day and night (including at least once nightly in the first months)</li> <li>⦿ Daytime feedings should be no &gt;4 hours apart, and night-time feedings no &gt;6 hours apart</li> <li>⦿ She must not give the child any solid foods or other liquids apart from breast milk</li> </ul> </li> <li><input type="checkbox"/> Advise the client that LAM will no longer be an effective FP method IF:           <ul style="list-style-type: none"> <li>⦿ The baby does not feed regularly on demand</li> <li>⦿ Menstruation resumes; she will then need to use another FP method</li> </ul> </li> <li><input type="checkbox"/> Advise the client           <ul style="list-style-type: none"> <li>⦿ To use condoms as well as LAM if there is any risk of exposure to STIs/HIV</li> <li>⦿ To return after 3 months for a routine follow-up</li> <li>⦿ or earlier if she has any problem</li> <li>⦿ If she wants to change to another FP method</li> </ul> </li> </ul>	<b>HC1</b>

### 15.2.11 Surgical Contraception for Men: Vasectomy

ICD10 CODE: Z30.2

This permanent FP method involves a minor operation carried out under local anaesthetic to cut and tie the two sperm-carrying tubes (vas deferens). It is only available at centres with specially trained service providers. There is need to dispel the myths of impotence following vasectomy.

## Indications

- Fully aware, counselled clients who have voluntarily signed the consent form
- Males of couples
- Who have definitely reached their desired family size and want no more children
- Where the woman cannot risk another pregnancy due to age or health problems

## Management

INSTRUCTIONS	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Ensure client understands how the method works and that it is permanent, not reversible, and highly effective</li> <li><input type="checkbox"/> Explain to client that:           <ul style="list-style-type: none"> <li>▪ Vasectomy is not castration and sexual ability/activity is not affected</li> <li>▪ The procedure is not immediately effective and that the client will need to use a condom for at least 15 ejaculations after the operation (or three months)</li> </ul> </li> <li><input type="checkbox"/> After the operation, advise client:           <ul style="list-style-type: none"> <li>▪ On wound care</li> <li>▪ To return for routine follow-up after days days or earlier if there is fever, excessive swelling, pus, or tenderness at the site of operation</li> <li>▪ To continue using condoms or other contraceptive devices for three-months following the procedure</li> <li>▪ To use condoms if there is any risk of HIV/STIs</li> </ul> </li> </ul>	HC4

### 15.2.12 Surgical Contraception for Women: Tubal Ligation

ICD10 CODE: Z30.2

This permanent FP method involves a minor 15-minute operation carried out under local anaesthetic to cut and tie the two egg-carrying

fallopian tubes. It is only available at centres with specially trained service providers.

### Indications

- ⦿ As for vasectomy (above) but for females

### Management

INSTRUCTIONS	LOC
<ul style="list-style-type: none"><li>❑ Ensure client understands how the method works and that it is permanent, irreversible, and highly and immediately effective</li><li>❑ Explain to client that:<ul style="list-style-type: none"><li>▪ There may be some discomfort/pain over the small wound for a few days</li></ul></li><li>❑ Advise client:<ul style="list-style-type: none"><li>▪ On wound care</li><li>▪ To use condoms if there is any risk of exposure to STIs/HIV</li><li>▪ To return after 7 days for routine follow-up or earlier if there is fever, excessive swelling, pus, or tenderness at the site of operation</li></ul></li></ul>	HC4

# 16 Obstetric Conditions

## 16.1 ANTENATAL CARE (ANC) ICD10 CODE: Z36

Antenatal care is a planned programme of medical care offered to pregnant women by a skilled birth attendant, from the time of conception to delivery, aimed at ensuring a safe and satisfying pregnancy and birth outcome.

The main objective of antenatal care is to give information on:

- Screening, prevention, and treatment of complications
- Emergency preparedness
- Birth planning
- Satisfying any unmet nutritional, social, emotional, and physical needs of the pregnant woman
- Provision of patient education, including successful care and nutrition of the newborn
- Identification of high-risk pregnancy
- Encouragement of male partner involvement in antenatal care

### 16.1.1 Goal-Oriented Antenatal Care Protocol

**Important:** Goals are different depending on the timing of the visit. 4 visits are aimed for in an uncomplicated pregnancy.

If a woman books later than in first trimester, preceding goals should be combined and attended to. At all visits address any identified problems, check the BP and measure the Symphysio-Fundal Height (SFH). All women must receive Hb, HIV testing and Syphilis testing (RPR) routinely.

Visit	Timing Of Visit	Goals	History Taking	Examination	Laboratory Investigations	Health Promotion	Actions
BOOKING VISIT	Any time before 14 weeks gestation	<ul style="list-style-type: none"> <li>- Patient assessment</li> <li>- Plan for ANC</li> <li>- Identify and manage any illness</li> <li>- Develop birth and emergency plan</li> <li>- Give health education</li> <li>- Check foetal growth and maternal well-being</li> <li>- Start preventive interventions</li> </ul>	<ul style="list-style-type: none"> <li>- Medical</li> <li>- Surgical</li> <li>- Obstetric</li> <li>- LMP</li> <li>- Confirm period of gestation</li> <li>- Contraceptive use (type, duration)</li> <li>- STI</li> <li>- Family history</li> <li>- Access for SGBV</li> </ul>	<ul style="list-style-type: none"> <li>- General exam including evidence of trauma and mood,</li> <li>- Vital observations (BP, Pulse rate, respiratory rate)</li> <li>- SFH (symphysio-fundal height)</li> <li>- Abdominal exam</li> <li>- Vulva exam (speculum if indicated)</li> <li>- Blood grouping</li> <li>- If Mother has fever (temp above 37.5°C do RDT/ BS</li> <li>- If RDT/BS positive, follow guidelines</li> <li>- Check for hereditary conditions if suspected sickling test (G6PD)</li> </ul>	<ul style="list-style-type: none"> <li>- Syphilis test (RPR)</li> <li>- HIV test</li> <li>- Urinalysis (Urine strip &amp; microscopy)</li> <li>- If BP &gt; 140/90, check urine for protein</li> <li>- Hb estimation</li> <li>- HBsAg testing</li> </ul>	<ul style="list-style-type: none"> <li>- Educate on ANC visits</li> <li>- Address any observed or volunteered problems and illnesses</li> <li>- Involve husband in ANC</li> <li>- Develop emergency plan</li> <li>- Teach danger signs during pregnancy</li> <li>- Discuss STI/HIV/ AIDS prevention and care</li> <li>- After HIV test, provide counselling. If HIV-positive, start ART for eMTCT immediately</li> <li>- Provide ITN (LLINs)</li> <li>- Discuss pregnancy discomforts, sexual relations</li> </ul>	<ul style="list-style-type: none"> <li>- Give TT1</li> <li>- Give iron/folic acid</li> <li>- HIV counselling, testing and post-test counselling</li> <li>- If HIV+, begin ART as soon as identified as HIV positive</li> <li>- Treat any illness</li> <li>- Counsel woman</li> <li>- Start IPTp with SP after 13 weeks gestation</li> </ul>

Visit	Timing Of Visit	Goals	History Taking	Examination	Laboratory Investigations	Health Promotion	Actions
SECOND VISIT	24-28 weeks	- Give TT - Exclude multiple pregnancy - Check for pregnancy-induced hypertension (PIH) - Determine foetal growth and movement - Exclude anaemia - Screen for GDM if the mother is at risk.	- Social smoking, alcohol/drugs - Social support	- Ask for any social problems and illnesses - Ask date of first foetal movements - Ask if there is/ was any vaginal bleeding or discharge	- Measure BP and weight - Check for Oedema and Pallor - Measure SFH - Abdominal exam: rule out multiple pregnancy - Check foetal heartbeat - Access for SGBV	- If BP > 140/90 check urine for protein - Check Hb - Do OGTT - If Mother has fever (Temp above 37.5°C do RDT/ BS	- Counsel on ITN use - Discuss the danger of SGBV in pregnancy - Emphasise on hygiene, nutrition and adherence to treatment - Advise on common discomforts of pregnancy - Give TT2 - Address any observed or volunteered problems and illnesses - Refill iron/folic acid - Give IPTp-SP if 1 month has passed since previous dose - Update birth and emergency plan - Review danger signs in pregnancy - If HIV-positive, counsel on eMTCT - If HIV+, on eMTCT and refill of ARVs - Counsel on ITN use - Advise on common discomforts of pregnancy - Repeat HIV test - Viral load/CD4 for HIV positive mothers - For Rhesus Negative mothers, do anti body screening
						- Give nebenbazole - If HIV+, on eMTCT and refill of ARVs - Treat any illnesses problems - Counsel woman - Discuss the danger of SGBV in pregnancy - Emphasise on hygiene, nutrition and adherence to treatment - Health educate on LLINs use, care and maintenance	



Visit	Timing Of Visit	Goals	History Taking	Examination	Laboratory Investigations	Health Promotion	Actions
THIRD VISIT	30-32 weeks	<ul style="list-style-type: none"> <li>- Determine foetal growth</li> <li>- Exclude anaemia</li> <li>- Check for PIH</li> <li>- Update birth and emergency plan</li> </ul>	<ul style="list-style-type: none"> <li>- Ask for any social problems and illnesses</li> <li>- Ask if there is/ was any vaginal bleeding and discharge</li> </ul>	<ul style="list-style-type: none"> <li>- Measure BP</li> <li>- Check for pallor</li> <li>- Measure SFH</li> <li>- Abdominal exam</li> <li>- Check foetal heartbeat</li> </ul>	<ul style="list-style-type: none"> <li>- If BP &gt; 140/90, check urine for protein</li> <li>- Check Hb</li> <li>- If Mother has fever (Temp above 37.5°C do RDT/ BS</li> <li>- If RDT/BS positive, follow guidelines</li> </ul>	<ul style="list-style-type: none"> <li>- Address any observed or volunteered problems and illnesses</li> <li>- Teach danger signs in pregnancy/labour</li> <li>- Discuss labour</li> <li>- Discuss and update birth and emergency plan</li> <li>- Discuss family planning</li> <li>- If HIV-positive, counsel on eMTCT</li> <li>- Counsel ITN use</li> <li>- Teach about postpartum care</li> <li>- Teach care of the newborn: early exclusive breast-feeding thermal care, cord care, danger signs</li> <li>- Discuss the danger of SGBV in pregnancy</li> <li>- Emphasise on hygiene, nutrition and adherence to treatment</li> </ul>	<ul style="list-style-type: none"> <li>- Refill iron/folic acid</li> <li>- Give IPTp-SP if 1 month has passed since previous dose</li> <li>- Treat any problems</li> <li>- If HIV+, eMTCT</li> <li>- Counsel to use dual protection for FP/HIV</li> <li>- Counsel woman</li> <li>- Health educate on LLINs use, care and maintenance</li> </ul>



Visit	Timing Of Visit	Goals	History Taking	Examination	Laboratory Investigations	Health Promotion	Actions
FOURTH VISIT	>36 weeks	<ul style="list-style-type: none"> <li>- Determine foetal growth</li> <li>- Exclude anaemia</li> <li>- Check for PIH</li> <li>- Check for pre-eclampsia</li> <li>- Exclude cephalopelvic disproportion, abnormal presentation/lie</li> <li>- Explain symptoms of labour</li> <li>- Update birth and emergency plan</li> </ul>	<ul style="list-style-type: none"> <li>- Ask for problems</li> <li>- Ask if any vaginal bleeding</li> <li>- Abdominal exam</li> <li>- Check lie</li> <li>- Check presentation/lie</li> <li>- Ask for problems</li> </ul>	<ul style="list-style-type: none"> <li>- Measure BP</li> <li>- Measure SFH</li> <li>- Count foetal heart rate</li> <li>- Check Hb</li> <li>- If Mother has fever (Temp above 37.5°C do RDT/ BS</li> <li>- If RDT/BS positive, follow guidelines</li> <li>- Check presentation</li> </ul>	<ul style="list-style-type: none"> <li>- If BP &gt;140/90 check urine for protein</li> <li>- If Mother has fever (Temp above 37.5°C do RDT/ BS</li> <li>- Teach eMTCT in labour, birth, post-partum</li> <li>- Counsel on ITN use</li> <li>- Rediscuss FP and HIV prevention</li> <li>- Teach about postpartum care</li> <li>- Teach care of newborn: danger signs in newborn, early and exclusive breastfeeding, thermal care, cord care</li> <li>- Discuss the danger of SGBV in pregnancy</li> <li>- Emphasise on hygiene, nutrition and adherence to treatment</li> </ul>	<ul style="list-style-type: none"> <li>- Address any observed or volunteered problems and illnesses</li> <li>- Discuss labour</li> <li>- update birth and emergency plan</li> <li>- If HIV+, eMTCT</li> <li>- Counsel to use dual protection for FP/HIV prevention</li> <li>- Counsel woman</li> <li>- Health educate on LLINs use, care and maintenance</li> </ul>	<ul style="list-style-type: none"> <li>- Refill iron/folic acid</li> <li>- Give IPTp-SP if 1 month has passed since previous dose</li> <li>- Treat any problems</li> <li>- If HIV+, eMTCT</li> <li>- Counsel to use dual protection for FP/HIV prevention</li> <li>- Counsel woman</li> <li>- Teach about postpartum care</li> <li>- Teach care of newborn: danger signs in newborn, early and exclusive breastfeeding, thermal care, cord care</li> <li>- Discuss the danger of SGBV in pregnancy</li> <li>- Emphasise on hygiene, nutrition and adherence to treatment</li> </ul>

## 16.1.2 Management of Common Complaints during Pregnancy

COMPLAINT	ACTION	REMARKS
Low back ache, and frequency of passing urine	<ul style="list-style-type: none"> <li>⦿ Exclude urinary tract infection and local lesion. If none, reassure</li> </ul>	Avoid unnecessary medication
Morning sickness (nausea & vomiting)	<ul style="list-style-type: none"> <li>⦿ Reassure; usually lasts only up to 3 months</li> <li>⦿ Give general advice (frequent small dry meals, avoid spicy and fatty food, take ginger and lemon)</li> <li>⦿ If severe with dehydration, admit for observation and rehydration (using IV RL or NS)</li> <li>⦿ Vitamin B6 (Pyriddoxine) 25 mg 2-3 times daily</li> </ul>	<p>Avoid anti-emetics in the first trimester.</p> <p>Anti-emetics may be necessary ONLY in severe forms (see section 16.3.1)</p>
Swelling of the feet	<ul style="list-style-type: none"> <li>⦿ Check for anaemia, blood pressure, urine protein, and manage appropriately</li> </ul>	Advise mother to elevate feet if findings are normal
Indigestion (flatulence & constipation)	<ul style="list-style-type: none"> <li>⦿ High roughage diet, increase fluids.</li> <li>⦿ If severe, treat as constipation</li> </ul>	Avoid strong laxatives & enemas

COMPLAINT	ACTION	REMARKS
Excessive salivation (ptyalism)	<ul style="list-style-type: none"> <li>⦿ Reassure</li> <li>⦿ Advise mother to use ginger</li> </ul>	Avoid anticholinergic drugs
Food craving (pica)	<ul style="list-style-type: none"> <li>⦿ Ensure balanced diet</li> </ul>	Discourage harmful materials, e.g. soil Soil craving is a sign of iron deficiency anaemia, give ferrous + folic acid
Generalised pruritus	<ul style="list-style-type: none"> <li>⦿ Reassure.</li> <li>⦿ If severe, treat as skin allergy/urticaria</li> </ul>	Avoid steroids
Vulval pruritus with whitish non-foul smelling discharge Burning sensation on passing urine	<ul style="list-style-type: none"> <li>⦿ Treat as for abnormal vaginal discharge (most likely candida)</li> <li>⦿ Use Clotrimazole cream or pessaries</li> <li>⦿ In severe cases, use fluconazole 150 mg stat.</li> <li>⦿ Avoid repeat doses or prolonged use</li> </ul>	Avoid douching with antiseptics
Cramps	<ul style="list-style-type: none"> <li>⦿ Give calcium lactate</li> <li>⦿ 600 mg 8 hourly for 5 days</li> </ul>	Avoid giving NSAIDS
Fatigue	<ul style="list-style-type: none"> <li>⦿ Reassure, bed rest</li> </ul>	Avoid drugs

### 16.1.3 High Risk Pregnancy (HRP)

ICD10 CODE: O09

This is a pregnancy with a higher than average risk of an adverse outcome for the mother or baby, e.g., abortion, intrauterine death, still birth, prematurity, other morbidity or mortality.

#### High risk criteria: if a woman has history of or current

- Extremes of reproductive age: <18 and >35 years
- Primigravida: Especially if too young (<18 years), short (<150cm), or old (>35 years)
- High parity: 5+ or short birth-to-pregnancy interval below 2 years
- Maternal Obesity (BMI >30)
- History of:
  - Large infants: 4 kg and over
  - Prematurity and Low birth weight (LBW) <2.5kg
  - Obstructed and difficult labours
  - Instrumental delivery
- Poor obstetric history, e.g., stillbirths, neonatal deaths, abortions, caesarean section
- History of reproductive tract surgery, e.g., VVF repair, repaired (ruptured uterus), surgery on the cervix, myomectomy
- Genetic or familial diseases, such as sickle cell disease
- Medical conditions: Diabetes, HIV, cardiac, renal, hypertension, rhesus, those with disabilities
- Obstetrical conditions, e.g. multiple pregnancy, malpresentations, APH, PPH, DVT, IUGR,(FGR) ,M,PROM, post dates, CPD, Surrogate Mother

## Management

TREATMENT	LOC
<b>Principles of management</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Early identification of high risk pregnant women and referral as appropriate</li> <li><input type="checkbox"/> Preconception care and folic acid supplementation</li> <li><input type="checkbox"/> Prophylaxis and antenatal counselling will prevent some HRP</li> <li><input type="checkbox"/> Early start of antenatal care</li> <li><input type="checkbox"/> Close medical supervision during pregnancy</li> <li><input type="checkbox"/> Special investigations to evaluate foetal development and maternal well-being</li> <li><input type="checkbox"/> Birth preparedness plan</li> <li><input type="checkbox"/> Timely intervention for therapy and delivery</li> <li><input type="checkbox"/> Skilled birth attendance</li> <li><input type="checkbox"/> Early referral to higher level as appropriate</li> </ul>	HC3 HC4

**Note:** Skilled attendance at birth remains the most important component of comprehensive emergency obstetric and new-born care.

## 16.2 MANAGEMENT OF SELECTED CONDITIONS IN PREGNANCY

### 16.2.1 Anaemia in Pregnancy

ICD10 CODE: 099.019

Anaemia is the most frequent and major complication of pregnancy. It may be defined as haemoglobin level below the normal (11 g/dL for pregnant women). For second trimester the cut off is 10.5g/dL.

## Causes

- Nutritional causes; iron deficiency, folic acid deficiency
- Infections and infestations; hookworm infestation, malaria, UTI, HIV/AIDS
- Haemorrhagic causes: bleeding in pregnancy, trauma
- Haemoglobinopathies eg. Sickle cell anaemia, thalassemias
- Malignancies
- Due to medications from HIV /Cancer treatment
- Any other causes

## Clinical features

### Mother may give history of

- Gradual onset of exhaustion or weakness
- Swelling of the legs
- Dyspnoea, dizziness, and palpitations

### On examination

- Pallor of the conjunctiva, tongue, palm, vagina, etc., of varying degree, depending on the severity of anaemia
- Glossitis and stomatitis
- Oedema of the legs
- In very severe cases: evidence of heart failure such as engorged neck veins, dyspnoea, hepatomegally, ascites, gallop rhythm, and oedema

## Complications

- Untreated anaemia may increase the risk of premature labour, poor intrauterine foetal growth, weak uterine contractions, foetal hypoxia, postpartum haemorrhage, poor lactation, post-partum sepsis

## Investigations

- Blood
- Hb (<11 g/dL is considered abnormal)
- Peripheral smear to determine the type of anaemia and presence of malaria parasites
- HB electrophoresis
- Stool: ova and cysts of hookworm infestation

## Management

TREATMENT	LOC
<b>Prophylaxis</b>	HC2
<ul style="list-style-type: none"> <li><input type="checkbox"/> All pregnant women should receive ferrous and folic acid daily from 12 weeks. Continue supplementation until 6months after delivery.</li> </ul>	
If severe anaemia(Hb < 7 g/dL) or patient has heart failure <ul style="list-style-type: none"> <li><input type="checkbox"/> Refer patient to a well-equipped facility for further management</li> </ul>	HC4
If Hb > 7 g/dL <ul style="list-style-type: none"> <li><input type="checkbox"/> Give combination of ferrous and folic acid</li> <li><input type="checkbox"/> once daily(Fe-200mg+400mcg)</li> <li><input type="checkbox"/> Review the mother every 2 weeks (Hb should rise by 0.7-1 g/dL per week)</li> </ul>	HC2
<ul style="list-style-type: none"> <li><input type="checkbox"/> Emphasise a realistic balanced diet rich in proteins, iron, and vitamins, e.g. beans, peas, millet, sorghum, peanuts, red meat, liver, dark green vegetables, fortified foods, Bananas.</li> <li><input type="checkbox"/> Treat malaria presumptively with SP and follow up</li> <li><input type="checkbox"/> De-worm the patient with mebendazole 500 mg single dose in 2nd and 3rd trimesters</li> <li><input type="checkbox"/> Treat any other cause as found from investigations</li> <li><input type="checkbox"/> Advise child spacing with an interval of at least 2 years</li> </ul> <p>If not improving, refer to hospital</p>	HC2
If mother still anaemic at 36 weeks of gestation, or at time of delivery <ul style="list-style-type: none"> <li><input type="checkbox"/> Refer to a well-equipped facility for further management (blood transfusion)</li> </ul>	HC4
<b>If patient has sickle-cell disease</b>	HC4
<ul style="list-style-type: none"> <li><input type="checkbox"/> Refer to higher level for ANC and delivery</li> </ul>	

## Prevention/Health Education / mother selfcare

- Explain the possible causes of anaemia
- Advise on nutrition and diet: mother should increase consumption of foods rich in iron and vitamins
- Instruct patient to use medication as prescribed, and the dangers of not complying
- Advise on side effects of iron medicines (e.g. darkened stools)
- Instruct patient to come every 2 weeks for follow-up

### 16.2.2 Pregnancy and HIV Infection

All HIV services for pregnant mothers are offered in the MCH clinic. After delivery, mother and baby will remain in the MCH postnatal clinic until HIV status of the child is confirmed, then they will be transferred to the general ART clinic.

All pregnant mothers and partners should receive routine counselling and testing for HIV.

If mother tests negative:

- Counsel on HIV prevention
- Repeat test in third trimester/during labour and delivery

If mother tests positive or is already known positive but not yet on ART

- Enroll on HIV care (eMTCT).

If mother is already positive and already on ART:

- Continue on their existing regimen; may not be switched to
- Option B+ regimens
- Perform viral load at first contact

For more information on HIV, including clinical diagnosis, management, and psychosocial support, refer to specific HIV/AIDS guidelines (see chapter 3).

### **16.2.2.1 Care for HIV Positive Women (eMTCT)**

ICD10 CODE: 098.719

Ensure the following care is provided during pregnancy, labour, delivery, and postpartum period for all HIV+ women

- Find out what she has told her partner (degree of disclosure), labour companion, and family support. Respect her choice and desired confidentiality

<p><b>During labour: safe obstetric practices</b></p> <ul style="list-style-type: none"> <li>▪ Avoid episiotomy</li> <li>▪ Avoid artificial rupture of membranes</li> <li>▪ Avoid instrumental delivery (vacuum)</li> <li>▪ Avoid frequent vaginal examination</li> <li>▪ Do not milk umbilical cord before cutting</li> <li>▪ Actively manage third stage of labour</li> </ul>	
<p><b>Baby (see section 3.1.9.3)</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Give infants daily Nevirapine (NVP) for 6 weeks (12 weeks for high risk infants)</li> <li><input type="checkbox"/> Give Cotrimoxazole beginning at 6 weeks, continue until final HIV status is confirmed negative</li> <li>▪ Offer DNA PCR test at 6 weeks, and again 6 weeks after cessation of breastfeeding</li> </ul>	HC3
<p><b>Notes</b></p> <ul style="list-style-type: none"> <li>▪ TDF and EFV are now considered safe in pregnancy</li> <li>▪ Those newly diagnosed during labour will receive sdNVP tablet and begin HAART for life after delivery</li> </ul> <p><b>Caution</b></p> <ul style="list-style-type: none"> <li>▪ In case of low body weight, high creatinine, diabetes, hypertension, chronic renal disease, and concomitant nephrotoxic medications: perform renal investigation before giving TDF</li> </ul>	

- TDF is contraindicated in advanced chronic renal disease

### Benefits of Option B+

- Reduction of new HIV infection in children, by minimizing the risk of HIV transmission from infected pregnant and lactating women, to less than 5% in breastfeeding populations, and to less than 2% in non-breastfeeding populations
- Improved health, and reduced maternal mortality and morbidity of HIV-infected mothers through lifelong ART
- Reduction of the risk of HIV transmission to non-HIV- infected sexual partner in discordant relationship
- Reduction in the number of HIV/AIDS orphans
- Contribution to the achievement of the 90/90/90 goals by 2020
- Contributes to achievement of the Sustainable Development Goals by 2030

#### 16.2.2.2 Counselling for HIV Positive Mothers

- Give psychosocial support
- Encourage mothers to enroll in Family Support Groups (FSG) for peer support
- Advise on the importance of good nutrition
  - Talk to family members to encourage the woman to eat enough and help her avoid hard physical work
  - Micronutrient supplementation during pregnancy and breastfeeding; iron + folic acid and multivitamins
- Advise her that she is more liable to infections, and to seek medical help as soon as possible
- Review the birth plan
  - Advise her to continue attending ANC
  - Advise her to deliver in a health facility where appropriate care can be provided for her and the baby
  - Advise her to go to the health facility as soon as labour starts or membranes rupture

## **During postpartum period**

- Advise on the infectiousness of lochia and blood- stained sanitary pads, and how to dispose them off safely according to local facilities
- If not breastfeeding exclusively, advise her to use a family planning method immediately to prevent unwanted pregnancy
- Linkage of mother-baby pair and her family, for on-going care beyond peurperium
- Breast care: If not breastfeeding, advise that:
  - The breasts may be uncomfortable for a while
  - She should avoid expressing the breast to remove milk (the more you remove the more it forms)
  - She should support her breasts with a firm, well-fitting bra or cloth, and give her paracetamol for painful breasts
  - Advise her to seek care if breasts become painful, swollen, red; if she feels ill; or has fever

## **Counselling on infant feeding choice**

- Begin infant feeding counselling before birth when the pregnant mother has been identified to be HIV positive.
- The decision on how she will feed the baby should be made before delivery. The mother should then be supported to implement the feeding option she has chosen
- All mothers are encouraged to breastfeed their babies exclusively for 6 months and then introduce complimentary feeding until 1 year
- The mother has to continue her ARVs all through breastfeeding
- The child should continue cotrimoxazole prophylaxis, until status confirmed negative with a PCR at 6 weeks after stopping breastfeeding

- ⑤ If a mother chooses to feed the newborn on replacement feeding from the beginning, the choice of replacement feeds should fulfil the AFASS Criteria (Affordable, Feasible, Available, Sustainable and Safe).

### 16.2.3 Chronic Hypertension in Pregnancy

ICD 10 CODE: O10, O13

Blood pressure  $>140/90$  present before the pregnancy or starting before 20 weeks.

Pregnant women with chronic hypertension should continue to follow the lifestyle modifications for controlling hypertension such as:

- ⑥ No alcohol
- ⑥ Regular moderate exercise, brisk walking for 30 minutes at least 3 times a week
- ⑥ Smoking cessation.

#### Health worker should:

- ⑥ Ask mother about foetal movements at each visit
- ⑥ Aim for BP  $<140/90$  mmHg
- ⑥ Consider labour if BP is persistently 160/90 mmHg, pregnancy 37 weeks gestation, and if there is maternal or foetal compromise, e.g. poor SFH growth

#### Management

TREATMENT	LOC
Switch chronic antihypertensive medication to or start <input type="checkbox"/> Metyldopa 250 mg 8 hourly, increase as necessary, max 500 mg 6 hourly And/or <input type="checkbox"/> Nifedipine 20-40 mg every 12 hours If not controlled or any sign of pre eclampsia: refer to hospital	HC3

TREATMENT	LOC
<p><b>Caution</b></p> <ul style="list-style-type: none"> <li>▪ ACE inhibitors, ARBs are contraindicated in pregnancy</li> <li>▪ Avoid beta blockers and diuretics</li> </ul>	

#### 16.2.4 Malaria in Pregnancy

ICD10 CODE: B54

Malaria can contribute to pregnancy complications such as abortion, poor foetal mental development, premature labour, intrauterine growth retardation and foetal death, severe maternal anaemia due to haemolysis, and death.

Complications are more common in mothers of low gravidity (primi- and secundigravidae), HIV positivity, adolescent age, sickle-cell disease, and those from areas of low endemicity, e.g. in Kisoro and Kabale.

. see section 2.5.2 for more information on features and diagnosis of malaria

#### Management of Malaria in Pregnancy

APPROACH	MANAGEMENT	LOC
Prophylaxis All pregnant mothers W <sup>x</sup> except those with HIV on cotrimoxazole prophylaxis	<input type="checkbox"/> Intermittent Preventive Treatment (IPTp) with Sulphadoxine/ pyrimethamine (SP) once a month starting at 13 weeks until delivery	HC2
Treatment of Uncomplicated malaria in 1st trimester	<input type="checkbox"/> Quinine oral 600 mg 8 hourly for 7 days (if Quinine not available, ACT may be used)	HC2

APPROACH	MANAGEMENT	LOC
Treatment of Uncomplicated malaria in 2nd and 3rd trimesters	<p>First line</p> <p><input type="checkbox"/> Artemether/Lumefantrine  <input type="checkbox"/> 80/480 mg 12 hourly for 3 days</p> <p>First line alternative</p> <p><input type="checkbox"/> Dihydroartemisinin/ Piperaquine 3 tablets (1080 mg) once daily for 3 days</p> <p>And if no response</p> <p><input type="checkbox"/> Quinine, oral 600 mg 8 hourly for 7 days</p>	HC2 HC4 HC3
Severe malaria All trimesters and lactation	<p><input type="checkbox"/> IM/IV Artesunate 2.4 mg/kg at 0, 12 and 24 hours, then once a day until mother can tolerate oral medication. Complete treatment with 3 days of oral ACT</p> <p>First line alternative</p> <p><input type="checkbox"/> IM artemether 3.2 mg/kg loading dose then 1.6 mg/ Kg once daily until mother can tolerate oral medication. Complete treatment with 3 days of oral ACT</p> <p>If artesunate or arthemeter not available, use</p> <p><input type="checkbox"/> Quinine 10 mg/Kg IV every 8 hours in Dextrose 5%</p>	HC3 HC3

### Caution

- Quinine is associated with an increased risk of hypoglycaemia in late pregnancy

### Prevention and control of malaria in pregnancy

- Use insecticide-treated mosquito nets (ITN) before, during, and after pregnancy.

- Give all pregnant women intermittent preventive treatment (IPTp) with sulfadoxine pyrimethamine (SP) – Except in allergy to sulphonamide
- Prompt diagnosis and effective treatment of malaria in pregnancy

### **Education messages to mothers and the community**

- Malaria is transmitted by female anopheles mosquitoes
- Pregnant women and children are at particular risk of malaria
- If untreated, malaria can cause severe anaemia and death in pregnant women
- Malaria can lead to anaemia, miscarriage, stillbirth, mentally-retarded children, or low birth weight children, who are more prone to infant/childhood mortality compared to normal weight children
- It is better and cheaper to prevent than to treat malaria
- The individual, family, and the community can control malaria by taking appropriate actions
- Sleeping under an insecticide-treated mosquito net is the best way to prevent malaria
- It is very important to complete the course of treatment in order to achieve a cure
- Severe complicated malaria needs special management, therefore refer

#### **16.2.5 Diabetes in Pregnancy**

ICD10 CODE: O24

Diabetes can be pre-existent or presenting during pregnancy: the latter is called gestational diabetes (GDM).

#### **Risk factors (and indication for screening)**

- BMI >35 kg/m<sup>2</sup>
- Age >40 years



- GDM in previous pregnancy
- Family history (8 first degree relatives) of diabetes
- Previous unexplained third trimester death, macrosomic baby (weight >4 kg)
- Polyhydramnios
- Glycosuria
- Foetus large for gestational age

### **Diagnostic criteria for gestational diabetes**

- Fasting blood sugar >5.6 mmol/L or
- Plasma glucose >7.8 mmol/L 2 hours after 75 g glucose tolerance test

### **Therapeutic targets**

- Pre prandial blood glucose <5.3 mmol/L
- 1-hour postprandial glucose <7.8 mmol/L
- 2-hour postprandial glucose <6.4 mmol/L

### **Management**

TREATMENT	LOC
<input type="checkbox"/> Stop smoking, moderate exercise, dietary advice (see section 19.1.3)	HC3
<b>If obese and mild diabetes consider</b> <input type="checkbox"/> Metformin 500 mg (start with one tablet a day, increase by 500 mg per week up to max 2 g per day in divided doses)	
<b>If not controlled:</b> <input type="checkbox"/> Insulin (see section 8.1.3)	HC4
<b>Note</b> <ul style="list-style-type: none"> <li>▪ Mothers with diabetes should be advised to deliver in hospital</li> </ul>	

## 16.2.6 Urinary Tract Infections in Pregnancy

ICD10 CODE: O23

Urinary tract infections are common in pregnancy, and maybe associated with adverse consequences.

### Clinical features

#### Uncomplicated cystitis

- ◆ Low abdominal pain
- ◆ Frequency and urgency of micturition
- ◆ Dysuria (pain at micturition)

#### Pyelonephritis

- ◆ Fever
- ◆ Renal angle tenderness
- ◆ Vomiting, tachycardia

### Investigations

- Urine dipstick (for nitrate and/or leucocytes, also protein and blood may be present)
- Full blood count (raised in pyelonephritis)

### Management

TREATMENT	LOC
<b>For cystitis</b>	
<ul style="list-style-type: none"><li>□ Encourage increased oral fluid intake</li><li>□ Nitrofurantoin 100 mg twice a day for 5 days (avoid in 1st trimester and at term)</li><li>□ Or Amoxicillin 500 mg every 8 hours for 5 days</li></ul>	HC2

TREATMENT	LOC
<b>For pyelonephritis</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Admit and hydrate</li> <li><input type="checkbox"/> Ceftriaxone 1 g IV daily for 48 hours or until fever subsides, then switch to</li> <li><input type="checkbox"/> Cefixime 200 mg every 12 hours for 10 days</li> </ul>	HC4 H
<b>If ceftriaxone not available</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Ampicillin 500 mg IV every 6 hours + gentamicin 5-7 mg/kg in 2-3 divided doses IM (max 80 mg/dose) for 10-14 days</li> </ul>	HC3

## 16.3 ANTENATAL COMPLICATIONS

### 16.3.1 Hyperemesis Gravidarum

ICD10 CODE: O21

Excessive vomiting during pregnancy, associated with ketosis, dehydration and weight loss (>5% of pre-pregnancy weight).

#### Cause

Not known but may be common in multiple and molar pregnancy

#### Clinical features

- ◆ May occur from the 4th week of pregnancy and can continue beyond the 12th week
- ◆ Defining symptoms are nausea and vomiting so severe that oral intake is compromised
- ◆ Patient may develop complications of excessive vomiting, such as vomiting blood and dehydration

#### Differential diagnosis

- ◆ Intestinal obstruction

- ◆ Other causes of vomiting
- ◆ Molar pregnancy

## **Investigations**

- Blood: complete count, RDT for malaria parasites
- Urinalysis: to exclude urinary tract infection
- Ultrasound scan: to detect molar or multiple pregnancies

## **Management**

TREATMENT	LOC
<input type="checkbox"/> IV fluids to correct dehydration (see section 1.1.3) and ketosis (give Ringer's lactate or Normal saline and Glucose 5%)	HC3
<input type="checkbox"/> Promethazine 25 mg IM or orally every 8 hours prn	HC4
<input type="checkbox"/> Vitamin B6 (Pyridoxine) 1 tablet every 12 hours for 7 days	
<input type="checkbox"/> Or Metoclopramide 10 mg IM or IV or orally every 6-8 hours prn and  If not responding to the above  <input type="checkbox"/> Chlorpromazine 25 mg IM or orally every 6 hours prn and refer	HC3

### **16.3.2 Vaginal Bleeding in Early Pregnancy/ Abortion**

ICD10 CODE: O20

This is almost always abnormal, and patients may need to be admitted or referred. The most common causes of bleeding in the first six months (<26 weeks gestation) are abortion and ectopic pregnancy

Abortion (miscarriage) occurs when the foetus is lost before 28 weeks of pregnancy.



## Cause

- ◆ Not known in the majority of patients
- ◆ May be intentional (induced abortion)
- ◆ May be spontaneous (often as a result of fever)
- ◆ If mother has more than 2 miscarriages, refer for assessment

## Differential diagnosis

- ◆ Pregnancy outside the uterus (ectopic pregnancy)
- ◆ Other causes of bleeding from the vagina, e.g. cancer
- ◆ Other causes of lower abdominal pain, e.g. PID

## Investigations

- Urine: Pregnancy test
- Ultrasound
- Blood: Complete count

## Clinical features, terminology and management

- ◆ Depend on the stage of the abortion See table below.

FEATURES	MANAGEMENT	LOC
Threatened abortion Little vaginal bleeding No or moderate lower abdominal pain Uterus is of expected size by date Cervix is closed Pregnancy may still continue	<ul style="list-style-type: none"> <li><input type="checkbox"/> Medical treatment is usually not necessary (hormones and tocolytics will not prevent a miscarriage)</li> <li><input type="checkbox"/> Observe for 4-6 hours</li> <li><input type="checkbox"/> Paracetamol 1 g every 6-8 hours prn for 5 days</li> <li><input type="checkbox"/> If bleeding stops:</li> <li><input type="checkbox"/> Avoid strenuous activity and abstain from sex for at least 14 days</li> <li><input type="checkbox"/> Follow up in 2 days in ANC clinic</li> </ul> <p><b>If bleeding persists, refer to HC3</b></p>	HC2

FEATURES	MANAGEMENT	LOC
<b>Inevitable abortion</b> Process irreversible Products of conception not yet expelled but painful contractions (pain similar to labour pains) and bleeding Cervix proceeds to open	<ul style="list-style-type: none"> <li><input type="checkbox"/> Bed rest</li> <li><input type="checkbox"/> If there are signs of infection, give antibiotics</li> <li><input type="checkbox"/> Observe for continued bleeding</li> <li><input type="checkbox"/> If patient in shock</li> <li><input type="checkbox"/> Resuscitate with IV fluids (Normal Saline)</li> <li><input type="checkbox"/> If anaemic</li> <li><input type="checkbox"/> Refer to HC4 for replacement of blood lost</li> <li><input type="checkbox"/> Establish IV access before referral</li> <li><input type="checkbox"/> Give stat dose of antibiotics before referral</li> </ul>	HC3  HC4
<b>Incomplete abortion</b> Uterine contents not completely passed out Bleeding sometimes with clots from the vagina (may be severe) or Severe lower abdominal cramps Cervix open Products of conception (POC) may be felt in the cervical canal	<ul style="list-style-type: none"> <li>If evacuation of uterus is not immediately possible               <ul style="list-style-type: none"> <li><input type="checkbox"/> Give oral misoprostol 600 microgram sublingual stat (repeat once after 4 hours if necessary)</li> <li><input type="checkbox"/> If at HC2, refer to HC3 after misoprostol</li> <li><input type="checkbox"/> Use fingers to remove POC protruding through the cervix</li> <li>Evacuate the uterus by Manual Vacuum</li> <li><input type="checkbox"/> Aspiration (if pregnancy &lt;16 weeks) or Dilation and Curettage</li> <li><input type="checkbox"/> Ensure follow up</li> <li><input type="checkbox"/> Give stat dose of antibiotics before referral</li> <li><input type="checkbox"/> Treat anaemia</li> </ul> </li> </ul>	HC2  HC3  HC4

FEATURES	MANAGEMENT	LOC
	<p>If signs of infection (fever, foul smelling blood)</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Give a stat dose of IV Ceftriaxone 2 g and IV metronidazole 500 mg</li> <li><input type="checkbox"/> Amoxicillin 500 mg orally every 6 hours for 7 days</li> <li><input type="checkbox"/> Plus metronidazole 400 mg orally every 8 hours for 7 days</li> </ul>	HC2 HC3 HC4
<b>Complete abortion</b>	<input type="checkbox"/> Examine to make sure that all products have been passed	
All uterine contents have been passed out Bleeding is decreasing Cervix closed Uterus empty and reduced in size	<input type="checkbox"/> Follow up for continuous bleeding (it should stop in a few days)	HC3
<b>Septic abortion</b>  Incomplete abortion with infection (may follow induced abortion)  Fever Offensive vaginal discharge Lower abdominal pain Tenderness on palpating the abdomen	<ul style="list-style-type: none"> <li><input type="checkbox"/> Give 7-day course of antibiotics as in incomplete abortion (above)</li> <li><input type="checkbox"/> Evacuate the uterus</li> </ul>	HC4

FEATURES	MANAGEMENT	LOC
<p><b>Post-abortal Sepsis</b></p> <p>Patient has signs and symptoms of sepsis following an abortion, but there are no products of conception in the uterus</p>	<input type="checkbox"/> Give IV antibiotics ceftriaxone 2 g + metronidazole 500 <input type="checkbox"/> mg IV 8 hourly for 48 hours, until fever has disappeared, then switch to oral treatment as for septic abortion	HC4
<p><b>Missed abortion</b></p> <p>Foetus died</p> <p>Contents of the uterus not expelled</p> <p>May be dark blood drops (spotting) from the vagina</p> <p>Uterus smaller than expected by dates/not growing</p>	<input type="checkbox"/> Refer to hospital for evacuation	H
<p><b>Molar abortion</b></p> <p>Abnormal placenta, no foetus, vaginal bleeding, and passing of red material like ripe coffee berries/ white (translucent) grape like material; uterus much bigger than expected; mother feels no foetal movements even after five months</p>	<input type="checkbox"/> Resuscitate and refer the patient <input type="checkbox"/> Do not attempt to evacuate the uterus unless you have facilities for blood transfusion and oxytocin <input type="checkbox"/> Refer to hospital for further management	H

### 16.3.3 Ectopic Pregnancy

ICD10 CODE: O00

Pregnancy outside the uterus, usually in the uterine tubes; could result in an emergency when the tube ruptures

#### Cause

- ◆ Partial blockage of the tube due to a previous infection
- ◆ Congenital malformation of the fallopian tubes
- ◆ Excessively long tubes

## Risk factors

- ◆ History of prior ectopic pregnancy
- ◆ Prior abdominal or tubal surgery
- ◆ History of PID, endometriosis, history of infertility
- ◆ Cigarette smoking
- ◆ Multiple sexual partners

## Clinical features

- ◆ There may be a period of amenorrhoea as in normal pregnancy
- ◆ Lower abdominal pain, often acute and followed by slight bleeding from the vagina
- ◆ If the tube ruptures, the patient may suddenly become anaemic and go into shock
- ◆ Abdomen may be very tender with rebound tenderness and guarding on palpation
- ◆ Abdomen may not be moving with normal breathing
- ◆ Tenderness of moving cervix during vaginal examination
- ◆ There may be features of free fluid in the abdomen

## Differential diagnosis

- ◆ Other causes of acute abdominal pain and vaginal bleeding, e.g., twisted ovarian cyst
- ◆ Appendicitis, pelvic inflammatory disease
- ◆ Incomplete abortion

## Investigations

- Usually diagnosed clinically
  - If the tube ruptures, there may be little time for investigations but ultrasound could be useful (if the patient is not in shock)
- Pregnancy test (to exclude other causes)
- Complete blood count, blood grouping and cross-matching

## Management

TREATMENT	LOC
<input type="checkbox"/> Set up IV drip with normal saline and run very slowly just to maintain IV access	HC3
<input type="checkbox"/> Refer to hospital for surgery	H
<b>Note</b>	
<ul style="list-style-type: none"> <li>○ DO NOT RUN A LOT OF FLUIDS BEFORE SURGERY, as this raises blood pressure, which may worsen the patient's bleeding, and worsen state of shock.</li> </ul>	

### 16.3.4 Premature Rupture of Membranes (PROM & PPROM)

ICD10 CODE: O42

PROM is a rupture of membranes before the start of labour. It can occur either:

- When foetus is mature/term at or after 37 weeks (PROM)
- Or when foetus is immature/preterm between 24-37 weeks of gestation. This is referred to as Pre-term PROM (PPROM).

In all cases of PPROM, prematurity and its attendant problems are the principal concerns for the foetus, while infection morbidity and its complications are the primary concerns for the mother.

#### Risk factors associated with PPROM

Low socioeconomic status, tobacco use

- ◆ Low body mass index
- ◆ Prior history of PV bleeding during pregnancy
- ◆ History of preterm labour
- ◆ Urinary tract infection, chorioamnionitis
- ◆ Cervical cerclage, amniocentesis

#### Clinical features associated with PROM

- ◆ Leakage of fluid or vaginal discharge

- ◆ May be with or without vaginal bleeding
- ◆ Pelvic pressure but no contractions
- ◆ If ROM has been prolonged, the patient may present with fever, abdominal pain, and a foul smelling vaginal discharge

## Investigation

- The typical odour of amniotic fluid is diagnostic
- Place a vaginal pad over the vulva; examine visually and by smell after 1 hour
- Use a high-level disinfected or sterile speculum for vagina
- examination: fluid may be seen coming from the cervix or forming a pool in the posterior fornix
- Ask patient to cough: this may cause a gush of fluid
- If membrane rupture is not recent or leakage is gradual, confirming the diagnosis may be difficult
- Abdominal US scan may show absence of or very low amounts of amniotic fluid
- If available, do Nitrazine test and Ferning test

### Caution

- Do NOT do digital vaginal examination – it does not help diagnosis and may cause infection

## Management of PROM (>37 weeks)

- ◆ Over 90% of patients with PROM go into spontaneous labour within 24 hours
- ◆ Expectant management carries a risk of infection
- ◆ Induction of labour decreases the risk of infection without increasing the C/S delivery rate
- ◆ Expectant management also carries a risk of neonatal issues, e.g., infection, abruptio placenta, foetal distress, foetal restriction deformities, and death

MANAGEMENT	LOC
<p><input type="checkbox"/> Refer all patients to hospital and keep in hospital until delivery</p> <p><b>If the membranes have been ruptured for &gt;18 hours and no signs of infection</b></p> <p><input type="checkbox"/> Give prophylactic antibiotics until delivery to help reduce neonatal group B streptococcus infection: Ampicillin 2 g IV every 6 hours or benzylpenicillin 2 MU IV every 6 hours</p> <p><input type="checkbox"/> Assess the cervix</p> <p><input type="checkbox"/> Refer to HC4 or above (with facilities for emergency obstetric management) for induction with oxytocin (see section 16.4.2)</p>	HC4
	HC4

### Management of PPROM (<37 weeks)

- ◆ The primary determinant of neonatal morbidity and mortality is gestational age at delivery, hence stressing the need for conservative management whenever possible for Pre-PROM
- ◆ All patients with Pre-PROM should receive antenatal steroids for foetal lung maturity
- ◆ All patients with PPROM should receive prophylactic antibiotics since there is a high risk of infection
- ◆ Administration of tocolytics for 48 hours may allow administration of steroids to accelerate lung maturity
- ◆ In general, prognosis is good after 34 weeks of gestation
- ◆ All patients with PPROM should be cared for in a facility where a Neonatal Intensive Care Unit (NICU) is available

TREATMENT	LOC
<input type="checkbox"/> Refer all patients to hospital, and keep in hospital until delivery <b>If no signs of infection and pregnancy 24-34 weeks (if gestational age is accurate)</b> <input type="checkbox"/> Give dexamethasone 6 mg IM every 12 hours for a total of 4 doses (or betamethasone 12 mg IM, 2 doses 24 hours apart)	H
<input type="checkbox"/> Routine antibiotics: Erythromycin 250 mg every 8 hours plus amoxicillin 500 mg every 8 hours <ul style="list-style-type: none"> <li>- Stop them after delivery if no signs of infection</li> </ul> <input type="checkbox"/> Deliver at 34 weeks	H
<b>If palpable contractions and blood- stained mucus</b>	
<input type="checkbox"/> Suspect preterm labour <input type="checkbox"/> Hydrate with IV fluids before administering nifedipine <input type="checkbox"/> Consider administration of tocolytics <ul style="list-style-type: none"> <li>- Tocolytics: Nifedipine 10 mg sublingual tablet placed under the tongue every 15 minutes if necessary, up to a maximum of 40 mg in the first hour. Then 60-160 mg daily in 3-4 divided doses, adjusted to uterine activity, for max 48 hours</li> </ul>	
<b>If vaginal bleeding with abdominal pain (intermittent or constant)</b>	
<input type="checkbox"/> Suspect and treat as abruptio placentae (see section 16.3.6)	
<b>If signs of infection (fever, foul-smelling vaginal discharge)</b>	
<input type="checkbox"/> Give antibiotics as for Amnionitis (section 16.3.5) <input type="checkbox"/> Deliver immediately	
<b>Caution</b>	
<ul style="list-style-type: none"> <li>▪ Do not use steroids in presence of infection</li> </ul>	

### 16.3.5 Chorioamnionitis

ICD10 CODE: O41.1

Infection of the chorionic and amniotic membranes/fluid before delivery.

#### Risk factors

- ◆ Prolonged rupture of membranes
- ◆ Prolonged labour
- ◆ Untreated STI

#### Clinical features

- ◆ History of vaginal draining of liquor
- ◆ Fever >37.8 C
- ◆ Maternal tachycardia
- ◆ Foetal tachycardia
- ◆ Uterine tenderness
- ◆ Foul-smelling or purulent vaginal discharge
- ◆ Acute complications: postpartum haemorrhage, puerperal sepsis, renal failure
- ◆ Chronic complications: infertility due to salpingitis, and/ or uterine sinechie

#### Investigations

- RDT or BS to rule out Malaria
- Urinalysis to rule out UTI
- Swab (vaginal discharge) for gram stain

#### Management

Care for mother and neonate includes early delivery and antibiotic administration. The risk of neonatal sepsis is increased.

TREATMENT	LOC
<input type="checkbox"/> Start antibiotics and refer to hospital <ul style="list-style-type: none"> <li>- Ampicillin 2 g IV every 6 hours</li> <li>- Plus gentamicin 5 mg/kg IV every 24 hours</li> </ul> <p>For penicillin allergic patients, give</p> <input type="checkbox"/> Clindamycin 300-600 mg IV 12 hourly	H
<b>If patient delivers vaginally</b>	
<input type="checkbox"/> Continue parenteral antibiotics until woman is afebrile for 48 hours and no foul-smelling discharge	
<input type="checkbox"/> If the mother comes back with complications, refer for further care	H
<b>If the woman has a Caesarean section</b>	
<input type="checkbox"/> Continue the above antibiotics, and add metronidazole 500 mg IV every 8 hours <ul style="list-style-type: none"> <li>- Continue until 48 hours after fever has gone</li> </ul>	
<b>Newborn</b>	H
<input type="checkbox"/> Examine the neonate for suspected sepsis before discharge	
<input type="checkbox"/> If newborn sepsis is suspected manage as in section 2.1.7.1	
<input type="checkbox"/> Advise the mother on how to recognize danger signs (see section 17.1.1)	

### 16.3.6 Antepartum Haemorrhage (APH) – Abruptio Placentae and Placenta Praevia ICD10 CODE: O44-O46

Vaginal bleeding occurring after 28 weeks of pregnancy, and up to second stage of labour.

## Causes

- ◆ Local causes from genital tract
- ◆ Placenta praevia: All or part of the placenta is found in the lower segment of the uterus
- ◆ Abruptio placentae: Premature separation of a normally placed placenta

## Comparison of Clinical features

SIGN/SYMPOTM	PLACENTA PRAEVIA	ABRUPTIO PLACENTAE
Abdominal pain	Painless	Severe pain
Foetal movements	Foetal movements usually present	Loss of foetal movements common
Amount of vaginal bleeding	Significant bleeding from the vagina	Significant bleeding may be absent; only serous fluid in some cases (bleeding is behind the placenta)
Maternal general condition	Shock and anaemia if bleeding is heavy	Shock and anaemia, even when no frank bleeding
Uterine consistency	Uterus soft and not tender	Uterus hard and tender
Position of foetal presenting part	High presenting part (head) or malpresentation (the part in the lower uterus not head)	Foetal parts difficult to feel because of hard uterus
Foetal heart sounds	Foetal heart sounds usually heard	Foetal heart sounds often absent



## Differential diagnosis

- ◆ Ruptured uterus especially in a patient with previous caesarean section or grand multipara
- ◆ Local causes, e.g. cervical cancer

## Investigations

- Ultrasound: To find the site of the placenta and viability of the baby, this may not be conclusive for AP (take note of clinical signs and symptoms)
- Blood:
  - Grouping, cross-matching
  - Haemoglobin, fibrinogen levels
  - Clotting time and bleeding time

## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Any bleeding in late pregnancy needs immediate referral to hospital</li> <li><input type="checkbox"/> Give IV normal saline infusion</li> <li><input type="checkbox"/> Admit, inspect the vulva to ascertain colour and amount of bleeding but DO NOT perform a digital vaginal examination if you suspect placenta praevia</li> <li><input type="checkbox"/> Correct anaemia and coagulation defects (transfuse blood and fresh frozen plasma)</li> <li><input type="checkbox"/> In case of confirmed Abruptio Placentae where the baby is dead, and facilities for theatre and blood transfusion are available, with no contraindication to vaginal delivery:           <ul style="list-style-type: none"> <li>- Rupture membranes and start oxytocin 10 IU in 500 mL of Normal saline to induce labour</li> </ul> </li> </ul>	H

<ul style="list-style-type: none"> <li><input type="checkbox"/> In case of Abruptio Placentae where the baby is alive           <ul style="list-style-type: none"> <li>- Deliver by emergency caesarean section (ensure you have enough blood)</li> </ul> </li> <li><input type="checkbox"/> In case of placenta praevia           <ul style="list-style-type: none"> <li>- Give steroids (as for PPROM) if &lt;34 weeks</li> <li>- Emergency cesarean section if bleeding is uncontrolled, mother's or baby's life in danger or pregnancy &gt;37 weeks</li> <li>- If bleeding resolves, keep mother in hospital and deliver at &gt;37 weeks</li> </ul> </li> </ul>	H
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### 16.3.7 Pre-Eclampsia

ICD10 CODE: O14

Pre-eclampsia is a hypertensive condition of pregnancy usually diagnosed after 20 weeks of gestation and can present as late as 4-6 weeks postpartum.

It is characterized with hypertension, proteinuria with or without oedema and, may result into maternal fits if not managed appropriately.

It may also be superimposed on chronic hypertension. It is classified as mild to severe pre-eclampsia.

TYPE OF ECLAMPSIA	DESCRIPTION
Mild to moderate pre-eclampsia	A diastolic BP of 90-109 mmHg and/ or systolic BP of 140-159 mmHg, with 1+ proteinuria; and no organ dysfunction
Severe pre- eclampsia	acute severe hypertension (160/110 mmHg) and 1+ proteinuria OR any degree of hypertension with evidence of organ dysfunction (e.g., renal dysfunction, raised liver enzymes, thrombocytopaenia)

#### Clinical features of severe pre-eclampsia

- ◆ Headache, blurring of vision of new onset
- ◆ Epigastric or right upper quadrant pain, vomiting



- ◆ Dyspnoea, weakness or general malaise
- ◆ Oedema (swelling of hands, face, legs and other parts of the body), excessive weight gain
- ◆ Systolic BP >160 mmHg and Diastolic BP >110 mmHg
- ◆ Urine protein ++, may be oliguria
- ◆ Pre-eclampsia related hypertension usually resolves spontaneously after delivery and almost always within 12 weeks from delivery.

### Differential diagnosis

- ◆ Other causes of oedema and hypertension, e.g., renal disease)

### Investigations

- Urine: for protein
- Blood for:
  - LFT & RFT
  - Serum creatinine
  - Clotting time if platelet count is less than  $100 \times 10^9$
  - Fibrinogen levels
- Ultrasound Scan for foetal Estimated Gestational Age and viability

### Management

Any case of pre-eclampsia has to be referred to hospital, lower facilities can give emergency care (Magnesium sulphate, antihypertensive as available).

### Goals of treatment are to:

- ◆ Prevent convulsions
- ◆ Control blood pressure
- ◆ Deliver the baby if indicated

TREATMENT	LOC
<b>General measures</b> <input type="checkbox"/> Bed rest, preferably in hospital <input type="checkbox"/> Lifestyle adjustment and diet <input type="checkbox"/> Monitor BP, urine output, renal and liver function tests, platelet count, foetal condition <input type="checkbox"/> Mother may be hypovolaemic; careful (slow) infusion of IV fluids may be necessary <input type="checkbox"/> Consider delivery if risks to mother outweigh risks of prematurity to baby	HC4
<b>Mild to moderate pre-eclampsia</b> <input type="checkbox"/> Based on BP response <input type="checkbox"/> Methyldopa, oral, 250 mg every 8 hours as a starting dose, increase to 500 mg 6 hourly according to response, Max dose 2 g daily	HC3
<b>AND/OR</b> <input type="checkbox"/> Nifedipine 20-40 mg every 12 hours	
<b>Severe pre-eclampsia (hypertensive emergency)</b> <b>To prevent convulsions</b> <input type="checkbox"/> Give IV fluids (Normal saline) very slowly (1 L in 6-8 hours max) <input type="checkbox"/> Give IV loading dose of magnesium sulphate injection (4 g of MgSO <sub>4</sub> ) <ul style="list-style-type: none"> <li>- Draw 8 mL of a 50% MgSO<sub>4</sub> and add 12 mL of water for injection or Normal saline: this is equal to 4 g of 20% MgSO<sub>4</sub></li> <li>- Give the solution as a slow IV bolus over 20 minutes (the 20-20-20 rule)</li> </ul> <input type="checkbox"/> Then give 5 g MgSO <sub>4</sub> (10 mL of MgSO <sub>4</sub> 50%, undiluted) in each buttock deep IM (total 10 g) with 1 mL of 2% lignocaine in the same syringe <input type="checkbox"/> If unable to give IV loading dose, give only the 10 g deep IM	HC3

TREATMENT	LOC
<b>Antihypertensives</b> <b>If BP is &gt;95 mmHg diastolic or &gt;160 mmHg systolic</b> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Give hydralazine 5 mg IV bolus every 30 minutes until diastolic is BP is down to &lt;100 mmHg           <ul style="list-style-type: none"> <li>- Alternative if hydralazine not available: Nifedipine 20-40 mg orally every 12 hours until delivery</li> <li>- Or Labetalol 20 mg IV over 2 minutes, double the dose every 30 minutes until diastolic is &lt;100 mmHg (total dose not to exceed 160 mg/hour)</li> </ul> </li> <li><input checked="" type="checkbox"/> Maintenance antihypertensive therapy is necessary after controlling the BP. Maintain the patient on Nifedipine 20 mg 12 hourly until delivery</li> <li><input checked="" type="checkbox"/> Monitor BP every 15 minutes until stable (when systolic BP &lt;160 and Diastolic &lt;100 mmHg)</li> </ul>	HC4 HC3 RR
<b>Deliver baby</b> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Women with severe pre-eclampsia should be delivered urgently (vaginally or C/S) regardless of gestational age in the following situations:           <ul style="list-style-type: none"> <li>- Non-reassuring foetal heart</li> <li>- Ruptured membranes</li> <li>- Uncontrolled BP</li> <li>- Oligohydramnios</li> <li>- Features of IUGR</li> <li>- Oliguria of &lt;500 mL/24 hours</li> <li>- Pulmonary Oedema</li> <li>- Headache that is persistent and severe</li> </ul> </li> </ul>	H
<b>After delivery</b> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Monitor BP every 15 minutes for 2 hours</li> <li><input checked="" type="checkbox"/> Continue to monitor vital signs (BP, urine protein, etc) very carefully for at least 48 hours</li> <li><input checked="" type="checkbox"/> Continue antihypertensive to maintain diastolic BP less than 90 mmHg</li> <li><input checked="" type="checkbox"/> Send home when BP is stable and no urine protein</li> <li><input checked="" type="checkbox"/> Continue antihypertensive according to clinical monitoring           <ul style="list-style-type: none"> <li>- Hypertension usually resolves with the birth of the baby but may persist (e.g. in case of undiagnosed pre existent hypertension)</li> </ul> </li> </ul>	

**Notes**

- Do not use ergot-containing medicines
- Do not use diuretics or ACE inhibitors

**16.3.8 Eclampsia**

ICD10 CODE: O15

Occurrence of generalised tonic-clonic seizures after 20 weeks of pregnancy, associated with hypertension and proteinuria, without any other neurological cause of seizures.

**Clinical features**

- ◆ Patient may or may not have had previous clinical features of severe pre-eclampsia
- ◆ Headache that is usually frontal, blurring of vision, aura (flickering lights)
- ◆ Generalized tonic-clonic seizures
- ◆ Right upper quadrant abdominal pain with nausea
- ◆ BP raised  $>140/90$  mmHg
- ◆ Oedema of legs and sometimes face and body
- ◆ Unconsciousness if condition not treated
- ◆ Amnesia and other mental changes

**Differential diagnosis**

- ◆ Other causes of fits, e.g. cerebral malaria, meningitis, epilepsy, poisoning

**Investigations**

- Urine for Protein
- CBC, LFT, RFT
- Malaria parasites
- Urea, electrolytes
- Clotting time if platelet count  $<100 \times 10^9$
- Fibrinogen levels

## Principles of Management

Eclampsia is a medical emergency and should be referred to hospital urgently, after first aid measures as available.

### Goals of treatment are:

- ◆ Controlling/preventing convulsions
- ◆ Controlling blood pressure
- ◆ Delivering the baby as soon as possible

TREATMENT	LOC
<b>First aid</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Protect the airway by placing the patient on her left side</li> <li>- Prevent patient from hurting herself</li> <li><input type="checkbox"/> Place padded tongue blade between her teeth to prevent tongue bite, and secure it to prevent aspiration – DO NOT attempt this during a convulsion</li> <li><input type="checkbox"/> Do not restrict/restrain the patient while fitting</li> <li><input type="checkbox"/> Refer to hospital as soon as possible</li> </ul>	HC2
<b>Stop and control convulsions</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Give IV loading dose of magnesium sulphate</li> <li><input type="checkbox"/> injection (4 g of MgSO<sub>4</sub>)</li> <li><input type="checkbox"/> Draw 8 mL of a 50% MgSO<sub>4</sub> and add 12 mL of water for injection or Normal saline: this is equal to 4 g of 20% MgSO<sub>4</sub></li> <li><input type="checkbox"/> Give the solution as slow IV bolus over 20 minutes (the 20-20-20 rule)</li> <li><input type="checkbox"/> Then give 5 g of magnesium sulphate (10 mL of MgSO<sub>4</sub> 50% solution, undiluted) in each buttock deep IM (total 10 g) with 1 mL of 2% lignocaine in the same syringe</li> <li><input type="checkbox"/> Give IV fluids (Normal saline) very slowly (1 L in 6-8 hours max)</li> <li><input type="checkbox"/> Monitor BP, pulse, and respiration every 30 minutes; pass indwelling Foley's catheter for continuous bladder drainage</li> </ul>	HC3

TREATMENT	LOC
<input type="checkbox"/> Monitor fluid balance <b>If the facility has capacity, continue with maintenance dose after 4 hours from the loading dose, ONLY IF:</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Urine output &gt;100 mL in 4 hours f Respiratory rate is &gt;16 per minute f Patellar reflexes (knee jerk) are present</li> </ul>	HC3
<b>Signs of magnesium sulphate toxicity</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Respiratory depression, rate &lt;16 breaths per minute</li> <li><input type="checkbox"/> Urine output &lt;30 mL/hour</li> <li><input type="checkbox"/> Depressed patellar reflexes</li> </ul>	H
<b>Antidote for magnesium sulphate</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Give calcium gluconate 1 g (10 mL of 10%) slow IV, not exceeding 5 mL per minute. Repeat prn until respiratory rate gets back to normal (rate &gt;16 breaths per minute)</li> </ul>	
<b>Maintenance dose</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Magnesium sulphate 5 g IM (10 mL of MgSO<sub>4</sub> 50% solution) every 4 hours in alternate buttocks for 24 hours from the time of loading dose or after the last convulsion; whichever comes first. Add 1 mL of lignocaine 2% in the same syringe</li> </ul>	
<b>If there are further convulsions</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Repeat ½ of the loading dose of magnesium sulphate (2 g of 20% solution given IV, slowly)</li> </ul>	
<b>ONLY IF magnesium sulphate is not available use</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Diazepam 10 mg slow IV over 2 minutes loading dose, (repeat once if convulsions recur)</li> <li><input type="checkbox"/> Diazepam 40 mg in 500 mL of normal saline IV infusion to run slowly, keeping the patient sedated but rousable</li> </ul>	
<b>Note</b> <ul style="list-style-type: none"> <li>▪ Notify the person who will resuscitate the newborn that a benzodiazepine and/or magnesium sulphate has been given to the mother</li> </ul>	
<b>Control blood pressure: if BP is &gt;110 mmHg diastolic or &gt;170 mmHg systolic</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Give hydralazine 5 mg IV bolus every 30 minutes until</li> </ul>	H RR

TREATMENT	LOC
diastolic is BP is down to <100 mmHg	H RR
<input type="checkbox"/> Alternative, if hydralazine not available: Nifedipine 20 mg orally every 12 hours until delivery	
<input type="checkbox"/> Or Labetalol 20 mg IV over 2 minutes, double the dose every 30 minutes until diastolic is <100 mmHg (total dose not to exceed 160 mg/hour)	H RR
<input type="checkbox"/> Maintenance antihypertensive therapy is necessary after controlling the BP. Maintain the patient on Nifedipine retard 20 mg 12 hourly until delivery	
<input type="checkbox"/> Monitor BP every 15 minutes until stable (when systolic BP <170 and Diastolic <100 mmHg)	H
<b>Deliver the baby by the safest and fastest means available within 6-12 hours</b>	
<input type="checkbox"/> Augment labour if mother is approaching second stage with no contraindication to vaginal delivery and theatre is nearby	
<input type="checkbox"/> Perform vacuum extraction if mother is in second stage and there is no contraindication	
<input type="checkbox"/> Deliver by emergency caesarian section if facilities are available	
<b>Post delivery care</b>	
<input type="checkbox"/> Monitor BP every 15 minutes for 2 hours	
<input type="checkbox"/> Continue to monitor vital signs (BP, urine protein, etc) very carefully for at least 48 hours	
<input type="checkbox"/> Continue antihypertensive to maintain BP diastolic <90 mmHg	
<input type="checkbox"/> Send home when BP is stable and no urine protein	
<input type="checkbox"/> Continue antihypertensive according to clinical monitoring	
<b>Note</b>	
<ul style="list-style-type: none"><li>▪ Hypertension usually resolves with birth of the baby, but may persist (e.g. in case of undiagnosed pre existent hypertension)</li></ul>	

## 16.4 LABOUR, DELIVERY AND ACUTE COMPLICATIONS

### 16.4.1 Normal Labour and Delivery

ICD10 CODE: O80

Labour is a physiological process by which the uterus expels the foetus

#### Prevention

- ◆ Regular attendance of good antenatal care with a skilled birth attendant, and checking of blood pressure and urine protein.

and other products of conception. Labour can last from between 6 to 18 hours; being longer for first pregnancies.

#### Normal labour is characterized by:

- ◆ Onset of regular uterine contractions at term
- ◆ Progressive cervical dilatation
- ◆ Expulsion of the foetus

#### FIRST STAGE OF LABOUR

- ◆ From onset of labour to full dilation of the cervix
- ◆ The presenting part descends well into the midpelvis

#### What to do

- Provide rapid counselling and testing for HIV if it was not done during prenatal period
- Make correct diagnosis of labour
- Open a partogram for the patient and monitor progress of labour
- Vaginal examinations every 2 to 4 hours. Expected rate of cervical dilatation is at least 1 cm/hour. Examine every hour once an 8 cm dilatation has been reached
- Observe change of shape of foetal head (moulding), foetal position, and caput. Descent is assessed by abdominal palpation noting how much of the head you can feel above the pelvis
- Check uterine contractions
- Hourly monitoring of mother's BP, temperature, pulse and respiration. Check ketones and proteins in urine, and Hb

- Check foetal heart rate (FHR) for 1 minute every 30 minutes. A normal FHR is 120 to 160 beats per minute; FHR >160 or <120 beats per minute indicates foetal distress
- Observe state of membranes and colour of amniotic fluid if membranes are ruptured

### Hydration and nourishment

- Ensure oral or IV fluid intake especially in prolonged labour, to avoid dehydration and ketosis
- Give normal saline and Dextrose solution as required

### Analgesia

- Provide appropriate analgesia if desired by the patient e.g. morphine 10 mg IM stat at 4-6 cm dilatation

### 2ND STAGE OF LABOUR

- ◆ From full dilatation to expulsion of the foetus
- ◆ Contractions become strong and frequent
- ◆ Patient bears down
- ◆ Perineum bulges and overlying skin becomes tense and shiny

### What to do

- Ensure full dilatation of the cervix by vaginal examination
- Encourage the mother to bear down with contractions, and relax in between
- Protect the perineum from tearing by supporting with fingers at crowning
- Do an episiotomy under local anaesthesia if required
- Allow the baby's head to rest when it is born and loose cord from around the neck if present. If cord is too tight, clamp it with two artery forceps and cut it.
- Support the head during delivery. Anterior shoulder is delivered first followed by posterior.
- Place the baby on mother's abdomen or arms. Dry the baby, wipe eyes
- If baby not crying, assess breathing. Rub the back 2-3 times. If not breathing resuscitate (see section 16.5.1)

- After the baby is born, palpate mother's abdomen to exclude second baby
- Then give Oxytocin 10 IU IM to the mother
- Clamp the cord and cut it (1-3 minutes after birth)

### 3RD STAGE OF LABOUR

- From delivery of the baby to delivery of the placenta

#### What to do: Child

- Evaluate baby's condition using APGAR (Appearance, Pulse, Grimace, Activity, Respiration) score, and record in the baby's chart. Resuscitate if necessary
- Give 1 mg IM stat of phytomenadione (Vitamin K) to baby
- Clean the eyes with sterile warm water and apply tetracycline eye ointment to baby's eyes as prophylaxis against ophthalmia neonatorum
- Give identification tag to baby, wrap in warm towels and give to the mother to introduce breast feeding
- Weigh the baby and compare with chart
- Give a full physical examination to the baby f Immunize the baby

#### What to do: Mother

- Examine fundal height and palpate uterus lightly to determine whether it has contracted well and to exclude undiagnosed twins
- Ensure oxytocin 10 IU IM was given
- Await strong contraction (2-3 minutes) and deliver the placenta by controlled cord traction. Deliver the
- placenta and examine it for completeness and normalcy. Weigh the placenta. If placenta is not delivered within 30 minutes, see Retained Placenta section 16.4.5
- Massage lower abdomen lightly to stimulate contraction and expel clots
- Examine the perineum, vagina, and cervix for tears.
- Repair episiotomy and any tears immediately
- Observe for 1 to 2 hours. Monitor BP, temperature, and pulse rate hourly. Also do uterine palpation, vulva inspection and estimation of degree of blood loss
- Refer to postnatal ward

## 16.4.2 Induction of Labour

Induction of labour may be indicated for medical reasons, like, pre-eclampsia, diabetes, post-term pregnancy.

However, possible risks of induction are:

- Failed induction
- Hyperstimulation syndrome, requiring emergency caesarean section.

Induction is contraindicated in para 5 and above and in patients with a previous scar. In these cases there is indication for caesarean section.

TREATMENT	LOC
<p>Cervix favourable in HIV and Hep B negative mothers</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Artificially rupture the membranes (with amniotic hook or Kocher clamp) followed 2 hours later by</li> <li><input type="checkbox"/> Oxytocin IV 2.5 IU in 500 mL of Normal saline.</li> <li><input type="checkbox"/> Start with 10 drops/minute</li> <li><input type="checkbox"/> Increase infusion rate by 10 drops every 30 minutes (max 60 minutes) until good contraction pattern is established (3-5 contractions in 10 minutes each lasting &gt;40 secs), and maintain until delivery is complete</li> <li><input type="checkbox"/> If no good contraction pattern with 60 drops/ minute, increase oxytocin concentration to 5 IU in 500 mL of Dextrose or Normal saline at 30 drops/minute, increase by 10 drops every 30 minutes until maximum of 60 drops/minute</li> <li><input type="checkbox"/> ONLY IN PRIMIGRAVIDA: if no good contraction pattern established, increase concentration of oxytocin to 10 IU in 500 mL and repeat as above (from 30 to 60 drops/minute)</li> <li><input type="checkbox"/> DO NOT USE 10 IU in 500 mL in MULTIGRAVIDA or WOMEN WITH PREVIOUS CAESAREAN SECTION</li> <li><input type="checkbox"/> Refer other cases or primigravida not responding to the higher concentration for surgical management</li> <li><input type="checkbox"/> NEVER LEAVE THE WOMAN ALONE</li> </ul>	H

TREATMENT	LOC
<p>If &gt;4 contractions in 10 minutes, or contraction longer than 60 secs or foetal distress:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Stop rate of infusion</li> <li><input type="checkbox"/> Give salbutamol 5 mg in RL or NS 500 mL IV infusion at 10 drops/minute</li> <li><input type="checkbox"/> Monitor foetal heart rate</li> </ul> <p><b>Cervix not favourable</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Ripen cervix using either</li> <li><input type="checkbox"/> Misoprostol 25 micrograms inserted vaginally every 6 hours for 2 doses, if no response increase to 50 micrograms every 6 hours, max 200 micrograms in 24 hours – stop when in established labour</li> <li><input type="checkbox"/> Or misoprostol 20 micrograms orally (dissolve 1 200 microgram tablet in 200 mL of water and give 20 mL) every 2 hours until labour starts or max 24 hours</li> <li><input type="checkbox"/> Or Foley catheter: insert Foley catheter through internal cervical os under sterile technique, inflate bulb with 50 mL of water, and tape catheter under light traction, leave it until contraction begins or up to 12 hours</li> <li><input type="checkbox"/> If cervical ripening, proceed to cesarean section</li> <li><input type="checkbox"/> If cervix ripens but labour does not start, start oxytocin induction</li> </ul>	H
<p>Caution</p> <ul style="list-style-type: none"> <li>▪ Do not start oxytocin within 8 hours of using misoprostol</li> <li>▪ Carefully control oxytocin infusion – do not give rapidly</li> <li>▪ Monitor uterine contractions and foetal heart rate closely</li> <li>▪ If foetal distress, do emergency cesarean section</li> </ul>	

## Causes

- ◆ Cephalopelvic disproportion (CPD)
- ◆ Large baby
- ◆ Foetal abnormalities: hydrocephalus, conjoined twins
- ◆ Small or deformed pelvis
- ◆ Malpresentation: the presenting part of the foetus is not the head, e.g. breech presentation, shoulder presentation, face, etc
- ◆ Malposition: an abnormal position of the foetal head when this is the presenting part, e.g. occipito-posterior
- ◆ Any barrier that prevents the baby's descent down the birth canal

## Clinical features

- ◆ Contractions are strong but no evidence of descent of the presenting part
- ◆ Malposition or malpresentation may be felt on abdominal examination
- ◆ In a first delivery, the pains will just stop spontaneously
- ◆ Foetal distress with meconium stained liquor
- ◆ Fever and dehydration with maternal exhaustion
- ◆ In late stages, the regular colicky strong pains may stop when the uterus is ruptured, and be replaced by a dull continuous pain
- ◆ Signs of shock if the uterus has ruptured
- ◆ Physical examination reveals signs of shock, tender uterus, formation of a Bandl's ring, vulva may be oedematous, vagi-

### 16.4.3 Obstructed Labour

ICD10 CODE: O64-O66

Failure of labour to progress despite good uterine contractions.

na is hot and dry, there's usually a large caput

## Management

TREATMENT	LOC
<input type="checkbox"/> Set up an IV normal saline line and rehydrate the patient to maintain plasma volume and treat dehydration and ketosis	HC3 HC4
<input type="checkbox"/> Start 5-day course of antibiotics: Amoxicillin 500 mg every 8 hours or erythromycin 500 mg every 6 hours	HC3 HC4
<input type="checkbox"/> Plus metronidazole 400 mg every 8 hours	H
<input type="checkbox"/> Refer urgently to HC4/Hospital for further management	

### Note

- Every woman with prolonged/obstructed labour should receive the management protocol for prevention of obstetric fistula (see section 16.6.4)

## Prevention

- ◆ Careful monitoring of labour using a partogram for early recognition
- ◆ Active management of labour

### 16.4.4 Ruptured Uterus

ICD10 CODE: O71.1

Partial or complete tearing of the uterus, common in:

- ◆ Multiparous women (i.e. have had >1 live babies)
- ◆ Women with previous caesarean section

## Causes/predisposing factors

- ◆ Assisted deliveries/obstetric procedures
- ◆ Neglected obstructed labour
- ◆ Tearing of a poorly-healed uterine scar during labour
- ◆ Short interpregnancy interval of less than 18 months after Caesarean Section
- ◆ Previous history of uterine surgery, e.g. myomectomy



- ◆ Damage to uterus due to a blow, e.g. kick or accident
- ◆ Use of oxytocic herbs

### Clinical features

- ◆ Cessation of regular uterine contractions (labour pains)
- ◆ Continuous abdominal pain
- ◆ Vaginal bleeding
- ◆ Anxiety, anaemia, and shock
- ◆ Abdomen is irregular in shape
- ◆ Foetal parts easily felt under the skin if the foetus is outside uterus and foetal heart is not heard

### Differential diagnosis

- ◆ Abruptio placentae
- ◆ Placenta praevia
- ◆ Other causes of acute abdomen in late pregnancy
- ◆ Ruptured spleen
- ◆ Bowel obstruction

### Investigations

- Blood: CBC, grouping and cross-matching

### Management

Mothers with a suspicion of ruptured uterus should be referred immediately to hospital for blood transfusion and surgical management.

TREATMENT	LOC
<input type="checkbox"/> Set up IV normal saline infusion <input type="checkbox"/> Give IV ceftriaxone 2 g and IV metronidazole 500 mg stat then <input type="checkbox"/> Refer to hospital immediately for surgical management (cesarean section ± hysterectomy)	HC3 H

## Prevention

- ◆ Good ANC and education on early arrival to the facility for labour and delivery
- ◆ Skilled birth attendance at all deliveries
- ◆ Careful monitoring of labour using a partogram
- ◆ Minimise the use of oxytocin in multiparous women
- ◆ Do not attempt fundal pressure during labour
- ◆ DO NOT use misoprostol for induction of labor

### 16.4.5 Retained Placenta

ICD10 CODE: O73

Failure of delivery of placenta within 30 minutes of delivery of the baby.

#### Causes

- ◆ Poor management of 3rd stage of labour
- ◆ Failure of the uterus to contract
- ◆ Failure of the placenta to separate, e.g. if it is stuck in uterine muscle; placenta accreta
- ◆ Closing of the cervix before the placenta is expelled

#### Clinical features

- ◆ The umbilical cord protrudes from the vagina
- ◆ Bleeding may be present (in partial separation)
- ◆ Uterus may be poorly contracted and high in the abdomen
- ◆ May be signs of infection, e.g. fever, unpleasant bloody discharge if the placenta is retained for long

#### Differential diagnosis

- ◆ Retained second twin
- ◆ Ruptured uterus



## Investigations

- Blood: Hb, grouping and cross-matching

## Management

TREATMENT	LOC
If woman is bleeding, manage as PPH (section 16.4.6)	
If woman not bleeding	HC3
<input type="checkbox"/> Set up IV normal saline infusion <input type="checkbox"/> Empty the bladder (voluntarily or catheterise) <input type="checkbox"/> Encourage breastfeeding <input type="checkbox"/> Repeat controlled cord contraction	
If placenta is not delivered in another 30 minutes	
<input type="checkbox"/> Perform manual removal of placenta (use diazepam 10 mg IM/IV) <input type="checkbox"/> Repeat Oxytocin 10 IU IM or slow IV injection after manual removal <input type="checkbox"/> If no signs of infection and no obstructed labour Give ceftriaxone 2 g IV stat <input type="checkbox"/> If signs of infection, give antibiotics as in amnionitis <input type="checkbox"/> If obstructed labour, give antibiotic prophylaxis as indicated in section 16.4.3	
If unable to remove placenta manually	HC4 H
<input type="checkbox"/> Give ceftriaxone 2 g IV stat <input type="checkbox"/> Give oxytocin 20 IU in Normal saline 500 cc at 30 drops per minute during transfer <input type="checkbox"/> Refer to HC4 or Hospital	

### 16.4.6 Postpartum Haemorrhage (PPH) ICD10 CODE: O72

Vaginal bleeding of more than 500 mL after vaginal delivery or >1000 mL after caesarean section.

- Primary PPH occurs in the first 24 hours after delivery
- Secondary PPH occurs between 24 hours and six weeks after delivery

PPH is an EMERGENCY. It can occur in any woman and needs prompt recognition and treatment.

### **Causes**

- ◆ Tone: failure of uterus to contract, precipitated labour
- ◆ Tissues: such as retained placenta (in part or whole) or membranes which may lead to atony as well as infection in the uterus
- ◆ Tears (e.g. damage to/rupture of the perineum, vagina, cervix or uterus)
- ◆ Thrombotic disorders which may be due to DIC following abruptio placenta or severe APH

### **High risk patients**

- ◆ History of previous PPH, multiple previous C/S, multiple pregnancy
- ◆ Placenta praevia, abruptio placenta
- ◆ Precipitated labour, prolonged labour, large baby
- ◆ Patients with hypertensive disorders

### **Clinical features**

- ◆ Bleeding from the genital tract which may be a gush of blood or a small but persistent trickle of blood (>1 pad soaked in five minutes)
- ◆ The uterus may still be large, soft, and not contracted especially in primary PPH
- If uterus is well contracted, look for tears on the perineum, vagina, cervix, or uterus

- ◆ Signs of shock may be present: tachycardia, low BP, cold and clammy skin
- ◆ In secondary PPH, there may be signs of infection, e.g., fever, abdominal tenderness

## Investigations

- Hb and blood group should have been already done and recorded during ANC; if not, do them urgently
- Women at high risk of PPH should have blood cross- matched and at least 2 units booked
- If time allows (e.g. in secondary PPH), check blood for Hb, clotting

## Management

The principles of management include two major components:

1. Resuscitation and management of obstetric haemorrhage and possibly hypovolemic shock
2. Identification and management of underlying causes

TREATMENT	LOC
<p>First aid</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Check uterus to see if contracted f Massage uterus (to expel clots) f Give oxytocin 10 IU IM or IV slowly Give tranexamic acid 1gm IV slowly over 10 mins but within 3 hours after delivery of the baby</li> <li><input type="checkbox"/> Empty the bladder</li> <li><input type="checkbox"/> Start IV fluids (normal saline) using 2 IV lines using large bore canulae, run 2L as fast as possible then give 40drops per minute according to patient BP</li> </ul>	HC3

TREATMENT	LOC
<input type="checkbox"/> If oxytocin not available, give misoprostol 800 micrograms sublingually or ergometrine 0.2mg IM (if a non-hypertensive mother) <b>Check if placenta has been expelled, and is complete</b> <input type="checkbox"/> If yes, expel any clots in the birth canal <input type="checkbox"/> If not, perform manual removal or refer <input type="checkbox"/> Prophylactic antibiotic: ampicillin 2 g IV stat plus <input type="checkbox"/> metronidazole 500 mg IV <input type="checkbox"/> If signs of infection, give antibiotics as in puerperal fever	HC3
<b>If uterus contracted and placenta expelled</b> <input type="checkbox"/> Check for local causes if bleeding continues <ul style="list-style-type: none"> <li>- Inspect carefully the lower genital tract for perineal lacerations, haematomas, vaginal and cervical tears</li> </ul> <b>If bleeding not responding,</b> <input type="checkbox"/> Repeat oxytocin 10 IU in 0.5L of normal saline run at 60 drops/min <input type="checkbox"/> Give misoprostol sublingual 800 micrograms or ergometrine 0.2mg IM (if not given before) <input type="checkbox"/> Repeat tranexamic acid 1gm after 30 mins of the first dose <input type="checkbox"/> If bleeding persists, insert Uterine balloon tamponade (UBT) and apply Non-pneumonic anti-shock garment (NASG) <input type="checkbox"/> Restore blood volume with IV fluids <input type="checkbox"/> Refer to higher level for further management with UBT & NASG in situ <input type="checkbox"/> Check for coagulation problems	HC3
<b>Caution</b> <ul style="list-style-type: none"> <li>▪ Do not give heat stable carbetocin for treatment of PPH. It is used for prevention of PPH.</li> <li>▪ Do not give ergometrine in hypertensive mothers</li> </ul>	
<b>Prevention</b> <ul style="list-style-type: none"> <li>◆ Ensure active management of 3rd stage of labour for all women in labour, and delivery by skilled staff</li> </ul>	

- ◆ Give heat stable Carbetocin 100mcg IV/IM (single dose) or oxytocin 10 IU IM or misoprostol 600mcg orally to the mother within 1 minute of delivery, after ruling out presence of another baby
- ◆ Clamp the cord and cut it (3-5 minutes after birth) or when the cord stops pulsating.
- ◆ Controlled cord traction during a contraction with counter-traction to deliver the placenta
- ◆ Massage the uterus immediately after delivery of the placenta to ensure the uterus is contracted
- ◆ Identify mothers at risk and manage accordingly
- ◆ Give 5 days' prophylactic antibiotics in prolonged or obstructed labour, or in presence of other risk factors, e.g. rupture of membranes, birth before arrival at health facility, instrument delivery:

**NOTE:** Carbetocin should be given as a single dose

#### 16.4.7 Puerperal Fever/Sepsis

ICD10 CODE: O85

Infection of the female internal genital tract within 6 weeks of childbirth. Signs and symptoms usually occur after 24 hours, although the disease may manifest earlier in settings of prolonged rupture of membranes and prolonged labour without prophylactic antibiotics.

##### Causes

- ◆ Ascending infection from contamination during delivery or abortion
- ◆ Bacteria include: Staphylococcus aureus and Gram- negative bacteria from the gut, e.g. Escherichia coli, Bacteroides, Streptococcus pyogenes, clostridium spp, chlamydia, gonococci
- ◆ In puerperal sepsis, multiple organisms are likely

## Clinical features

- ◆ Persistent fever >38 C
- ◆ Chills and general malaise
- ◆ Pain in the lower abdomen
- ◆ Persistent bloody/pus discharge (lochia) from genital tract, which may have an unpleasant smell
- ◆ Tenderness on palpating the uterus
- ◆ Uterine sub-involution

## Risk factors

- ◆ Anaemia, malnutrition in pregnancy
- ◆ Prolonged labour, prolonged rupture of membranes
- ◆ Frequent vaginal exams
- ◆ Traumatic delivery (instrumental deliveries, tears)
- ◆ Retained placenta

## Differential diagnosis

- ◆ Other causes of fever after childbirth, e.g. malaria, UTI, DVT, wound sepsis, mastitis/breast abscess, RTI

## Investigations

- Blood: CBC, C&S, BS for malaria parasites / RDT
- Lochia: swab for C&S
- Urine: For protein, sugar, microscopy, C&S

## Management

Puerperal fever carries a high risk of sepsis with a high mortality, and needs immediate attention

TREATMENT	LOC
<b>Parenteral antibiotic therapy</b>	HC3
<input type="checkbox"/> Ampicillin 500 mg IV or IM every 6 hours <input type="checkbox"/> Plus gentamicin 5-7 mg/kg IV or IM daily in 2 divided doses (every 12 hours) <input type="checkbox"/> Plus metronidazole 500 mg IV every 8 hours for at least 3 doses	HC4
<b>Alternative</b>	
<input type="checkbox"/> Clindamycin 150 mg IV/LM every 6 hours + gentamicin as above	
<b>Supportive/additional therapy</b>	
<input type="checkbox"/> Give IV fluids <input type="checkbox"/> Give analgesics <input type="checkbox"/> If anaemic, transfuse with blood <input type="checkbox"/> Look for retained products and evacuate uterus if necessary	

### Prevention

- ◆ Use of clean delivery kits and ensuring clean deliveries, proper hygiene
- ◆ Prophylactic antibiotic when indicated (prolonged labour and premature rupture of membranes, manual removal of placenta)

### 16.4.8 Care of Mother and Baby Immediately After Delivery

ICD10 CODE: Z39

Provide the following care for the first two hours after complete delivery of the placenta.

#### General measures

- ◆ Constant attention; Never leave mother and baby alone
- ◆ Request the mother or attendant to report any unusual changes in the mother and baby to the health worker
- ◆ Record any findings, treatment, and procedures in the Post-partum Record

For additional information on care of the HIV positive mother, refer to section 16.2.2 above.

### **16.4.8.1 Care of Mother Immediately After Delivery**

TREATMENT	LOC
<ul style="list-style-type: none"> <li>- Take the blood pressure</li> <li>- Rapid assessment for danger signs such as excessive PV bleeding, difficulty in breathing, severe headache</li> <li>- Feel if uterus is hard and round</li> </ul>	HC3
<b>Monitoring of mother</b> <ul style="list-style-type: none"> <li>◆ Check every 15 minutes for 2 hours, then at 3 and 4 hours, then every 4 hours until discharge</li> </ul>	HC3
<b>Assess, classify, and treat</b> <ul style="list-style-type: none"> <li>◆ Raised diastolic blood pressure           <ul style="list-style-type: none"> <li>- &gt;110 mmHg with proteinuria 3+ and signs/ symptoms of eclampsia: manage as severe eclampsia (section 16.3.8)</li> <li>- If 90-110 mmHg with proteinuria: manage as pre-eclampsia (section 16.3.7)</li> <li>- If &gt;90 mmHg with no proteinuria and no symptoms of eclampsia: monitor and treat as hypertension (section 16.6.1.2)</li> </ul> </li> <li>◆ Fever with chills or uterine tenderness or foul smelling discharge, treat as puerperal fever (section 16.4.7)           <ul style="list-style-type: none"> <li>- If isolated raised temperature, monitor, hydrate and observe for 12 hours. Treat for puerperal fever if it persists (section 16.4.7)</li> </ul> </li> <li>◆ If bleeding perineal tear           <ul style="list-style-type: none"> <li>- Suture if trained or refer for further management</li> </ul> </li> <li>◆ If bleeding (If pad soaked in &lt;5 minutes or constant trickle of blood) and uterus not hard and around:           <ul style="list-style-type: none"> <li>- Treat as PPH (section 16.4.6)</li> </ul> </li> </ul>	

TREATMENT	LOC
<ul style="list-style-type: none"> <li>◆ Anaemia: monitor for bleeding and look for conjunctival or palmar pallor, check Hb if indicated, manage as appropriate</li> </ul> <p><b>Care of mother</b></p> <ul style="list-style-type: none"> <li>◆ Encourage mother to pass urine, eat, and drink</li> <li>◆ Ask the companion to stay with her</li> </ul>	

#### 16.4.8.2 Care of Baby Immediately After Delivery

TREATMENT	LOC
<p>Monitoring of baby</p> <ul style="list-style-type: none"> <li>◆ Check every 15 minutes           <ul style="list-style-type: none"> <li>- Breathing, warmth, pulse, SpO<sub>2</sub></li> <li>- Umbilical cord stump should be well ligatured</li> </ul> </li> </ul> <p><b>Care of baby</b></p> <ul style="list-style-type: none"> <li>❑ Ensure the room is warm</li> <li>❑ Wipe off blood or meconium with wet cloth           <ul style="list-style-type: none"> <li>- Do not remove vernix or bathe the baby within the first 24 hours</li> </ul> </li> <li>❑ Apply an eye antimicrobial e.g. tetracycline eye ointment           <ul style="list-style-type: none"> <li>- Leave in place and do not wash it away</li> </ul> </li> <li>❑ Apply chlorhexidine digluconate gel to the cord stump daily after every bath, until the cord falls off. Provide the gel to the mother and teach her how to use it while at home</li> <li>❑ Give vitamin K 1 mg IM</li> <li>❑ Keep baby warm with skin to skin contact</li> </ul> <p>If feet are cold or mother and baby are separated</p> <p><b>Cover</b> baby with blanket; cover baby's toes and fingers as well as the head with warm clothing</p> <ul style="list-style-type: none"> <li>❑ Reassess after 1 hour</li> </ul>	HC3

TREATMENT	LOC
<b>If breathing difficulty</b> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Examine the baby according to first newborn examination requirements, classify the condition, and treat accordingly (see section 16.5 and section 17.1) Section 17.1)</li> </ul>	

### Breastfeeding

Ensure the mother starts breastfeeding as soon as possible (preferably within the first hour)

- ◆ Offer mother help to position (attach) the baby correctly onto the breast to avoid cracked nipples
- ◆ Counsel and reassure mother

### If unable to start breastfeeding:

- ◆ Plan for alternative feeding method
- Ensure that alternative method is Affordable, Feasible, Acceptable, Sustainable and Safe
- Do not give artificial feeds, sugar water or local feeds
- before baby has attempted to initiate natural breastfeeding
- Consider referral to a higher level

### Baby dead or stillborn

In case the baby dies or is stillborn

- ◆ Give supportive care to the mother
- ◆ Respect local customs; find out if the mother/family would like to look at or hold the stillborn baby
- ◆ Check, identify and give wrapped body to family for disposal/burial according to local customs
- ◆ Provide death certificate and complete required reporting formalities

TREATMENT	LOC
<input type="checkbox"/> Advise on postpartum care and hygiene <input type="checkbox"/> Advise mother on breast care; wear a firm bra, do not express the breasts <input type="checkbox"/> Give paracetamol if breasts are painful <input type="checkbox"/> You may give lactation suppression drugs such as bromocriptine 2.5 mg once a day for 2 weeks <input type="checkbox"/> Counsel on appropriate family planning	HC3

## 16.5 ESSENTIAL CARE OF THE NEWBORN

### 16.5.1 Newborn Resuscitation ICD10 CODE: P22

Start resuscitation within one minute of birth if baby is not breathing or is gasping for breath

- ◆ Observe universal hygiene precautions to prevent infection
- ◆ Prepare for resuscitation at each delivery even where there are no signs of foetal distress, just in case the baby requires it

#### Minimum preparation for every birth

Ensure that the following equipment is available and in good working order:

- ◆ Two warm cotton cloths and a small one to position the head
- ◆ Heat source to keep the baby warm
- ◆ Mucus extractor such as a penguin sucker (or bulb syringe)
- ◆ Ambu bag and new-born masks of varying sizes (0 and 1), pulse oximeter
- ◆ Clock or watch
- ◆ A birth attendant skilled in new-born resuscitation

MANAGEMENT	LOC
<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Keep the baby warm by drying the baby using the first cotton cloth and change to the second dry cotton cloth. Rub the back 2-3 times <ul style="list-style-type: none"> <li>- Clamp and cut the cord if necessary</li> <li>- Transfer the baby to a dry clean warm surface</li> <li>- Tell the mother that the baby is having difficulty starting to breathe and that you will help the baby</li> </ul> </li> <li><input checked="" type="checkbox"/> Open the airway <ul style="list-style-type: none"> <li>- Position the head so that it is slightly extended</li> <li>- Place a folded towel &lt;2 cm thick under baby's shoulders</li> <li>- Suction if secretions in mouth or nose and if baby born through meconium stained amniotic fluid:</li> </ul> </li> </ul>	HC3
<p>suction 5 cm in the mouth, 3 cm in the nose while withdrawing, for max 10 seconds in total.</p> <ul style="list-style-type: none"> <li>- Do not suction too deep into the throat as this may cause the heart to slow down or breathing to stop</li> <li><input checked="" type="checkbox"/> If still not breathing, SELECT APPROPRIATE MASK SIZE TO COVER CHIN, MOUTH AND NOSE, AND VENTILATE <ul style="list-style-type: none"> <li>- Form a seal with mask covering chin, mouth and nose</li> <li>- Squeeze bag 5 times</li> <li>- Observe chest</li> </ul> </li> </ul>	
<p><b>If not rising</b></p> <ul style="list-style-type: none"> <li>- Reposition head, check mask seal, squeeze bag harder</li> <li><input checked="" type="checkbox"/> Once good seal and chest rising, ventilate for one minute at 40 squeezes per minute then stop and look for breathing</li> </ul>	

### Check for hypertension

If breathing >30/minute and no severe chest in- drawing	
<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Stop ventilating</li> <li><input checked="" type="checkbox"/> Put baby skin-to-skin on mother's chest</li> <li><input checked="" type="checkbox"/> Observe every 15 minutes for breathing and warmth: take temperature, count breaths, observe for chest-in-drawing or grunting respiration.</li> <li><input checked="" type="checkbox"/> Monitor SpO<sub>2</sub></li> </ul>	

MANAGEMENT	LOC
If breathing >30/minute and no severe chest in-drawing  <input type="checkbox"/> Stop ventilating <input type="checkbox"/> Put baby skin-to-skin on mother's chest <input type="checkbox"/> Observe every 15 minutes for breathing and warmth: take temperature, count breaths, observe for chest-in-drawing or grunting respiration. <input type="checkbox"/> Monitor SpO <sub>2</sub> <input type="checkbox"/> Encourage mother to breastfeed within one hour <input type="checkbox"/> DO NOT LEAVE THE BABY ALONE	
If breathing <30/minute or severe chest in-drawing  <input type="checkbox"/> Continue ventilating f Arrange for immediate referral <input type="checkbox"/> Give oxygen if available f Reassess every 1-2 minutes <input type="checkbox"/> Continue to ventilate during referral	
If not gasping or breathing at all after 20 minutes of ventilation  <input type="checkbox"/> Stop ventilation, the baby is dead	
<b>Notes</b>	
<ul style="list-style-type: none"> <li>○ Room air is sufficient in the absence of oxygen</li> <li>○ Cardiac massage is RARELY required; it is dangerous when done incorrectly. A slow heart rate almost always responds to good breathing assistance only</li> <li>○ Usually, there is no need for drugs if prompt and sufficient ventilation is provided</li> </ul>	

### Harmful and ineffective resuscitation practices

- Routine suction of new-born's mouth and nose as soon as the head is born
- Stimulation of the new-born by slapping or flicking the soles of the feet

- Postural drainage (putting the baby upside down) and slapping the back
- Squeezing the back to remove secretions from airway
- Routine giving of sodium bicarbonate to new-borns who are not breathing.
- Intubation by an unskilled person

### **16.5.2 General Care of Newborn After Delivery**

Provide the following care up to the time of discharge:

TYPE OF CARE AND MONITORING	NOTES
Keep baby with mother <ul style="list-style-type: none"> <li>- In same bed or within easy reach</li> <li>- Under mosquito net</li> </ul>	If baby is in a cot, ensure baby is dressed or well-wrapped: covered with blanket, head is covered and the feet and hands have socks
<b>Ensure room is warm</b> (>25 C) and has no cold breeze (draughts)	Do NOT put baby in direct sun or on any cold surface or directly in the line of a cold breeze
Advise/teach mother how to: <ul style="list-style-type: none"> <li>- Keep the baby warm</li> <li>- Give cord care</li> <li>- Ensure hygiene</li> </ul>	<ul style="list-style-type: none"> <li>- If mother is unable to take care of baby, provide required care or teach her next of kin</li> <li>- Wash hands before and after handling baby</li> <li>- Do not bathe baby for up to 24 hours</li> </ul>
<b>Support exclusive breast-feeding</b> on demand, day and night, whenever baby wants	<b>If breastfeeding difficult:</b> Help mother to position and attach the baby <b>If breastfeeding not possible:</b> Advise on safe replacement feeding (AFASS)

TYPE OF CARE AND MONITORING	NOTES
<b>Ask mother and companion to:</b> Watch the baby Report breastfeeding or breathing problems, cold feet, bleeding from cord or other bleeding Check every baby at 4 and 8 hours then daily for: Warm feet Normal pink colour Feeding Breathing problems	<b>If feet cold-this is a sign of hypothermia:</b> Teach mother how to rewarm the baby; apply one to two layers of clothes more than adults, and use of hats/ caps Reassess in 1 hour; if no improvement, take temperature and manage accordingly If breathing problem Assess and manage accordingly If cord tie loose/cord bleeding: Retie cord If bleeding persists, refer urgently
Check any baby with warning signs at 2, 4, 8, and 12 hours: <ul style="list-style-type: none"> <li>- Listen for grunting</li> <li>- Look for chest in drawing</li> <li>- Count breaths/ minute</li> <li>- Measure temperature</li> <li>- Observe breastfeeding</li> </ul>	<b>Refer urgently if:</b> <ul style="list-style-type: none"> <li>- Breathing problem worsens or persists for &gt;8 hours</li> <li>- Temperature <math>&lt;36.5\text{ C}</math></li> <li>- persists or decreases</li> <li>- Not able to feed at 8 hours</li> </ul>
Give prescribed treatments according to dosage schedule	If referring the baby, write treatments given, when, and why

Assess breastfeeding in every baby before planning discharge	Do not discharge if baby is not feeding well
Do not discharge baby < 24 hours old	
Advise mother: <ul style="list-style-type: none"> <li>- When to seek care</li> <li>- When to return if danger signs appear (refusal to feed, excessive crying, bleeding from the cord stump, fever, bulging fontanel, abdominal distension, grunting respiration)</li> </ul>	Do NOT plan early discharge if: <ul style="list-style-type: none"> <li>- Baby small (LBW or preterm)</li> <li>- Not feeding well</li> </ul>
Give BCG and polio 0 before discharge	Counsel mother on next routine check in 3-7 days and next immunization in 6 weeks

### 16.5.3 Extra Care of Small Babies or Twins in the First Days of Life

Provide the following care for small babies:

- Preterm up to 1 month early
- Low Birth Weight <2,500 g
- Refer very small babies for specialized attention:
- Very preterm >1 month early
- Very Low Birth Weight <1,500 g

TYPE OF CARE AND MONITORING	NOTES
Ensure room is warm: Teach mother how to keep baby warm	Provide extra blanket for mother and baby if needed

TYPE OF CARE AND MONITORING	NOTES
Teach mother how to ensure hygiene for baby	Do not bathe the baby Clean prn with swabs or cloth
Give special support for breastfeeding and assess daily	If not breastfeeding well, teach mother alternative feeding methods
<b>Assess small baby daily:</b> <ul style="list-style-type: none"><li>- Measure temperature</li><li>- Feeding progress, weight</li><li>- Breathing</li><li>- Jaundice (see section 17.1.2 and 17.2.2)</li></ul>	<ul style="list-style-type: none"><li>- If breathing or breastfeeding problem or hypothermia, examine and manage accordingly</li><li>- If maternal concern, examine and manage the baby accordingly;</li></ul>
	<ul style="list-style-type: none"><li>- If breastfeeding problem persists &gt;3 days or weight loss &gt;10% of birth weight and no other problems, refer for breastfeeding counselling and management</li></ul>
Keep mother and baby (or twins) longer before discharge. Plan the discharge when: <ul style="list-style-type: none"><li>- Breastfeeding well</li><li>- Weight gain on 3 consecutive days</li></ul>	
<ul style="list-style-type: none"><li>- Body temperature normal for 3 consecutive days</li><li>- Mother confident in caring for baby</li></ul>	<ul style="list-style-type: none"><li>- If mother &amp; baby not able to stay, ensure daily (home) visits or send to hospital</li></ul>

#### 16.5.4 Newborn Hygiene at Home

CATEGORY	CARE
Eye care	<p><input type="checkbox"/> Explain to mother to seek care if eyes drain pus, and not to apply anything into the eyes</p>
Cord care	<p><input type="checkbox"/> Wash hands before and after cord care</p> <p><input type="checkbox"/> Put chlorhexidine gel daily (if not available put nothing) for 7 days</p> <ul style="list-style-type: none"> <li>- Keep stump loosely covered with clean clothes</li> <li>- Fold nappy below the stump</li> <li>- If stump soiled, wash with clean water and soap, dry completely with clean cloth</li> <li>- Do not bandage the stump or abdomen</li> <li>- Do not apply anything else to the stump</li> <li>- Avoid touching the stump unnecessarily</li> </ul> <p>If umbilicus red or draining pus or blood</p> <p><input type="checkbox"/> Examine the baby and manage accordingly</p>
General baby care hygiene	<p><input type="checkbox"/> Wash the face, neck, and under arms daily</p> <p><input type="checkbox"/> Wash the buttocks when soiled and dry completely</p> <ul style="list-style-type: none"> <li>- Use cloth on baby's bottom to collect stool</li> <li>- Dispose as for sanitary towels/pads and wash hands</li> <li>- If Bathe when necessary using warm water</li> <li>- Ensure room is warm with no cold breezes</li> <li>- Dry completely, then dress and cover the baby</li> </ul>

**Note:**

- Small babies need specially careful attention
- Wash hands before and after baby care

## 16.6 POSTPARTUM CONDITIONS

### 16.6.1 Postpartum Care ICD10 CODE: Z39

The postpartum period, also known as the puerperium, begins with the delivery of the baby and placenta, up to six weeks after delivery.

Healthcare providers should be aware of the medical and psychological needs of the postpartum mother, and sensitive to cultural differences that surround childbirth, which

may involve eating particular foods and restricting certain activities.

#### **Postpartum care services**

The mother and baby should be seen at 6 hours after birth and again before discharge if in a health facility (and anytime the mother reports concern about herself and her baby) or approximately 6 hours after delivery at home.

The routine follow-up visits are at 6 days and 6 weeks, and have the following components:

- ◆ Counselling
- ◆ Assessment and management of observed or reported problems. Check for hypertension, anaemia, vaginal bleeding and discharge, uterine infection, puerperal fever, malaria, UTI, urine dribbling, pus or perineal pain, postpartum depression, breast problems, HIV and any other complaint

#### **16.6.1.1 Postpartum Counselling**

Provide the following counselling at all postpartum visits.

## General counselling

- ◆ Breastfeeding/breast care
- ◆ Nutrition, ferrous and folic acid supplements, avoid alcohol and tobacco

## Complications and danger signs for the mother

- ◆ Danger signs (see next table)
- ◆ Readiness plan in case of an emergency
  - Advise her to have someone near for at least 24 hours after delivery to respond to any change in condition
  - Discuss emergency issues with her and partner/family:
  - Where to go if danger signs appear, how to get there, costs involved, family/community support
  - Advise her to seek help from the community if needed
  - Advise her to bring any home-based maternal record to the health facility, even for an emergency visit
- ◆ Self care and other good health practices, personal hygiene, handwashing, genital hygiene (care of the episiotomy or repaired tears)
- ◆ Pelvic floor exercises
- ◆ Sleeping under mosquito nets
- ◆ Postpartum checks (6 days and 6 weeks)
- ◆ Provide information on bonding by encouraging the mother to hold, touch, explore her baby as well as rooming-in (mother and baby sleeping in the same bed) HIV testing
- ◆ Discuss with the couple the need for shared care of the newborn
- ◆ Help build confidence by providing reassurance that the woman is capable of caring for the newborn

## Counselling on baby care

- ◆ Hygiene and care of the baby, (see previous sections)
- ◆ Danger signs for the baby
- ◆ Immunization schedule
- ◆ Let baby sleep on the back or side
- ◆ Ensure the baby is kept warm without overcovering
- ◆ Apply chlorhexidine digluconate gel to the cord stump daily after every bath until the cord falls off. Provide the gel to the mother, and teach her how to use it while at home
- ◆ Keep baby away from smoke and smokers
- ◆ Keep baby (especially if small) away from anyone who is ill
- ◆ Do not share supplies (for example, clothing, feeding utensils) with other babies

### Advise mother on danger signs as follows:

TYPE OF DANGER SIGN	ACTION TO TAKE
<ul style="list-style-type: none"><li>◆ Vaginal bleeding (&gt;2 pads soaked in 30 minutes after delivery or bleeding increases instead of decreases after delivery)</li><li>◆ Fever or convulsions</li><li>◆ Fast or difficult breathing</li><li>◆ Too weak to get out of bed</li></ul>	Go to health facility immediately
<ul style="list-style-type: none"><li>◆ Severe abdominal pain</li><li>◆ Severe headache/blurred vision</li><li>◆ Pain in the calf (ankle) muscles</li></ul>	

TYPE OF DANGER SIGN	ACTION TO TAKE
<input checked="" type="radio"/> Fever; abdominal pain; feels ill; breasts red, tender, swollen; sore nipple; urine dribbling or pain on urination; perineal pain or draining pus; foul-smelling lochia	Go to health facility as soon as possible

### 16.5.1.2 Postpartum Examination of the Mother Up to 6 Weeks

#### Ask, check record

- ◆ When and where did you deliver?
- ◆ How are you feeling?
- ◆ Any pain or fever or bleeding since delivery?
- ◆ Do you have any problem with passing urine?
- ◆ Ask if the woman has started having sex with her partner
- ◆ Have you decided on any contraception?
- ◆ How do your breasts feel?
- ◆ Do you have any other concerns?
- ◆ Check records for any complications during delivery, any treatments she is receiving, HIV status?
- ◆ Ask about tobacco use and exposure to second-hand smoke

#### Look, listen feel

- ◆ Measure blood pressure and temperature
- ◆ Feel uterus. Is it hard and round?
- ◆ Look at vulva and perineum for tear, swelling or pus
- ◆ Look at pad for bleeding and lochia
- Does it smell or is the bleeding profuse?
- Look for pallor

**Look, listen feel**

- ◆ Measure blood pressure and temperature
- ◆ Feel uterus. Is it hard and round?
- ◆ Look at vulva and perineum for tear, swelling or pus
- ◆ Look at pad for bleeding and lochia
  - Does it smell or is the bleeding profuse?
- Look for pallor

Use the table on the next page to examine mother at any postpartum visit

## Classify and treat as directed below Check for hypertension

ASSESSMENT	SIGNS	CLASSIFY	TREAT AND ADVISE
Blood pressure		Severe Hypertension	<ul style="list-style-type: none"> <li>◆ Assess and treat for pre-eclampsia (section 16.3.7). Refer to hospital</li> <li>◆ If not pre-eclampsia, give/continue appropriate antihypertensive as in non-pregnant women (section 4.1.6)</li> </ul>
◆ History of eclampsia or pre-eclampsia	<ul style="list-style-type: none"> <li>◆ Diastolic BP 110 mmHg</li> </ul>	Moderate Hypertension	<ul style="list-style-type: none"> <li>◆ Assess for pre-eclampsia</li> <li>◆ If no pre-eclampsia, give/continue appropriate antihypertensive as in non-pregnant women (see section 4.1.6)</li> </ul>
◆ Diastolic BP			<ul style="list-style-type: none"> <li>◆ Review in one week</li> </ul>
◆ 90 mmHg, repeat after an hour	<ul style="list-style-type: none"> <li>◆ 90 mmHg on 2 on 2 readings</li> </ul>	Blood Pressure Normal	<ul style="list-style-type: none"> <li>◆ No additional treatment</li> </ul>
◆ 2 readings			

## Check for anaemia

ASSESSMENT	SIGNS	CLASSIFY	TREAT AND ADVISE
<p>Check for anaemia</p> <ul style="list-style-type: none"> <li>◆ Check record for bleeding in pregnancy, delivery or after delivery</li> <li>◆ Ask any heavy bleeding since delivery?</li> <li>◆ Do you tire easily?</li> </ul>	<ul style="list-style-type: none"> <li>◆ Hb &lt;7 g/dL</li> <li>◆ And/or</li> <li>◆ Severe palmar or conjunctival pallor</li> <li>◆ Any pallor and any of:           <ul style="list-style-type: none"> <li>◆ RR &gt;30 breaths per minute</li> <li>◆ Tires easily</li> <li>◆ Breathlessness at rest</li> </ul> </li> <li>◆ Are you breathless during routine house-work?</li> <li>◆ Measure Hb</li> </ul>	<p>Severe Anaemia</p>	<ul style="list-style-type: none"> <li>◆ Give double dose of iron sulphate 200 mg (or Fe-fol) : 1 tablet 2-3 times daily for 3 months</li> <li>◆ Refer urgently to hospital</li> <li>◆ Follow up in 2 weeks to check clinical progress and compliance with treatment</li> <li>◆ Reassess in 4 weeks</li> <li>◆ If anaemia persists, refer to hospital</li> </ul>

ASSESSMENT	SIGNS	CLASSIFY	TREAT AND ADVISE
<ul style="list-style-type: none"> <li>◆ Look for conjunctival and palmar pallor</li> <li>◆ Count breaths per minute</li> </ul>	<ul style="list-style-type: none"> <li>◆ Hb 7-11 g/dL or Palmar or conjunctival pallor</li> <li>◆ Hb &gt;11 g/dL</li> <li>◆ No pallor</li> </ul>	Moderate Anaemia	<ul style="list-style-type: none"> <li>◆ Give double dose of ferrous sulphate 200 mg (or Fefol) 1 tablet twice daily for 3 months</li> <li>◆ Reassess in 4 weeks</li> <li>◆ If anaemia persists, refer to hospital</li> </ul>
		No Anaemia	<ul style="list-style-type: none"> <li>◆ Continue treatment with ferrous sulphate 200 mg (or Fefol) once daily to complete treatment duration of 3 months</li> </ul>

#### Check for vaginal bleeding and possible uterine/urinary tract or febrile infection

ASSESSMENT	SIGNS	CLASSIFY	TREATMENT
<ul style="list-style-type: none"> <li>◆ Heavy vaginal bleeding</li> </ul>	<ul style="list-style-type: none"> <li>◆ More than 1 pad soaked in 5 minutes</li> </ul>	Postpartum Bleeding	<ul style="list-style-type: none"> <li>◆ Give oxytocin 10 IU IM</li> <li>◆ Give appropriate IM/IV antibiotics</li> <li>◆ Refer urgently to hospital</li> <li>◆ See PPH section 16.4.6</li> </ul>
<ul style="list-style-type: none"> <li>◆ Heavy/ light vaginal bleeding after 6 weeks</li> </ul>	<ul style="list-style-type: none"> <li>◆ Still bleeding 6 weeks after delivery</li> </ul>	Postpartum Bleeding	<ul style="list-style-type: none"> <li>◆ Refer urgently to hospital</li> <li>◆ See PPH section 16.4.6</li> </ul>

Signs	Classify As	Treat And Advise
<ul style="list-style-type: none"> <li>◆ Mother feeling well</li> <li>◆ Did not bleed &gt;250 mL</li> <li>◆ Uterus well contracted and hard</li> <li>◆ No perineal swelling</li> <li>◆ Blood pressure, pulse and temperature normal</li> <li>◆ No pallor</li> <li>◆ No breast problem</li> <li>◆ No fever or pain or concern</li> <li>◆ No problem with urination</li> </ul>	Normal Postpartum	<ul style="list-style-type: none"> <li>◆ Make sure woman and family know what to watch for and when to seek care</li> <li>◆ Advise on postpartum care, hygiene, and nutrition</li> <li>◆ Reinforce counselling on safer sexual practices</li> <li>◆ Counsel on the importance of birth spacing and family planning</li> <li>◆ Dispense 3 months iron supply and counsel on compliance</li> <li>◆ Give any treatment or prophylaxis due, e.g. TT</li> <li>◆ Promote use of impregnated bednet for the mother and the baby</li> <li>◆ Advise on when to return to the health facility for the next visit</li> <li>◆ Advise to avoid use of tobacco, alcohol, drugs, and exposure to second-hand smoke</li> </ul>

ASSESSMENT	SIGNS	CLASSIFY	TREATMENT
<ul style="list-style-type: none"> <li>◆ Have you had fever?</li> <li>◆ Ask for presence of foul-smelling lochia, burning on urination or heavy bleeding</li> <li>◆ Feel lower abdomen and flanks and tenderness</li> <li>◆ Look for abnormal lochia, stiff neck and lethargy</li> <li>◆ Measure temperature</li> </ul>	<p>Temperature &gt;38°C and any of:</p> <ul style="list-style-type: none"> <li>◆ Very weak</li> <li>◆ Abdominal tenderness</li> <li>◆ Foul-smelling lochia</li> <li>◆ Profuse lochia</li> <li>◆ Uterus not well contracted</li> </ul>	<p>Uterine Infection/ Puerperal Fever</p> <ul style="list-style-type: none"> <li>◆ Refer urgently to hospital (See puerperal fever 16.4.7)</li> </ul>	<ul style="list-style-type: none"> <li>◆ Insert IV line and give fluids rapidly</li> <li>◆ Give appropriate IM/IV antibiotics</li> </ul>

### Check for dribbling of urine

ASSESSMENT	SIGNS	CLASSIFY	TREATMENT
Ask if dribbling urine	Continuous leaking of urine (and/or faeces)	Suspect Obstetric Fistula	<ul style="list-style-type: none"> <li>◆ Refer for proper assessment and management (section 16.6.4)</li> </ul>
	Non continuous dribbling or leaking urine (urge, stress etc)	Urinary Incontinence	<ul style="list-style-type: none"> <li>◆ Check perineal trauma</li> <li>◆ Assess for urinary tract infection and treat if appropriate</li> <li>◆ Recommend pelvic floor exercises</li> <li>◆ Refer if not improving</li> </ul>

### Check for perineal trauma/infection

ASSESSMENT	SIGNS	CLASSIFY	TREATMENT
Ask if there is pus or perineal pain	Excessive swelling of vulva or perineum	Perineal Trauma	Refer to hospital
	<ul style="list-style-type: none"> <li>- Pus in perineum</li> <li>- Pain in perineum</li> </ul>	Perineal Infection or Pain	<ul style="list-style-type: none"> <li>◆ Remove sutures, if present</li> <li>◆ Clean wound</li> <li>◆ Counsel on care and hygiene</li> <li>◆ Give paracetamol for pain</li> <li>◆ Follow up in 2 days</li> <li>◆ If no improvement, refer to hospital</li> </ul>

## Check for vaginal discharge 4 weeks after delivery

ASSESSMENT	SIGNS	CLASSIFY	TREATMENT
If vaginal discharge 4 weeks after delivery, ask	<p>○ Abnormal vaginal discharge, and partner has urethral discharge or burning on passing urine</p> <ul style="list-style-type: none"> <li>◆ Any itching of the vulva?</li> <li>◆ Has your partner had a urinary problem?</li> <li>◆ If partner is present in the clinic, ask him if he has: urethral discharge or pus, burning on passing urine</li> </ul>	<p>Possible Gonorrhoea and/or Chlamydia Infection (see section 3.2.2)</p> <p>◆ Curd-like vaginal discharge and/or</p> <p>◆ Intense vulval itching</p>	<ul style="list-style-type: none"> <li>◆ Give appropriate oral antibiotics to woman</li> <li>◆ Treat partner with appropriate oral antibiotics</li> <li>◆ Counsel on safer sex including use of condoms</li> <li>◆ Give clotrimazole pessaries 1 each evening for 6 days</li> <li>◆ Counsel on safer sex including use of condoms</li> <li>◆ If no improvement, refer the woman to hospital</li> </ul>

ASSESSMENT	SIGNS	CLASSIFY	TREATMENT
◆ Do RDT or blood slide for malaria parasites	Fever >38 C and any of: ◆ Burning on urination ◆ Flank pain ◆ Burning on urination	Upper Urinary Tract Infection	◆ Give appropriate IM/IV antibiotics ◆ Refer urgently to hospital (see UTI in pregnancy 16.2.6)
		Lower Urinary Tract Infection	◆ Give appropriate oral antibiotic (See UTI in pregnancy 16.2.6) ◆ Encourage her to drink more fluids ◆ Follow up in 2 days
	◆ Fever >38 C and any of: - Stiff neck - Lethargy - RDT negative	Very Severe Febrile Disease	◆ Insert IV line and give fluids rapidly + glucose ◆ Give appropriate IM/IV antibiotics (See puerperal fever 16.4.7) Refer urgently to hospital
	◆ Fever >38 C ◆ RDT or blood slide for malaria parasites positive	Malaria	◆ Give oral antimalarial (see section 16.2.4) ◆ Follow up in 2 days ◆ Refer if not better in 2 days

## Check for breast problems

ASSESSMENT	SIGNS	CLASSIFY	TREATMENT
<p>Ask</p> <ul style="list-style-type: none"> <li>◆ How do your breasts feel?</li> <li>◆ Look at the nipple for fissure</li> <li>◆ Look at the breasts for: swelling, shininess, redness</li> <li>◆ Feel gently for painful part of the breast</li> <li>◆ Measure temperature</li> <li>◆ Observe a breastfeed if not yet done</li> </ul>	<ul style="list-style-type: none"> <li>◆ Nipple sore or fissured</li> <li>◆ Baby not well attached</li> <li>◆ Breast Engorgement</li> <li>◆ Both or one breasts are swollen, shiny and patchy red</li> </ul>	<p>Nipple Soreness or Fissure</p> <p>Breast Engorgement</p>	<ul style="list-style-type: none"> <li>◆ Encourage the mother to continue breastfeeding</li> <li>◆ Teach correct positioning and attachment</li> <li>◆ Reassess after 2 feeds (or 1 day). If not better, teach the mother how to express breast milk from the affected breast and feed baby by cup, and continue breastfeeding on the healthy side</li> <li>◆ Encourage the mother to continue breastfeeding</li> <li>◆ Teach correct positioning and attachment</li> <li>◆ Advise to feed more frequently</li> </ul>

ASSESSMENT	SIGNS	CLASSIFY	TREATMENT
	<ul style="list-style-type: none"> <li>◆ Baby not well attached</li> <li>◆ Not yet breast-feeding</li> </ul>		<ul style="list-style-type: none"> <li>◆ Reassess after 2 feeds</li> <li>◆ (1 day) If not better, teach mother how to express enough breast milk before the feed to relieve discomfort</li> </ul>
	<ul style="list-style-type: none"> <li>◆ Painful breast swollen and red</li> <li>◆ Temperature &gt;38 C</li> <li>◆ Feels ill</li> </ul>	Mastitis	See section 16.6.3

### Check for any psychosocial problems

ASSESSMENT	SIGNS	CLASSIFY	TREAT
Ask if feeling unhappy or crying easily, low energy, sleep problems, lack of concentration, unable to do usual work or take care of the baby, negative feeling towards the baby or herself, generalized body pains not otherwise explained	2 of the described signs/ symptoms, for more than 2 weeks	Possible Postnatal Depression	<input type="checkbox"/> See section 16.6.2
Ask if current or previous smoking, alcohol, drug abuse, previous or current history of violence	Any of the described signs and symptoms, during the 1st week after delivery	<p>Possible Baby Blues</p> <p><span style="color: blue;">⦿</span> Counsel, reassurance and review in 2 weeks</p> <p><span style="color: blue;">⦿</span> If persisting see section 16.6.2</p>	<input type="checkbox"/> Counselling and refer for specialist management

ASSESSMENT	SIGNS	CLASSIFY	TREATMENT
<ul style="list-style-type: none"> <li>◆ Separate the labia and look for abnormal vaginal discharge: amount, colour, odour and smell</li> <li>◆ If no discharge is seen, examine with a gloved finger and look at the discharge on the glove</li> </ul>	<ul style="list-style-type: none"> <li>◆ Abnormal vaginal discharge</li> </ul>	<p>Possible Bacterial or Trichomonas Infection (see section 3.2.2)</p>	<ul style="list-style-type: none"> <li>◆ Give metronidazole 2 g single dose to woman</li> <li>◆ Counsel on safer sex including use of condoms</li> </ul>

### Check for HIV infection

ASSESSMENT	SIGNS	CLASSIFY	TREATMENT
Do counseling and testing if never tested before	See chapter 3	HIV Negative	Counsel on safe sex and staying negative
		HIV Positive	Encourage partner testing Manage mother and baby as per eMTCT guidelines (see section 16.2.2)

## 16.6.2 Postnatal Depression

ICD10 CODE: F53

Condition characterized by persistent low mood developing during the puerperium period, usually 1 or 2 weeks following delivery. It needs specialized assessment and treatment.

Mild depressive symptoms (sadness, tearfulness, irritability, anxiety) develop commonly during the first week after

the delivery but resolve within 2 weeks (“baby blues”): it usually needs ONLY counseling and support.

### Risk factors

- ◆ Previous psychiatric history
- ◆ Recent stressful events
- ◆ Young age, first baby (primigravida) and associated fear of the responsibility for the new baby
- ◆ Poor marital relationship, poor social support

### Clinical features

- ◆ Starts soon after delivery and may continue for a year or more
- ◆ Feelings of sadness with episodes of crying, anxiety, marked irritability, tension, confusion
- ◆ Guilty feeling of not loving baby enough
- ◆ Loss of positive feeling towards loved ones
- ◆ Refusal to breast feed baby
- ◆ Ideas to harm the baby

### Postpartum psychosis

- ◆ Distortions of thinking and perception, as well as inappropriate or narrowed range of emotions (see section 9.1.1.1)



## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Routine assessment for depressive symptoms during postnatal visits or at least once at 6 weeks</li> <li><input type="checkbox"/> Counselling and reassurance at first contact and review after 2 weeks</li> <li><input type="checkbox"/> If persisting, refer for specialized treatment               <ul style="list-style-type: none"> <li>- Psychotherapy</li> <li>- Antidepressant (see section 9.2.2)</li> </ul> </li> <li><input type="checkbox"/> If suicidal thoughts, or any risk for mother and/or baby, refer urgently to hospital</li> </ul>	<b>HC3</b> <b>H</b>

## Prevention

- ◆ Postpartum counselling, support, and follow up
- ◆ Identification of patients at risk
- ◆ Male involvement and support

### 16.6.3 Mastitis/Breast Abscess

ICD10 CODE: O91

Infection of the breast usually in a breastfeeding mother. Causes

- ◆ Usually *Staphylococcus aureus* enters from the baby's mouth through a cracked nipple into an engorged breast. Less frequently *Streptococci*

## Clinical features

- ◆ Pain in the breast, which is swollen, often shiny, and tender with enlarged veins
- ◆ Often in 2nd postpartum week
- ◆ Fever
- ◆ May proceed to become an abscess; a collection of pus within the breast tissue
- There may be localised erythema (shiny red skin)
- Firm lump, felt initially but may later become fluctuant
  - May drain pus spontaneously

## Complications

- ◆ Recurrent infection, scarring
- ◆ Loss of breast size, noticeable breast asymmetry
- ◆ Mammary duct fistula formation due to recurrence

## Differential diagnosis

- ◆ Breast engorgement (for mastitis)
- ◆ Breast lump/cancer (for abscess)

## Investigations

- Breast milk: For C&S
- US scan to rule out breast abscess in patients with recurrent mastitis

## Management

TREATMENT	LOC
<input type="checkbox"/> Stop breastfeeding on the affected breast but express milk and discard to avoid breast engorgement <input type="checkbox"/> Give analgesics such as paracetamol 1 g every 8 hours for 3 days <input type="checkbox"/> Apply warm compresses to relieve pain in affected breast <input type="checkbox"/> Continue breastfeeding on the normal breast <input type="checkbox"/> Give cloxacillin 500 mg 6 hourly for 10 days or <ul style="list-style-type: none"> <li>- (If not available use amoxicillin 500 mg every 8 hours for 10 days)</li> </ul>	<b>HC2</b> <b>HC3</b> <b>H</b>
<input type="checkbox"/> If penicillin allergies: erythromycin 500 mg every 6 hours for 10 days <ul style="list-style-type: none"> <li>- Or cephalexin 500 mg PO every six hours for 10 days</li> </ul>	
<b>If not improving</b>	
<input type="checkbox"/> Refer to hospital for ultrasound scan and further management <input type="checkbox"/> If clinical or US scan features of breast abscess: incise and drain	

## Prevention

- ◆ Proper attachment of baby on the breast
- ◆ Frequent emptying of the breast
- ◆ Ensure the baby is sucking on the areolar and not the nipple
- ◆ Manage breast engorgement if not breastfeeding, or lost baby  
(Refer to section on care of the mother and baby immediately after delivery)

### 16.6.4    **Obstetric Fistula**

ICD10 CODE: 071

Obstetric fistula is an abnormal communication between the birth canal, and either the bladder, ureters, or rectum. It is one of the major causes of maternal morbidity making the women with the condition suffer from constant urinary incontinence which can lead to skin infections, kidney disorder or death if left untreated.

## Causes

- ◆ Obstructed labour (main cause): most fistula develops in 2 weeks after an obstructed labour, causing an often expansive crush injury to the vaginal tissues
- ◆ Sexual abuse and rape (Gender-based violence)
- ◆ Complication of unsafe abortion
- ◆ Surgical trauma usually following a caesarean section
- ◆ Gynaecological cancers and radiotherapy

## Predisposing factors

- ◆ Lack of access to maternity care
- ◆ Lack of/inadequate skilled care at birth
- ◆ Lack of facilities for ANC and childbirth
- ◆ Lack of knowledge to identify danger signs and promptly respond
- ◆ Poverty and lack of women empowerment
- ◆ Early marriage and childbirth

- ◆ Inadequate family planning access
- ◆ Harmful traditional practices such as Female Genital Mutilation

### Clinical features

- ◆ Uncontrolled leakage of urine or faeces from vagina

### Differential diagnosis

- ◆ Stress, urge or overflow incontinence
- ◆ Ureterovaginal fistula (UVF)

### Investigations

- Speculum examination to visualise leakage; site, size and amount
- Confirm by dye test on pelvic examination/speculum examination, and/or examination under anaesthesia (EUA)

### Management

A fundamental part of the management of obstetric fistula is the appropriate standard management of ALL women who have survived prolonged or obstructed labour, since it can prevent fistula formation and cure small ones.

#### Aims of management are to:

- ◆ Prevent fistula formation
- ◆ Close the fistula
- ◆ Make the woman continent and able to resume a full and active life

Principles of immediate care of women who have survived prolonged/obstructed labour, or who present immediately after delivery with obstetric fistula

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Insert appropriate sized (Foley size 16-18) catheter and leave in situ</li> <li><input type="checkbox"/> Refer for follow-up care:           <ul style="list-style-type: none"> <li>- The vagina should be examined by speculum as soon as possible and necrotic tissue gently excised under aseptic conditions</li> <li>- Repeat this until vagina is clean</li> </ul> </li> <li><input type="checkbox"/> The mother can be discharged with the catheter and advised on care and to come back for review and/or removal</li> <li><input type="checkbox"/> Recommend increase in fluid intake up to 5 litres a day</li> <li><input type="checkbox"/> Perineal Sitz or salt baths twice daily to help the perineum to heal</li> <li><input type="checkbox"/> Treat any intercurrent infection and give prophylaxis against UTI:           <ul style="list-style-type: none"> <li>- Nitrofurantoin 100 mg 1 tablet in the evening</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li><input type="checkbox"/> Remove the catheter:           <ul style="list-style-type: none"> <li>- After 2 weeks, only if no damage is shown to have occurred</li> <li>- After 4-6 weeks in case of small fistula</li> </ul> </li> <li><input type="checkbox"/> After removing the catheter, if there is no evidence of fistula, discharge with the following advice:           <ul style="list-style-type: none"> <li>- Avoid sexual intercourse for 3 months. Once it has resumed, it should be gentle and with consideration for the woman</li> <li>- Avoid pregnancy for about 6 months to one year</li> <li>- Advise on family planning/contraception and spacing of children, and the importance of good ANC during her next pregnancy</li> <li>- All future babies should be delivered in a unit equipped to undertake caesarean section</li> </ul> </li> </ul>	HC 3 HC4

## Management of women who presents with an established obstetric fistula

These are women in whom the conservative management described above failed or they presented with an established fistula.

TREATMENT	LOC
<ul style="list-style-type: none"><li><input type="checkbox"/> Refer to regional level for assessment and appropriate management</li><li><input type="checkbox"/> Each woman who has been successfully repaired should receive a card with details of her history, a diagram of the injury and a summary of the operation done which should be presented to every health worker wherever she may go for care</li></ul>	<b>RR</b>
<b>Note</b>	
<ul style="list-style-type: none"><li><input checked="" type="radio"/> Fistula repair has to be performed by a trained doctor</li></ul>	

### Prevention

- ◆ Provide skilled attendance at births and improve on emergency obstetric care at all levels
- ◆ Increase access to accurate and quality family planning information and services, especially for adolescents
- ◆ Establish appropriate and effective referral system at all levels (early referrals)

ENSURE ALL WOMEN WHO HAVE SUFFERED OBSTRUCTED LABOUR ARE MANAGED ACCORDING TO THE STANDARD MANAGEMENT PROTOCOL FOR FISTULA PREVENTION

## 16.7 INTRAUTERINE FETAL DEMISE (IUFD) OR FETAL DEATH IN UTERO (FDIU)

### FISTULA PREVENTION

Fetal demise (fetal death) refers to situations in which the fetus is no longer alive, but the uterus has not yet started to expel its contents and the cervical os remains closed. Intrauterine fetal demise or death refers to babies with no signs of life in utero. “early IUFD” refers to fetal demise before 20 weeks’ gestation and IUFD for demise of a fetus at 20 weeks gestation through to term.

#### Causes

- Birth defects (congenital abnormalities of the fetus)
- Blood transfer from baby to mother (feto-maternal hemorrhage)
- Maternal or fetal infection
- Genetic abnormality of the fetus
- Placenta separated from the inner uterine wall (placental abruption)
- Umbilical cord issues
- Uterine rupture

#### Prevention:

This should be done during antenatal and intrapartum to reduce fetal death

- Detection and treatment of syphilis/ Malaria
- Detection and management of hypertensive disease of pregnancy
- Management of sickle cell disease
- Detection and management of diabetes
- Monitoring during labour

**Diagnosis:**

- vaginal bleeding
- Absence or cessation of fetal movements—the usual reason for consultation.
- A uterus that is significantly smaller than the expected size i.e., fundal height too small for gestational age or decrease in fundal height from a prior visit.
- Absence of fetal heart sounds on electronic auscultation
- Sometimes, breast engorgement, indicating the end of the pregnancy.
- The above signs suggest fetal death but are not sufficiently sensitive to justify a hasty, rash decision. Errors are common. Repeat the exam, do not rush.
- Ultrasonography paired with indicative clinical findings is essential for the accurate diagnosis/ confirmation of Intra-uterine Fetal Death (IUFD)

**Common etiologies of IUFD <28 weeks gestation:**

- Infection or other medical conditions
- Placental abruption or insufficiency/Intrauterine growth restriction
- Congenital malformations of the fetus
- Umbilical cord accidents or other complications

**Medical management of IUFD ( $\geq 14$  to  $\leq 28$  weeks)**

- IUFD may be managed expectantly or treated surgically (D&E) or medically (with medications).
- Discussions aim to foster shared decision making about the plan for care and support maternal/parental choice.
- Supportive social and psychological care should be made available to all bereaved parents
- a combination of mifepristone and misoprostol should be the first-line intervention:

- Mifepristone (200mg) administered orally followed 1–2 days later by repeat doses of 400 µg misoprostol administered sublingually or vaginally every 4–6 hours. The minimum recommended interval between use of mifepristone and misoprostol is 24 hours. Between 24 and 48 hours of mifepristone (200mg), the four tablets of misoprostol should be given vaginally, sublingually and can be administered by physician, midwife or woman herself.
  - Alternative regimens: repeat doses of 400 µg misoprostol administered sublingually or vaginally every 4–6 hours. However, research shows that the combination regimen, above is more effective than misoprostol alone.
- Expectant Management of IUFD involves awaiting spontaneous labour (may take up to 3 weeks).
  - Recommendations about labour and birth should take into account the mother's preferences, her medical condition and previous intra-partum history.
  - Vaginal birth is the recommended mode of delivery for most women, but caesarean birth may need to be considered in individual cases.
  - Pregnancy tissue should be treated in the same way as other biological material unless the individual expresses a desire for it to be managed otherwise.
  - If a woman has had a previous caesarean section, a discussion as to the safety and benefits of induction of labour needs to be undertaken by a consultant obstetrician.
  - Clinical assessment and evaluation are recommended to assess maternal wellbeing and to determine the cause of death, the chance of recurrence, and of avoiding future pregnancy complications.
  - Laboratory tests are recommended to rule out any maternal disease or risk factor that may have contributed to the IUFD
  - Fetal karyotyping should be considered in all cases.
  - Parents should be offered a full postmortem examination of the baby.

- Postmortem examination should include external examination with birth weight, histology of relevant tissues and plain radiography (skeletal survey)
- Pathological examination of the cord, membranes and placenta is recommended in all cases of IUFD
- Standardized checklists should be used to ensure that all appropriate care options are offered and that each response mark is recorded.
- A standardized dataset should be collected for all IUFDs.
- All IUFDs should be reviewed in a multi-professional meeting using a standardized approach.
- All term intra-partum deaths with no evidence of a major congenital anomaly should be investigated locally.
- Staff working with bereaved parents should be provided with an opportunity to develop their knowledge and understanding of perinatal loss, together with the development of skills in working in this area.
- A system should be in place to give clinical and psychological support to staff involved with an IUFD.
- A follow-up appointment with the consultant obstetrician should be arranged and it should be clear who is responsible for making these arrangements.
- Women with a history of IUFD should attend a consultant-led hospital-based antenatal clinic in their next pregnancy and undergo increased antenatal surveillance.

**NOTE**

Medical management of IUFD with mifepristone and misoprostol combined is contraindicated in any person with a known allergy to either medication, ectopic pregnancy, chronic adrenal failure, or inherited porphyria, and used with caution in women with life-threatening un-stabilized conditions such as uncontrolled cardiac disease, severe anemia, or hemorrhagic disorders, uncontrolled serious asthma or in those with an IUD in place.

**Medical management of induced abortion**

Medical management of induced abortion (for both viable and non-viable pregnancies) at early or later gestational ages involves the use of a single-drug regimen or a combination regimen of medicines used in sequence, with specific dosages and routes of administration.

In Uganda, the following categories of people who can get services for termination of pregnancy:

- severe maternal illnesses threatening the health of a pregnant woman e.g. severe cardiac disease, renal disease, severe pre-eclampsia and eclampsia;
- severe foetal abnormalities which are not compatible with extra-uterine life e.g. molar pregnancy, anencephaly; cancer cervix.
- HIV-positive women requesting for a termination.
- Rape, incest, and defilement.

**NOTE:**

Medical termination of pregnancy services can be provided at;

- HC IV
- general hospital, and
- referral hospital levels.

By a medical officer, or gynae/surgeon

## Management

**For medical management of induced abortion at gestation ages < 12 weeks:**

- Two-medication regimen: First, the use of 200 mg mifepristone is administered orally, followed 1–2 days later by 800 µg of misoprostol administered vaginally, sublingually, or buccally. The minimum recommended interval between use of mifepristone and misoprostol is 24 hours. These medications can be taken by the person herself, or administered on an outpatient basis by trained health workers.
- Single-medication regimen: 800 µg misoprostol administered buccally, sublingually, or vaginally.

**Evidence from clinical studies demonstrates that the combination regimen is more effective than misoprostol alone.**

**For either regimen:**

- Repeat doses of misoprostol can be considered when needed to achieve success of the abortion process. In this guideline we do not provide a maximum number of doses of misoprostol.
- All routes are included as options for misoprostol administration, in consideration of patient and provider preference

**Medical management of induced abortion at gestational ages 12 weeks**

- Two-medication regimen: 200 mg mifepristone is administered orally, followed 1–2 days later by repeat doses of 400 µg misoprostol administered buccally, sublingually or vaginally every 3 hours.\* The minimum recommended interval between use of mifepristone and misoprostol is 24 hours.
- Single-medication regimen: When using misoprostol alone: recommend the use of repeat doses of 400 µg misoprostol administered vaginally, sublingually or buccally every 3 hours.

## Pain Management

Should be proactive for medical management of induced abortion at any gestational age. Pain medication should be offered routinely (e.g. non-steroidal anti-inflammatory drugs [NSAIDs]). It should be provided for the individual to use if and when wanted. Acetaminophen can be used for pain control when NSAIDS are unavailable. Other methods of pain control, such as certain anti-emetics and epidural anaesthesia can be considered as necessary, with the goal of proactive, patient-centered pain management.

## Precaution

- Ectopic pregnancy should be excluded, and intra-uterine gestation confirmed before the medical abortion. The medical abortion regimen will not terminate the ectopic pregnancy
- Fertility can return within two weeks therefore all patients should be given post-abortion contraception where eligible
- Access to appropriate medical care must be assured in case an emergency develops; the patient should be given clear verbal and written instructions on whom she should contact and where to go in case of concerns or suspected complications

This chapter presents the management of sick infant and child up to age 5, following the WHO syndromic approach IMNCI.

Additional information about management of childhood illnesses can be found in specific sections:

TOPIC	REFERENCE SECTION
Care of the new born	See chapter 16
Immunisable diseases and other infectious diseases	See chapter 1 INFECTIONS and BODY SYSTEM CHAPTERS
HIV care in children	See chapter 3 HIV/AIDS

TOPIC	REFERENCE SECTION
Immunisation	See chapter 18 IMMUNISATION
Manutrition rehabilitation	See chapter 19 NUTRITION
Sickle cell disease	See chapter 11 BLOOD DISORDERS

## IMNCI (Integrated Management of Newborn and Childhood Illnesses)

The following guidelines use a syndromic approach to the management of common childhood conditions at Primary Health Care Level and should be followed page-by-page.

The general approach used involves 5 main steps:

- Assess the child
- Classify the illness
- Identify and provide the required treatment
- Counsel the mother
- Provide FOLLOW UP support

There are 3 sections, based on age:

- Sick newborn (1st week of life)
- Sick infant (up to 2 months)
- Sick child (2 months to 5 years)

# 17 Childhood Illness

## 17.1 SICK NEWBORN

### 17.1.1 Newborn Examination/Danger Signs

Use the following procedures to examine all newborn babies after delivery, before discharge or if baby is seen as an outpatient for routine, FOLLOW UP, or sick newborn visit during first week of life.

Ask If first visit	Look, listen, feel
<ul style="list-style-type: none"><li>● How old is the baby? Where was the baby born?</li><li>● Who delivered the baby? Check infant record for risk factors</li><li>● What was birth weight? LBW? Preterm? Twin?</li><li>● Any problem at birth? Breech? Difficult birth? Was resuscitation done?</li></ul> <p><b>Ask the mother</b></p> <ul style="list-style-type: none"><li>- Has the baby had any convulsions?</li><li>- Does the baby have frequent heavy vomiting?</li><li>- How is the baby feeding? Any feeding problems?</li><li>- How many times has baby breastfed in last 24 hours?</li><li>- Is baby satisfied with feeds? Have you fed baby any other food or drinks?</li><li>- Has baby breastfed in previous hour?</li><li>- How do your breasts feel?</li><li>- Do you have any other concerns?</li></ul>	<ul style="list-style-type: none"><li>● Assess breathing (baby must be calm)<ul style="list-style-type: none"><li>- Count breaths (normal: 30-60/min)</li><li>- Assess for grunting/chest in-drawing</li><li>- Check SpO2 if available</li></ul></li><li>● Look at the movements: normal and symmetrical?</li><li>● Look at the presenting part for swelling or bruises</li><li>● Check abdomen for pallor and distention</li><li>● Look for malformations</li><li>● Feel the tone: nomal?</li><li>● Feel for warmth and check temperature</li><li>● Weigh the baby</li><li>● Observe a breastfeed: Is the baby able to attach? Suckling effectively? Well-positioned?</li><li>● Look for ulcers and white patches in the mouth (thrush)</li></ul>

If danger signs present, treat as below

SIGNS	CLASSIFY	TREAT
<b>Any of the following</b> <ul style="list-style-type: none"> <li>⦿ Respiratory rate &gt; 60 or &lt; 30 or grunting or gasping</li> <li>⦿ Severe chest indrawing or cyanosis</li> <li>⦿ Not feeding well</li> <li>⦿ Convulsions</li> <li>⦿ Abdominal overdistension</li> <li>⦿ Heart rate constantly &gt; 180 beats per minutes</li> <li>⦿ Floppy or stiff body or no spontaneous movements</li> <li>⦿ Temperature &gt; 37.5 or &lt; 35.5 C after warming</li> <li>⦿ Umbilicus draining pus, redness/ swelling extended to skin</li> <li>⦿ Skin pustules &gt;10 or bullae or skin swelling and harness</li> <li>⦿ Bleeding from stump or cut</li> <li>⦿ Pallor</li> </ul>	<b>Possible Serious Illness</b> (see section 2.1.7.1, neonatal sepsis, 2.1.5.1 meningitis, 2.1.8.1 tetanus)	<input type="checkbox"/> Give ampicillin 50 mg/kg IM every 12 hours plus gentamicin 5 mg/kg every 24 hours (4 mg/kg if preterm) <input type="checkbox"/> Refer baby to hospital <input type="checkbox"/> If referral not possible continue treatment for 7 days <input type="checkbox"/> Keep baby warm <input type="checkbox"/> Clean infected umbilicus and pustules and apply Gentian Violet <input type="checkbox"/> If risk of staphylococcus infection, give cloxacillin 50 mg/Kg IV/IM every 6 hours and gentamicin 5-7 mg/Kg every 24 hours



## If no danger signs present, classify and treat as below

SIGNS	CLASSIFY	MANAGE BY/ADVISE ON
⦿ Feeding well (suckling effectively >8 times in 24 hours)	Well Baby	<input type="checkbox"/> Continue exclusive breastfeeding on demand <input type="checkbox"/> Ensure warmth, cord care, hygiene, other baby care if Routine visit at age 3-7 days <input type="checkbox"/> Next immunization at 6 weeks if When to return if danger signs f Record on home-based record
⦿ Weight >2,500 g or small baby but eating and gaining weight well		<input type="checkbox"/> If first visit (baby not delivered in health facilities) give Vitamin K 1 mg IM <input type="checkbox"/> Tetraacycline eye ointment
⦿ No danger signs		
⦿ No special treatment needs		
⦿ Receiving other foods/ drinks or given pacifier	Feeding Problem	<input type="checkbox"/> Stop other food/drinks <input type="checkbox"/> Feed more frequently, day and night. Reassure mother she has enough milk



SIGNS	CLASSIFY	MANAGE BY/ADVISE ON
<ul style="list-style-type: none"> <li>Ⓐ Breastfeeding &lt;8 times/ 24 hours</li> <li>Ⓐ Not well attached/ not suckling well</li> </ul>		<ul style="list-style-type: none"> <li><input type="checkbox"/> Ensure correct positioning/ attachment</li> <li><input type="checkbox"/> If thrush: teach how to treat at home (apply gentian violet paint 4 times daily for 7 days with clean hands, use a soft cloth)</li> </ul>
<ul style="list-style-type: none"> <li>Ⓐ Thrush</li> <li>Ⓐ Poor weight gain</li> </ul>	Feeding Problem	<ul style="list-style-type: none"> <li><input type="checkbox"/> FOLLOW UP visit in 2 days, re-check weight</li> <li><input type="checkbox"/> If no improvement: Refer for breastfeeding counselling</li> </ul>
<ul style="list-style-type: none"> <li>Ⓐ Thrush</li> <li>Ⓐ Poor weight gain</li> </ul>	Feeding Problem	<ul style="list-style-type: none"> <li><input type="checkbox"/> FOLLOW UP visit in 2 days, re-check weight</li> <li><input type="checkbox"/> If no improvement: Refer for breastfeeding counselling</li> </ul>
Ⓐ Preterm	Small Baby	<ul style="list-style-type: none"> <li><input type="checkbox"/> Provide as close to continuous Kangaroo mother care as possible to prevent hypothermia</li> <li><input type="checkbox"/> Give special support to breastfeed small baby/twins</li> </ul>
<ul style="list-style-type: none"> <li>Ⓐ Preterm</li> <li>Ⓐ Low birth weight (LBW) 1,500–2,500g</li> </ul>		<ul style="list-style-type: none"> <li><input type="checkbox"/> Teach mother how to care for a small baby</li> <li><input type="checkbox"/> Teach alternative feeding method (cup feeding)</li> </ul>

SIGNS	CLASSIFY	MANAGE BY/ADVISE ON
⦿ Twin		<input type="checkbox"/> Assess daily (if admitted) or every 2 days (if outpatient) until feeding and growing well <input type="checkbox"/> If twins, discharge them only when both are fit to go home
⦿ Very Low Birth weight < 1,500 g	Very Small Baby	<input type="checkbox"/> Refer urgently to hospital for special care <input type="checkbox"/> Ensure extra warmth during referral
⦿ Very preterm (< 32 weeks)		
⦿ Mother very ill/ receiving special treatments	Mother unable to take care of Baby	<input type="checkbox"/> Help mother to express breastmilk (to maintain lactation) <input type="checkbox"/> Consider other feeding methods until mother can breastfeed <input type="checkbox"/> Ensure warmth using other methods <input type="checkbox"/> Cord care and hygiene <input type="checkbox"/> Monitor daily
⦿ Mother transferred		

## 17.1.2 Assess for Special Treatment Needs, Local Infection, and Jaundice

Ask (check records)	Look Listen and feel
<ul style="list-style-type: none"> <li>⦿ Has the mother had (within 2 days of delivery) fever &gt; 38 C and/or infection treated with antibiotic?</li> <li>⦿ Did the mother have membrane ruptured &gt; 18 hours before delivery?</li> <li>⦿ Has the mother tested RPR positive?</li> <li>⦿ Has the mother started TB treatment &lt; 2 months ago?</li> <li>⦿ Is the mother HIV positive? is she on ARVs?</li> <li>⦿ Has anything been applied to the umbilicus?</li> </ul>	<ul style="list-style-type: none"> <li>⦿ Eyes: Swollen and draining pus?</li> <li>⦿ Umbilicus: Red and draining pus?</li> <li>⦿ Skin: Many or severe pustules? Swelling, hardness or large bullae?</li> <li>⦿ Jaundice: check face if baby &lt; 24 hours, check palms and soles if &gt; 24 hours</li> <li>⦿ Movements: Less than normal? Limbs moving symmetrically?</li> <li>⦿ Presenting part (head or buttocks): Swelling, bruising?</li> <li>⦿ Any malformation?</li> </ul>



## Classify and treat as below

SIGNS	CLASSIFY	MANAGE BY/ADVISE ON
<ul style="list-style-type: none"> <li>○ Baby &lt; 1 day old and membrane ruptured &gt; 18 hours</li> <li>○ Mother with fever and/or on antibiotics</li> </ul>	Risk of Bacterial Infection	<ul style="list-style-type: none"> <li><input type="checkbox"/> Give ampicillin 50 mg/kg every 12 hours plus gentamicin 5 mg/kg (4 mg if pre-term) once daily for 5 days</li> <li><input type="checkbox"/> Assess baby daily</li> </ul>
<ul style="list-style-type: none"> <li>○ Mother tested RPR positive</li> </ul>	Risk of Congenital Syphilis	<ul style="list-style-type: none"> <li><input type="checkbox"/> Give baby single dose benzathine penicillin 50,000 IU/ kg IM</li> <li><input type="checkbox"/> Ensure mother and partner are treated (see section 3.2.7)</li> <li><input type="checkbox"/> FOLLOW UP every 2 weeks</li> </ul>
<ul style="list-style-type: none"> <li>○ Mother started TB treatment &lt;2 months before delivery</li> </ul>	Risk of TB	<ul style="list-style-type: none"> <li><input type="checkbox"/> Give baby prophylaxis with isoniazid 5 mg/kg daily for 6 months</li> <li><input type="checkbox"/> Vaccinate with BCG only after treatment completed</li> <li><input type="checkbox"/> Reassure breastfeeding is safe</li> <li><input type="checkbox"/> FOLLOW UP every 2 weeks</li> </ul>

SIGNS	CLASSIFY	MANAGE BY/ADVISE ON
⦿ Mother known HIV positive	Risk of HIV	<input type="checkbox"/> Give ARV prophylaxis as per national guidelines (see section 3.1.9.3) <input type="checkbox"/> Counsel on infant feeding <input type="checkbox"/> Special counselling if mother breastfeeding <input type="checkbox"/> FOLLOW UP every 2 weeks
⦿ Eyes swollen, draining pus	Gonococcal Eye Infection (Possible Chlamydia Coinfection) (see section 3.2.9.1)	<input type="checkbox"/> Give ceftriaxone 125 mg IM stat plus azithromycin syrup 20 mg/kg daily for 3 days <input type="checkbox"/> Teach mother how to treat eye infection at home (clean eyes with clean wet cloth and apply tetracycline ointment 3 times day) <input type="checkbox"/> Assess and treat mother and partner for possible gonorrhoea and chlamydia (see section 3.2.1-3.2.2) <input type="checkbox"/> FOLLOW UP in 2 days If no improvement: Refer urgently to hospital
⦿ Red umbilicus	Local Umbilical Infection	<input type="checkbox"/> Teach mother how to treat at home (wash crust and pus with boiled cooled water, dry and apply Gentian Violet 0.5% 3 times a day) <input type="checkbox"/> FOLLOW UP in 2 days <input type="checkbox"/> If not improved, reclassify and treat or refer

SIGNS	CLASSIFY	MANAGE BY/ADVISE ON
⦿ <10 pustules	Local Skin Infection	<input type="checkbox"/> Teach mother to how to treat infection at home (wash crust and pus with boiled cooled water, dry and apply Gentian Violet 0.5% 3 times a day) <input type="checkbox"/> Reassess after 2 days <input type="checkbox"/> If not improved, reclassify and treat or refer
⦿ Yellow face (<24 hours old) or ⦿ Yellow palms and soles (>24 hours old)	Severe Jaundice	<input type="checkbox"/> Refer urgently to hospital <ul style="list-style-type: none"> <li>- Encourage breastfeeding</li> <li>- If breastfeeding problem, give expressed milk by cup</li> </ul>
⦿ Bruises or swelling on buttocks ⦿ Swollen head - bump on one or both sides	Birth Injury	<input type="checkbox"/> Explain to parents that it does not hurt the baby and it will disappear in 1 or 2 weeks by itself <input type="checkbox"/> DO NOT force the leg into a different position <input type="checkbox"/> Gently handle the limb that is not moving, do not pull

SIGNS	CLASSIFY	MANAGE BY/ADVISE ON
<ul style="list-style-type: none"> <li>Ⓐ Abnormal position of legs after breech presentation</li> <li>Ⓐ Asymmetrical arm movement or arm does not move</li> </ul>		<ul style="list-style-type: none"> <li><input type="checkbox"/> Refer for special evaluation and treatment</li> <li><input type="checkbox"/> Help mother breastfeed or teach mother alternative method if not possible</li> <li><input type="checkbox"/> Cover open tissue with sterile gauze soaked in sterile saline solution before referral</li> </ul>
<ul style="list-style-type: none"> <li>Ⓐ Club foot</li> <li>Ⓐ Cleft palate or lip</li> <li>Ⓐ Odd looking unusual appearance</li> <li>Ⓐ Open tissue on the head/ abdomen/ back/ perineum or genitalia</li> </ul>	<ul style="list-style-type: none"> <li>Malformation</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/></li> <li><input type="checkbox"/></li> <li><input type="checkbox"/></li> </ul>

## 17.2 SICK YOUNG INFANT AGE UP TO 2 MONTHS

- Ask the mother what the child's problems are
- Check if this is an initial or FOLLOW UP visit for this problem
- If FOLLOW UP visit: Check up on previous treatments
- If initial visit: Continue as below

### Assess, classify and treat for the following:

- Severe disease and local bacterial infection
- Jaundice
- Diarrhoea and dehydration
- HIV
- Feeding and weight problems
- Any other problem
- Immunization status

### Counsel the mother on

- Nutrition and breastfeeding of the child
- Her own health needs
- To return for FOLLOW UP as scheduled
- To return immediately at the clinic if the danger signs in the table below appear:

DANGER SIGN	RETURN
<input checked="" type="radio"/> Breastfeeding or drinking poorly	Immediately
<input checked="" type="radio"/> Becomes more ill	
<input checked="" type="radio"/> Develops fever	
<input checked="" type="radio"/> Fast or difficult breathing	
<input checked="" type="radio"/> Blood in stool	

## 17.2.1 Check for Very Severe Disease and Local Bacterial Infection

Ask	Look, listen, feel
<p>Ask if the infant is having difficulty in feeding?</p> <p><input checked="" type="radio"/> Has the infant had any convulsions?</p>	<ul style="list-style-type: none"><li><input checked="" type="radio"/> Count the number of breaths per minute (INFANT MUST BE CALM)<ul style="list-style-type: none"><li>- Repeat the count if this is &gt; 60 breaths per minute</li></ul></li><li><input type="radio"/> Look for severe chest indrawing and nasal flaring</li><li><input type="radio"/> Look and listen for grunting</li><li><input type="radio"/> Look and feel for a bulging fontanel</li><li><input type="radio"/> Look for pus draining from the ear</li><li><input type="radio"/> Look at the umbilicus. Is it red or draining pus?</li><li><input type="radio"/> Does the redness extend to the skin?</li><li><input type="radio"/> Measure the body temperature (or feel for fever or low body temperature)</li><li><input type="radio"/> Look for skin pustules, if present, are they many or severe?</li><li><input type="radio"/> See if the young infant is lethargic or unconscious</li><li><input type="radio"/> Observe the young infant's movements<ul style="list-style-type: none"><li>- Are they less than normal?</li><li>- Observe the young infant for any spasms (differentiate from convulsions)</li><li>- Check if young infant has stiff neck or lock jaw</li><li>- Feel the young infants abdomen for rigidity</li></ul></li></ul>

**Classify and treat possible infection as in the table below:**

SIGNS	CLASSIFY AS	TREATMENT
<b>Any of the following:</b> <ul style="list-style-type: none"> <li>Ⓐ Not feeding well or</li> <li>Ⓐ Convulsions or</li> <li>Ⓐ Fast breathing (&gt;60 breaths/min) or</li> <li>Ⓐ Severe chest in drawing or</li> <li>Ⓐ Fever (<math>&gt;37.5^{\circ}\text{C}</math> or feels hot)</li> <li>Ⓐ Low body temp (<math>&lt;35.5^{\circ}\text{C}</math> or feels cold)</li> <li>Ⓐ Movement when stimulated or no movements at all</li> <li>Ⓐ Blood in stool</li> </ul>	Very Severe Disease	<input type="checkbox"/> Give 1st dose of IM antibiotics: ampicillin 50 mg/kg plus gentamicin 5 mg/kg (if $<7$ days) or 7.5 mg/kg (if $>7$ days) <input type="checkbox"/> Or if HC2, Benzylpenicillin 50,000 IU/Kg IM single pre referral dose <input type="checkbox"/> Treat to prevent low blood sugar (breastfeed or give expressed breast milk or sugar water by cup or NGT) <input type="checkbox"/> Advise mother how to keep infant warm on the way to hospital <input type="checkbox"/> Refer URGENTLY to Hospital <b>If referral not possible,</b> <input type="checkbox"/> Continue ampicillin (twice daily if $<7$ days, thrice daily if $>7$ days) <input type="checkbox"/> Gentamicin once daily for at least 5 days

SIGNS	CLASSIFY AS	TREATMENT
<b>Any of the following:</b> <input checked="" type="radio"/> Umbilicus red or discharging pus <input checked="" type="radio"/> Skin pustules	Local Bacterial Infection	<input type="checkbox"/> Give appropriate oral antibiotic: amoxicillin 250 mg DT tab (if below 1 month, 4 kg) or $\frac{1}{2}$ tab (if 1-2 months, 4-6 kg) every 12 hours for 5 days <input type="checkbox"/> Teach mother to treat local infection at home (apply Gentian Violet paint twice daily for five days) <input type="checkbox"/> Advise mother on home care for the young infant if FOLLOW UP in two days: - If better: praise the mother, advise to complete treatment - If same or worse: refer to hospital
None of the signs of very severe disease or local bacterial infection	Severe Disease or Local Infection Unlikely	<input type="checkbox"/> Continue assessment of other problems <input type="checkbox"/> Advise mother to give home care
<b>Notes</b>		<input type="checkbox"/> Body temperatures are based on axillary measurement <input type="checkbox"/> Rectal readings are approximately 0.5 C higher

## 17.2.2 Check for Jaundice

If jaundice present, Ask	Look and feel
<ul style="list-style-type: none"> <li>Ⓐ When did the jaundice appear first?</li> </ul>	<ul style="list-style-type: none"> <li>Ⓐ Look for jaundice (yellow eyes or skin)</li> <li>Ⓑ Look at the young infant's palms and soles. Are they yellow?</li> </ul>

Classify jaundice as in the following table

SIGNS	CLASSIFY AS	TREATMENT
<ul style="list-style-type: none"> <li>Ⓐ Any jaundice if age less than 24 hours or</li> <li>Ⓑ yellow palms and soles at any age</li> </ul>	Severe Jaudice	<ul style="list-style-type: none"> <li><input type="checkbox"/> Treat to prevent low blood sugar (breast-feed or give expressed breast milk or sugar water by cup or NGT)</li> <li><input type="checkbox"/> Refer urgently to hospital</li> <li><input type="checkbox"/> Advise mother to keep infant warm .</li> <li><input type="checkbox"/> Advise mother to give home care for the young infant</li> <li><input type="checkbox"/> Advise mother to return immediately if palms and soles appear yellow</li> <li><input type="checkbox"/> If the young infant is older than 14 days refer to hospital for assessment</li> </ul>

SIGNS	CLASSIFY AS	TREATMENT
<ul style="list-style-type: none"> <li>Ⓐ Jaundice appearing after 24 hours of age and</li> <li>Ⓑ Palms and soles not yellow</li> </ul>	Jaundice	<p><input type="checkbox"/> FOLLOW UP in one day:</p> <ul style="list-style-type: none"> <li>- If palms and soles are yellow, refer to hospital</li> <li>- If palms and soles are not yellow but jaundice has not decreased, advise FOLLOW UP in one day</li> <li>- If jaundice is decreasing, reassure mother and</li> <li>- FOLLOW UP in two weeks</li> <li>- If still there in 2 weeks, refer to hospital</li> </ul>
<ul style="list-style-type: none"> <li>Ⓐ No jaundice</li> </ul>	No Jaundice	<p><input type="checkbox"/> Advise mother to give home care for the young infant</p> <p><input type="checkbox"/> Continue assessment for other problems</p>

### 17.2.3 Check for Diarrhoea/Dehydration

Ask	If yes, Look and feel
<ul style="list-style-type: none"> <li>Ⓐ If child has diarrhoea</li> <li>Ⓑ If yes, ask for how long it has been present</li> </ul>	<p><input type="checkbox"/> Infant's movements</p> <ul style="list-style-type: none"> <li>- Does the infant move on his/her own?</li> <li>- Does the infant move when stimulated but then stops?</li> <li>- Does the infant not move at all?</li> <li>- Is the infant restless and irritable?</li> <li>- Check the eyes. Are they sunken?</li> </ul>

	<ul style="list-style-type: none"> <li>- Pinch the skin of the abdomen. Does it go back</li> <li>- Very slowly? (takes &gt;2 seconds)</li> <li>- Slowly? (up to 2 seconds)</li> </ul>
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**Classify and treat the dehydration and diarrhoea as in the table below**

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
For dehydration (see also section 1.1.3.1)		
Two of these signs: <input checked="" type="radio"/> Movement only when	Severe Dehydration	If infant has no other severe classification: <input type="checkbox"/> Give fluid for severe dehydration (Plan C) OR
stimulated or no movement at all  <input checked="" type="radio"/> Sunken eyes  <input checked="" type="radio"/> Skin pinch goes back very slowly.		<b>If infant also has another severe classification:</b> <input type="checkbox"/> Refer URGENTLY to hospital with mother giving frequent sips of ORS on the way <input type="checkbox"/> Advise the mother to continue breastfeeding
<b>Two of these signs:</b> <input checked="" type="radio"/> Restless, irritable	Some Dehydration	<input type="checkbox"/> Give Plan B (Give fluid and breast milk for some dehydration) <input type="checkbox"/> Advise mother when to return immediately

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
<ul style="list-style-type: none"><li>Ⓐ Sunken eyes</li><li>Ⓑ Skin pinch returns slowly (up to 2 seconds)</li></ul>		<ul style="list-style-type: none"><li><input type="checkbox"/> FOLLOW UP in 2 days:<ul style="list-style-type: none"><li>- If better, praise the mother and advice to continue breastfeeding</li><li>- If not better, reassess and treat accordingly</li></ul></li><li>If infant also has another severe classification:<ul style="list-style-type: none"><li><input type="checkbox"/> Refer URGENTLY to hospital with mother giving frequent sips of ORS on the way</li><li><input type="checkbox"/> Advise the mother to continue breastfeeding</li></ul></li></ul>

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
<ul style="list-style-type: none"> <li>⦿ Not enough signs to classify</li> <li>⦿ as some or severe dehydration</li> <li>⦿</li> </ul>	No Dehydration	<ul style="list-style-type: none"> <li><input type="checkbox"/> Give fluids to treat diarrhoea at home and continue breast feeding (Plan A)</li> <li><input type="checkbox"/> Advise mother when to return immediately</li> <li><input type="checkbox"/> FOLLOW UP in two days                             <ul style="list-style-type: none"> <li>- If better, praise the mother and advice to continue breastfeeding</li> <li>- If not better, reassess and treat accordingly</li> </ul> </li> </ul>
<b>If diarrhoea of &gt; 14 days</b>		
<ul style="list-style-type: none"> <li>⦿ Diarrhoea lasting 14 days or more</li> </ul>	Severe Persistent Diarrhoea	<ul style="list-style-type: none"> <li><input type="checkbox"/> Refer to hospital</li> <li><input type="checkbox"/> Treat dehydration before referral</li> </ul>
<b>Note</b> <ul style="list-style-type: none"> <li>■ What is diarrhoea in a young infant?                             <ul style="list-style-type: none"> <li>- A young infant has diarrhoea if the stools have changed from usual pattern and are many and watery (more water than faecal matter).</li> <li>- The normally frequent or semi-solid stools of a breastfed baby are not diarrhoea.</li> </ul> </li> </ul>		

## 17.2.4 Check for HIV Infection

### Ask

- Has the mother and/or young infant had an HIV test?

### IF YES:

- What is the mother's HIV status?
  - Serological test POSITIVE or NEGATIVE
- What is the young infant's HIV status?
  - Virological test POSITIVE or NEGATIVE
  - Serological test POSITIVE or NEGATIVE

If mother is HIV positive (or serological test of the child is positive) and NO positive virological test in child ASK:

- Is the young infant breastfeeding now?
- Was the young infant breastfeeding at the time of test or before it?
- Is the mother and young infant on PMTCT ARV prophylaxis?

### IF NO test: Mother and young infant status unknown

- Perform serological HIV test for the mother (or serological test for the child if the mother is not present); if positive, perform virological test for the young infant



## Classify and treat HIV status (see also section 3.1.4)

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
<ul style="list-style-type: none"> <li>○ Positive virological testing in young infant</li> </ul>	Confirmed HIV Infection	<ul style="list-style-type: none"> <li><input type="checkbox"/> Give cotrimoxazole prophylaxis from age 6 weeks.</li> <li><input type="checkbox"/> Give HIV care and ART</li> <li><input type="checkbox"/> Advise the mother on home care</li> <li><input type="checkbox"/> FOLLOW UP regularly as per national guidelines</li> </ul>
<ul style="list-style-type: none"> <li>○ Mother HIV positive AND negative virological test in young infant breastfeeding or if only stopped less than 6 weeks ago. OR</li> <li>○ Mother HIV positive **, young infant not yet tested OR</li> <li>○ Positive serological test in infant</li> </ul>	HIV Exposed	<ul style="list-style-type: none"> <li><input type="checkbox"/> Give cotrimoxazole prophylaxis from 6 weeks of age</li> <li><input type="checkbox"/> Start or continue PMTCT ARV prophylaxis as per national recommendations</li> <li><input type="checkbox"/> Do virological test at age 6 weeks or repeat 6 weeks after the child stops breastfeeding</li> <li><input type="checkbox"/> Advise the mother on home care</li> <li><input type="checkbox"/> FOLLOW UP regularly as per national guidelines</li> </ul>
<ul style="list-style-type: none"> <li>○ Negative HIV test in mother or young infant</li> </ul>	HIV Infection Unlikely	<ul style="list-style-type: none"> <li><input type="checkbox"/> Treat, counsel and FOLLOW UP existing infections</li> </ul>

## 17.2.5 Check for Feeding Problem or Low Weight-for-Age

### 17.2.5.1 All Young Infants Except HIV-exposed Infants Not Breastfed

<p>If an infant has no indications to refer urgently to hospital:</p>	<p><b>Look listen and feel</b></p>
<p><b>Ask</b></p> <ul style="list-style-type: none"> <li>Ⓐ Is there any difficulty feeding?</li> <li>Ⓐ Is the infant breastfed? <ul style="list-style-type: none"> <li>- If yes, how many times in a 24-hour period?</li> </ul> </li> <li>Ⓐ Does the infant usually receive any other foods or drinks, including water? <ul style="list-style-type: none"> <li>- If yes, how often?</li> </ul> </li> <li>Ⓐ What do you use to feed the infant?</li> </ul>	<ul style="list-style-type: none"> <li>Ⓐ Determine weight for age <ul style="list-style-type: none"> <li>- Weigh the child and use the chart at the end of this chapter to determine if the child is low weight for its age in months</li> </ul> </li> <li>Ⓐ Look for ulcers or white patches in the mouth (thrush)</li> </ul>
<p><b>Assess breastfeeding</b></p> <ul style="list-style-type: none"> <li>Ⓐ Has the infant breastfed in the previous hour? <ul style="list-style-type: none"> <li>- If no, ask the mother to put the infant to the breast.</li> <li>- If yes, ask the mother if she can wait and tell you when the infant is willing to feed again</li> </ul> </li> <li>Ⓐ Observe breastfeeding for 4 minutes: is the infant able to attach properly to the breast? For good attachment, the following should be present: <ul style="list-style-type: none"> <li>- Chin touching breast</li> <li>- Mouth wide open</li> <li>- Lower lip turned outwards</li> <li>- More areola visible above than below the mouth</li> </ul> </li> <li>Ⓐ Is the infant able to suckle effectively? This means slow, deep sucks with occasional pauses <ul style="list-style-type: none"> <li>- Clear a blocked nose if it interferes with breastfeeding</li> </ul> </li> </ul>	



## Classify and treat feeding problems

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
<b>Any of these signs</b> <b>Feeding</b> Not well attached to breast or Not sucking effectively or Less than 8 breastfeeds in 24 hours or Receives other foods or drinks or Low weight for age or Thrush (ulcers or white patches in mouth)	Feeding Problem or Low Weight	<ul style="list-style-type: none"> <li><input type="checkbox"/> If not well attached or not sucking effectively, teach correct positioning and attachment               <ul style="list-style-type: none"> <li>- If not able to attach well immediately, teach the mother to express breast milk and feed by a cup</li> </ul> </li> <li><input type="checkbox"/> If breastfeeding less than 8 times in 24 hours, advise to increase frequency of feeding. Advise the mother to breastfeed as often and as long as the infant wants, day and night</li> <li><input type="checkbox"/> If not breastfeeding at all</li> <li><input type="checkbox"/> Advise the mother how to feed and keep the low weight infant warm at home</li> <li><input type="checkbox"/> If thrush, teach the mother to treat thrush at home (apply gentian violet paint 4 times daily for 7 days with clean hands, use a soft cloth)</li> </ul>

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
		<p><input type="checkbox"/> Advise mother to give home care for the young infant</p> <p><input type="checkbox"/> FOLLOW UP any feeding problem or thrush in 2 days and reassess.</p> <ul style="list-style-type: none"> <li>- Continue FOLLOW UP till satisfactory feeding. If losing weight, refer.</li> <li>- If thrush is worse, check that treatment is given correctly. If better, complete 7-day treatment.</li> </ul> <p><input type="checkbox"/> FOLLOW UP low weight for age in 14 days:</p> <ul style="list-style-type: none"> <li>- If no longer low weight for age, praise the mother and encourage to continue.</li> <li>- If still low weight for age but feeding well, praise the mother and FOLLOW UP in 14 days</li> <li>- If low weight for age, still feeding problem or lost weight: refer to hospital</li> </ul>

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
<ul style="list-style-type: none"> <li>Ⓐ Not low weight for age and no other signs of inadequate feeding</li> </ul>	No Feeding Problem	<ul style="list-style-type: none"> <li><input type="checkbox"/> Advise mother on home care for young infant</li> <li><input type="checkbox"/> Praise mother for feeding the infant well</li> </ul>

### 17.2.5.2 HIV-exposed Non Breastfeeding Infants

Ask	Look, listen and feel
<ul style="list-style-type: none"> <li>Ⓐ What milk are you giving?</li> <li>Ⓐ How many times during the day and night?</li> <li>Ⓐ How much is given at each feed?</li> <li>Ⓐ How are you preparing the milk?</li> <li>Ⓐ Let mother demonstrate or explain how a feed is prepared, and how it is given to the infant.</li> <li>Ⓐ Are you giving any breast milk at all?</li> <li>Ⓐ What foods and fluids in addition to replacement feeds is given?</li> <li>Ⓐ How is the milk being given? Cup or bottle?</li> <li>Ⓐ How are you cleaning the feeding utensils?</li> </ul>	<ul style="list-style-type: none"> <li>Ⓐ Determine weight for age</li> <li>Ⓐ Look for ulcers or white patches in the mouth (thrush)</li> </ul>

## Classify and treat feeding problems

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
➊ Milk incorrectly or unhygienically prepared or	Feeding Problem or Low Weight	<input type="checkbox"/> Counsel about feeding <input type="checkbox"/> Explain the guidelines for safe replacement feeding f Identify concerns of mother and family about feeding f If mother is using a bottle, teach cup feeding f Advise the mother how to feed and keep infant warm at home
➋ Giving inappropriate replacement feeds or		<input type="checkbox"/> If thrush, teach the mother to treat thrush at home (apply gentian violet paint 4 times daily for 7 days with clean hands, use a soft cloth)
⌾ Giving insufficient replacement feeds or		<input type="checkbox"/> Advise mother to give home care for the young infant
⌽ An HIV positive mother		<input type="checkbox"/> FOLLOW UP any feeding problem or thrush in 2 days
⌽ mixing breast and other feeds before 6 months or		- Continue FOLLOW UP till satisfactory feeding. If loosing weight, refer - If thrush is worse, check that treatment is given correctly. If better, complete 7-day treatment
Using a feeding bottle or.		

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
<input checked="" type="radio"/> Low weight for age or Thrush (ulcers or white patches in mouth)		<p><input type="checkbox"/> FOLLOW UP low weight for age in 14 days</p> <ul style="list-style-type: none"> <li>- If no longer low weight for age, praise the mother and encourage to continue.</li> <li>- If still low weight for age but feeding well, praise the mother and FOLLOW UP in 14 days</li> <li>- If low weight for age, still feeding problem or lost weight: refer to hospital</li> </ul>
<input checked="" type="radio"/> Not low weight for age and no other signs of inadequate feeding	No Feeding Problem	<p><input type="checkbox"/> Advise mother to give home care for the young infant</p> <p><input type="checkbox"/> Praise the mother for feeding the infant well</p>

## 17.2.6 Check Young Infant's Immunization Status

Check immunization card and classify

<input type="radio"/> Immunization not up to date according to national schedule (see chapter 18)	Infant Not Immunized as per Schedule	<input type="radio"/> Give all missed doses on this visit (Include sick infants unless being referred)
<input type="radio"/> Immunization upto date as per national schedule	Infant Immunized as Per Schedule	<input type="radio"/> Advise caretaker when to return for the next dose

## 17.2.7 Assess Other Problems

Assess any other presenting problems (e.g. eye problems, rashes) and manage accordingly.

## 17.2.8 Assess Mother's Health Needs

- Check for current health problems
- Check nutritional status and anaemia
- Check whether family planning help is required
- Check on tetanus immunization status

## 17.2.9 Summary of IMNCI Medicines Used for Young Infants

DRUG	DOSE	INDICATION	LOC
Ampicillin	50 mg/kg	Pre referral IM dose in very severe disease	HC3

DRUG	DOSE	INDICATION	LOC
Gentamicin	Age < 7 days 5 mg/Kg	Pre referral IM dose in very severe disease	HC3
	Age > 7 days 7.5 mg/kg		
Benzyl penicillin	50,000 IU/Kg IM	Pre referral IM dose in very severe disease if ampicillin/ gentamicin not available	HC2
	Birth-<1 month (< 4 kg): tab every 12 hours for 5 days 1-2 month (4-6 kg): ½ tab every 12 hours for 5 days		
Amoxicillin 250 mg dispersible tablets (DT)	Birth-<1 month (< 4 kg): tab every 12 hours for 5 days 1-2 month (4-6 kg): ½ tab every 12 hours for 5 days	In local bacterial infection	HC1
	Apply in the mouth 4 times a day for 7 days	In oral thrush	
Gentian Violet 0.5%	Apply on skin twice daily for 5 days	Local bacterial infection (skin pustules or umbilical infection)	HC2
	1 tab once daily	Prophylaxis in HIV infected or HIV exposed children till infection can be excluded	
Cotrimoxazole Tab 120 mg pediatric tablet			HC2

### 117.2.10 Counsel the Mother

Teach correct positioning and attachment for breast feeding

- Show mother how to hold the infant:
- With the infant's head and body straight

- Facing her breast with infant's nose opposite the nipple
- With infant's body close to hers
- Supporting the infant's whole body, not just the neck and shoulders
- Show her how to help the infant attach, she should:
  - Touch her infant's lips with her nipple
  - Wait until her infant's mouth opens wide
  - Move her infant quickly onto her breast aiming the infant's lower lip well below the nipple
  - Look for signs of good attachment and effective suckling
  - If either is not good, try again

#### Advise mother on home care for the young infant

- Food and fluids: Breastfeed frequently on demand (as often and for as long as the infant wants) day and night, during sickness and health
- Warmth: Ensure the young infant is always warm

### 17.3 SICK CHILD AGE 2 MONTHS TO 5 YEARS

#### Assess, classify, and treat

- Ask the mother what the child's problems are
- Check if this is an initial or FOLLOW UP
  - If FOLLOW UP visit: Check up on previous problems, check that the treatment has been given correctly and assess any new problems
  - If initial visit: Continue as below

#### In assessing a sick child, assess for the following:

- General danger signs: URGENT ATTENTION and ACTION REQUIRED.

#### Then check for:

- Cough or difficult breathing



- Diarrhoea and dehydration
- Fever
- Ear problems
- Malnutrition and feeding problems
- Anaemia
- HIV
- Immunization, deworming and vitamin A
- Any other problem

**Then counsel the mother on**

- Extra fluids for any sick child
  - Nutrition and breastfeeding of the child
  - How to give home treatments
  - Her own health needs
  - To return for FOLLOW UP as scheduled
- To return immediately if any danger sign appear

DANGER SIGN	RETURN
<input type="radio"/> Breastfeeding or drinking poorly <input type="radio"/> Becomes more ill	
<input type="radio"/> Develops fever <input type="radio"/> Fast or difficult breathing <input type="radio"/> Blood in stool	<b>Immediately</b>

### 17.3.21 Check for General Danger Signs

Ask	Look
<input type="radio"/> Is the child unable to drink or breastfeed <input type="radio"/> Is the child vomiting everything <input type="radio"/> Has the child had convulsions	<input type="radio"/> See if the child lethargic or unconscious <input type="radio"/> Is the child convulsing now

## Classify and treat as below

CLINICAL FEATURE	CLASSIFY AS	MANAGEMENT
<ul style="list-style-type: none"> <li>Ⓐ Any general danger sign</li> </ul>	Very Severe Disease	<ul style="list-style-type: none"> <li><input type="checkbox"/> Give diazepam if convulsing (rectal diazepam 0.5 mg/kg)</li> <li><input type="checkbox"/> Quickly complete the assessment</li> <li><input type="checkbox"/> Give any pre referral treatment immediately</li> <li><input type="checkbox"/> Treat to prevent low blood sugar (breastfeed or give expressed breast milk breastmilk substitute or sugar water by cup or NGT)</li> <li><input type="checkbox"/> Keep the child warm REFER URGENTLY</li> </ul>

### 17.3.2 Check for Cough or Difficult Breathing

<b>Ask</b> <ul style="list-style-type: none"> <li>Ⓐ If child has cough and/or difficulty in breathing</li> </ul> <p><b>If yes, ask</b></p> <ul style="list-style-type: none"> <li>Ⓐ For how long child has had this?</li> </ul>	<b>Look Listen and feel</b> <p><b>Ensure the child is calm, then</b></p> <ul style="list-style-type: none"> <li>Ⓐ Count the number of breaths/ minute</li> <li>Ⓐ Look for chest indrawing</li> <li>Ⓐ Look/listen for stridor (stridor is an abnormal harsh, high-pitched sound caused by obstructed airflow, usually more audible while inhaling)</li> <li>Ⓐ Look and listen for wheezing</li> <li>Ⓐ If pulse oximeter is available, determine oxygen saturation. Refer if &lt; 90%</li> </ul> <p><b>If wheezing with either fast breathing or chest indrawing:</b></p>
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	<p><input type="checkbox"/> Give a trial of rapid acting inhaled broncodilator (with spacer) for up to 3 times 15-20 min apart. Count the breaths and look for chest indrawing again, and then classify</p> <p><b>Fast breathing:</b></p> <ul style="list-style-type: none"> <li><input checked="" type="radio"/> Child 2–12 months: 50 breaths per minute</li> <li><input checked="" type="radio"/> Child 1–5 years: 40 breaths per minute</li> </ul>
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### Classify and treat as below

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
<ul style="list-style-type: none"> <li><input checked="" type="radio"/> Any general danger sign</li> <li><input checked="" type="radio"/> Or stridor in calm child</li> <li><input checked="" type="radio"/> SpO<sub>2</sub> &lt; 90%</li> </ul>	Severe Pneumonia or Very Severe Disease	<p><input type="checkbox"/> Give 1st dose of appropriate antibiotic : ampicillin 50 mg/ Kg IM and gentamicin 7.5 mg/Kg IM</p> <ul style="list-style-type: none"> <li>- Or Benzylpenicillin 50,000 IU/Kg IM if at HC2</li> <li>- Or Amoxicillin DT 40 mg/kg if parenteral antibiotics not available</li> <li>- Refer URGENTLY to HC4/HOSPITAL</li> </ul> <p><b>If referral not possible</b></p> <p><input type="checkbox"/> Continue ampicillin 6 hourly and gentamicin once daily for 5 days</p> <ul style="list-style-type: none"> <li>- If strong suspicion of meningitis, dose of ampicillin can be increased 4 times</li> </ul>
<input checked="" type="radio"/> Chest indrawing	Pneumonia	<input type="checkbox"/> Give amoxicillin DT 40 mg/kg for 5 days as first line treatment

## Classify and treat as below

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
<ul style="list-style-type: none"> <li>⦿ Fast breathing           <ul style="list-style-type: none"> <li>- Child 2-12 months: 50 breaths/ minute</li> </ul> </li> </ul>		<ul style="list-style-type: none"> <li><input type="checkbox"/> If wheezing give an inhaled bronchodilator for 5 days (salbutamol inhaler every 3-4 hours as necessary)</li> <li><input type="checkbox"/> If coughing for more than 14 days or recurrent wheeze, refer for possible TB or asthma assessment</li> </ul>
<ul style="list-style-type: none"> <li>- Children</li> <li>- 1-5 years:</li> <li>- 40 breaths/ minute</li> </ul>		<ul style="list-style-type: none"> <li><input type="checkbox"/> Soothe throat/relieve cough with safe remedy</li> <li><input type="checkbox"/> If coughing for more than 14 days or recurrent wheeze refer for possible TB or asthma assessment .</li> <li><input type="checkbox"/> Advise mother when to return immediately (danger signs)</li> <li><input type="checkbox"/> FOLLOW UP in 3 days and reassess           <ul style="list-style-type: none"> <li>- If better (slower breathing, no indrawing, less fever, eating better), praise the mother and advise to complete treatment</li> <li>- If not better or worse, refer urgently to hospital</li> </ul> </li> </ul>

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
No signs of severe disease or pneumonia	Cough or Cold (No pneumonia)  Most likely viral so no antibiotics needed	<input type="checkbox"/> If wheezing give an inhaled bronchodilator (salbutamol inhaler every 3-4 hours as necessary) for 5 days
		<input type="checkbox"/> Soothe throat/relieve cough with safe remedy <input type="checkbox"/> If coughing for more than 14 days or recurrent wheezing, refer for possible TB or asthma assessment <input type="checkbox"/> Advise mother when to return immediately (danger signs) <input type="checkbox"/> if not improving, FOLLOW UP in 5 days

**Note:**

- Use age-appropriate spacers to administer salbutamol inhaler

**17.3.3 Child Has Diarrhoea**

Ask	Look and feel
<ul style="list-style-type: none"> <li>○ Does the child have diarrhoea?</li> <li>○ If yes, for how long child has had this</li> <li>○ Using appropriate local terms, ask if there is blood in the stool</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Look at the child's general condition. Is the child:           <ul style="list-style-type: none"> <li>□ Lethargic or unconscious?</li> <li>□ Restless and irritable?</li> <li>□ Look for sunken eyes</li> <li>□ Offer the child fluid. Is the child:               <ul style="list-style-type: none"> <li>□ Unable to drink or drinks poorly?</li> <li>□ Thirsty, drinks eagerly?</li> <li>□ Pinch the skin of the abdomen. Does it go back:                   <ul style="list-style-type: none"> <li>□ Very slowly? (&gt;2 seconds)</li> <li>□ Slowly?</li> </ul> </li> </ul> </li> </ul> </li> </ul>

## Classify and treat as below

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
<b>Any 2 of these signs:</b> <ul style="list-style-type: none"> <li>Ⓐ Lethargic or unconscious</li> <li>Ⓑ Sunken eyes</li> </ul>	Severe Dehydration	<p><input type="checkbox"/> If child has no other severe classification, give dehydration Plan C (see section 1.1.3)</p> <p><input type="checkbox"/> If child also has another severe classification:</p> <ul style="list-style-type: none"> <li>- Give pre-referral treatment and refer urgently with mother giving frequent sips of ORS on the way</li> </ul>

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
<ul style="list-style-type: none"> <li>Ⓐ Unable to drink or drinks poorly</li> <li>Ⓑ Skin pinch returns very slowly (&gt;2 seconds)</li> </ul>		<ul style="list-style-type: none"> <li>- Advise mother to continue breastfeeding</li> <li><input type="checkbox"/> If child is 2 years or older and there is cholera in your area:</li> <li><input type="checkbox"/> Give 1st dose of erythromycin 125 mg (if child &lt; 2 years) or 250 mg (child 2-5 years) every 6 hours for 3 days</li> <li><input type="checkbox"/> Educate mother on hygiene and sanitation</li> </ul>
<b>Any 2 of these signs:</b> <ul style="list-style-type: none"> <li>Ⓐ Restless, irritable</li> </ul>	Some Dehydration	<p><input type="checkbox"/> Give fluid, zinc supplements, and food if possible See Dehydration Plan B (see section 1.1.3)</p> <p><input type="checkbox"/> If child also has a severe classification:</p>

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
<ul style="list-style-type: none"> <li><input checked="" type="radio"/> Sunken eyes Thirsty, drinks eagerly</li> <li><input checked="" type="radio"/> Skin pinch returns slowly</li> </ul>		<ul style="list-style-type: none"> <li>- Refer URGENTLY to hospital with mother</li> <li>- Giving frequent sips of ORS on the way</li> <li>- Advise the mother to continue breastfeeding f</li> <li>- Advise mother when to return immediately</li> </ul> <p><input type="checkbox"/> FOLLOW UP in 5 days</p> <ul style="list-style-type: none"> <li>- If better (diarrhoea stopped, less than 3 loose stools per day, praise mother and advise her on feeding)</li> <li>- If not better (<math>&gt; 3</math> loose stools per day), reassess, treat dehydration and refer</li> </ul> <p><input type="checkbox"/> Educate mother on hygiene and sanitation</p>
<ul style="list-style-type: none"> <li><input checked="" type="radio"/> Not enough signs to classify as some or severe dehydration</li> </ul>	No Dehydration	<p><input type="checkbox"/> Give fluid, zinc supplements, and food to treat diarrhoea at home (Plan A) (see section 1.1.3)</p> <p><input type="checkbox"/> Advise mother when to return immediately</p>

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
		<p><input type="checkbox"/> FOLLOW UP in 5 days</p> <ul style="list-style-type: none"> <li>- If better (diarrhoea stopped, less than 3 loose stools per day, praise mother and advise her on feeding)</li> <li>- If not better (&gt; 3 loose stools per day), reassess, treat dehydration and refer</li> </ul> <p><input type="checkbox"/> Continue with breast feeding</p> <p><input type="checkbox"/> Educate mother on hygiene and sanitation</p>
⑤ Blood in stool	Dysentery	<p><input type="checkbox"/> Give ciprofloxacin 15 mg/kg for 3 days for Shigella</p> <p><input type="checkbox"/> FOLLOW UP in 3 days</p> <ul style="list-style-type: none"> <li>- If better (fewer stools, less blood in stool, less fever, less abdominal pain, better feeding) praise the mother, complete the ciprofloxacin and advise on feeding</li> <li>- If not better, refer</li> </ul>
Dehydration present	Severe Persistent Diarrhoea	<p><input type="checkbox"/> Give vitamin A</p> <p><input type="checkbox"/> Treat dehydration before referral (unless child has another severe classification)</p> <p><input type="checkbox"/> Refer to hospital</p>

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
If diarrhoea for 14 days or more:		
No dehydration	Persistent Diarrhoea	<p><input type="checkbox"/> Advise mother on feeding child with PERSISTENT DIARRHOEA</p> <p><input type="checkbox"/> Give vitamin A; multivitamins and minerals (including zinc) for 14 days</p> <p><input type="checkbox"/> FOLLOW UP in five days</p> <ul style="list-style-type: none"> <li>- If better (diarrhoea stopped, less than 3 loose stools per day, praise mother and advise her on feeding)</li> <li>- If not better (&gt; 3 loose stools per day), reassess, treat dehydration and refer</li> <li>- If symptoms are the same or worse, start treating dehydration if present and refer to hospital</li> </ul>

**Note:**

- The current recommendation for treatment of diarrhoea is oral rehydration salts (ORS) and zinc salts (Zn sulphate, Zn gluconate or Zn acetate).
- Give zinc for 10 days: Child < 6 months: 10 mg per day; Child > 6 months: 20 mg per day

**17.3.4 Check for Fever**

Ask	Look and feel
<ul style="list-style-type: none"> <li>Ⓐ If the child has fever           <ul style="list-style-type: none"> <li>- By history, feels hot, or temperature 37.5 C (see note 1 in table below)</li> <li>Ⓐ If yes, ask for how long child has had this</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Ⓐ Look/feel for stiff neck</li> <li>Ⓐ Look for runny nose</li> <li>Ⓐ Look for any bacterial cause of fever: local</li> </ul>

<ul style="list-style-type: none"> <li>- If &gt;7 days, ask if fever has been present every day</li> <li>- Ask if the child has had measles in the last 3 months</li> </ul> <p><b>DO MALARIA TEST</b> in all fever cases</p>	<ul style="list-style-type: none"> <li><input checked="" type="radio"/> tenderness, oral sores, refusal to use a limb, hot tender swelling, red tender skin or boils, lower abdominal pain or pain on passing urine in older children</li> <li><input checked="" type="radio"/> Look for signs of measles:</li> <li><input checked="" type="radio"/> Generalised rash</li> <li><input checked="" type="radio"/> Cough, runny nose, or red eyes</li> </ul> <p><b>If child has measles now or had measles in last 3 months</b></p> <ul style="list-style-type: none"> <li><input checked="" type="radio"/> Look for mouth ulcers—are they deep or extensive?</li> <li><input checked="" type="radio"/> Look for pus draining from the eyes</li> <li><input checked="" type="radio"/> Look for clouding of the cornea</li> </ul>
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### Classify and treat as below

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
<ul style="list-style-type: none"> <li><input checked="" type="radio"/> Any general danger sign</li> <li><input checked="" type="radio"/> Stiff neck</li> </ul>	<b>Very Severe Febrile Disease</b>	<input type="checkbox"/> Give 1st dose of rectal artesunate (10 mg/kg) or IM/IV artesunate (3 mg/kg if < 20 kg, 2.4 mg/kg if > 20 kg) (see section 2.5.2)

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
		<ul style="list-style-type: none"> <li><input type="checkbox"/> Give 1st dose of appropriate antibiotic for serious bacterial infection: ampicillin 50 mg/Kg IM and gentamicin 7.5 mg/ Kg IM or           <ul style="list-style-type: none"> <li>- Benzylpenicillin 50,000 IU/Kg IM if at HC2</li> </ul> </li> <li><input type="checkbox"/> Treat child to prevent low blood sugar (breastfeed or give expressed breast milk or breastmilk substitute or sugar water by cup or NGT)</li> <li><input type="checkbox"/> Give one dose of paracetamol 10 mg/kg for high fever (38.5 C)</li> <li><input type="checkbox"/> Refer urgently</li> </ul>
<input checked="" type="radio"/> Malaria test positive	Malaria	<ul style="list-style-type: none"> <li><input type="checkbox"/> Give 1st line malaria treatment (oral ACT, see section 2.5.2)</li> <li><input type="checkbox"/> Give one dose of paracetamol 10 mg/kg for high fever (38.5 C)</li> <li><input type="checkbox"/> If a bacterial infection is also identified, give appropriate antibiotic treatment</li> <li><input type="checkbox"/> Advise mother when to return immediately, counsel on use of insecticide treated mosquito nets and educate on environmental sanitation</li> </ul>

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
		<p><input type="checkbox"/> FOLLOW UP in 3 days if fever persists:</p> <ul style="list-style-type: none"> <li>- Do a full reassessment and look for other causes of fever</li> <li>- Check that the child has completed the full course of antimalarials (without vomiting any dose)</li> <li>- Do not repeat RDT if it was positive on the initial visit</li> <li>- If no danger sign, no other apparent cause of fever and antimalarial treatment was given correctly, refer for microscopy and/or second line antimalarial</li> </ul> <p><input type="checkbox"/> If fever every day for &gt;7days, refer for assessment</p>
 Malaria test Negative	Fever No Malaria	<p><input type="checkbox"/> Give one dose of paracetamol 10 mg/Kg in child with high fever (38.5oC)</p> <p><input type="checkbox"/> If a bacterial infection is identified, give appropriate antibiotic treatment</p> <p><input type="checkbox"/> If no bacterial infection identified, reassure, give paracetamol, advise to come back in 3 days or in case of any problem</p>

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
		<ul style="list-style-type: none"><li><input type="checkbox"/> Advise mother when to return immediately and counsel on use of insecticide treated mosquito net and educate on environmental sanitation.</li><li><input type="checkbox"/> FOLLOW UP in 3 days if fever persists</li><li><input type="checkbox"/> Reassess the child for danger signs and other possible causes of fever<ul style="list-style-type: none"><li>- Repeat the malaria test and treat if positive</li><li>- If no apparent cause of fever, refer</li><li>- If fever every day for &gt;7days, refer for assessment</li></ul></li></ul>

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
If measles now or in last 3 months, classify as:		
<ul style="list-style-type: none"> <li>Ⓐ Any general danger sign</li> <li>Ⓐ Clouding of cornea</li> <li>Ⓐ Deep or extensive mouth ulcers</li> </ul>	<p>Severe Complicated Measles</p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Give vitamin A</li> <li><input type="checkbox"/> Give 1st dose of appropriate antibiotic for severe bacterial infection: ampicillin 50 mg/Kg IM and gentamicin 7.5 mg/Kg IM or Benzylpenicillin 50,000 IU/Kg IM if at HC2</li> <li><input type="checkbox"/> If clouding of cornea or pus draining from eye: apply tetracycline eye ointment</li> <li><input type="checkbox"/> REFER URGENTLY to hospital</li> </ul>
<ul style="list-style-type: none"> <li>Ⓐ Stridor</li> <li>Ⓐ Difficulty in breathing</li> <li>Ⓐ Diarrhoea</li> <li>Ⓐ Acute malnutrition</li> <li>Ⓐ Ear problem</li> </ul>	Complicated Measles	<ul style="list-style-type: none"> <li><input type="checkbox"/> Refer to the relevant IMCI sections</li> </ul>

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
<ul style="list-style-type: none"> <li>○ Pus draining from eye</li> <li>○ Mouth ulcers</li> </ul>	Measles + Eye Or Mouth Complications	<ul style="list-style-type: none"> <li><input type="checkbox"/> Give vitamin A</li> <li><input type="checkbox"/> If pus draining from eye: Apply tetracycline eye ointment</li> <li><input type="checkbox"/> If mouth ulcers, apply gentian violet paint</li> <li><input type="checkbox"/> FOLLOW UP in three days</li> <li><input type="checkbox"/> If eyes still discharging pus and treatment has been given correctly, refer. If eyes only red or better, complete treatment</li> <li><input type="checkbox"/> If mouth ulcers/thrush are the same or better, continue treatment. If worse and/or child has problem swallowing, refer</li> </ul>
<ul style="list-style-type: none"> <li>○ Measles now or in the last three months</li> </ul>	Measles	<ul style="list-style-type: none"> <li><input type="checkbox"/> Give Vitamin A (see section 2.3.3)</li> </ul>
<b>Note:</b>		<ul style="list-style-type: none"> <li>○ Body temperatures are based on axillary measurement. Rectal readings are approximately 0.5 C higher</li> <li>○ For doses of Vitamin A, Gentian violet and Tetracycline ointment see section 17.3.10.2</li> </ul>

### 17.3.5 Check for Ear Problem

Ask	Look and feel
<ul style="list-style-type: none"> <li>Ⓐ Does the child have an ear problem?</li> <li>Ⓐ If yes,</li> <li>Ⓐ Does the child have ear pain?</li> <li>Ⓐ Is there discharge:</li> <li>Ⓐ If yes, ask for how long</li> </ul>	<ul style="list-style-type: none"> <li>Ⓐ Look for pus draining from the ear</li> <li>Ⓐ Feel for tender swelling behind the ear</li> </ul>

Classify and treat as below

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
<ul style="list-style-type: none"> <li>Ⓐ Tender swelling behind the ear</li> </ul>	Mastoiditis	<ul style="list-style-type: none"> <li>Ⓐ Give 1st dose of appropriate antibiotic ampicillin 50 mg/ Kg IM and gentamicin 7.5 mg/Kg IM or           <ul style="list-style-type: none"> <li>- Benzylpenicillin 50,000 IU/Kg IM</li> <li>- Amoxicillin DT 40 mg/kg if parenteral not available f Give 1st dose of paracetamol 10 mg/kg for pain f REFER URGENTLY</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>Ⓐ Ear pain</li> <li>Ⓐ Pus seen draining</li> </ul>	Acute Ear Infection	<ul style="list-style-type: none"> <li>Ⓐ Give amoxicillin DT 40 mg/kg every 12 hours for 5 days</li> <li>Ⓐ Give paracetamol 10 mg/kg for pain</li> <li>Ⓐ Dry ear by wicking</li> </ul>

### 17.3.6 Check for Malnutrition and Feeding Problems

Ask	Look and feel
<ul style="list-style-type: none"> <li>⦿ If child £ 6 m, ask if the child has breastfeeding problem (how many times a day, etc)</li> <li>⦿ If child 6 months, ask if</li> <li>⦿ child is able to finish his portions (appetite)</li> <li>⦿ Ask about usual feeding habits</li> <li>⦿ Which foods are available at home</li> <li>⦿ What does the child eat</li> <li>⦿ How many times a day</li> <li>⦿ Does the child receive his/her own serving</li> </ul>	<p>⦿ Look for signs of acute mal-nutrition like</p> <ul style="list-style-type: none"> <li>- Oedema on both feet</li> <li>- Determine weight for height/length (WFH/L) using WHO growth charts standards (see end of this chapter)</li> <li>- As an alternative, determine weight for age (WFA) using WHO growth chart standard</li> <li>- Measure MUAC (Mid Upper Arm Circumference) in children 6 months using MUAC tape</li> </ul> <p>If WFH/L is less than -3 z-scores or MUAC &lt; 115 mm, then</p> <p>⦿ Check for any medical complication present</p> <ul style="list-style-type: none"> <li>- Any general danger sign</li> <li>- Any severe classification</li> <li>- Pneumonia or chest indrawing</li> </ul> <p>If no medical complication presents,</p> <p>⦿ Child 6 months: assess child appetite</p> <ul style="list-style-type: none"> <li>- offer RUTF (Ready to Use Therapeutic Food) and assess if child able to finish the portion or not</li> </ul> <p>⦿ Child £ 6 month: assess breastfeeding</p>

## Classify and treat as directed below

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
<ul style="list-style-type: none"> <li>Ⓐ Oedema of both feet OR</li> <li>Ⓑ WFH/L less than -3 z scores or</li> <li>Ⓐ MUAC less than 115 mm or</li> <li>Ⓐ Visible severe wasting AND</li> <li>Ⓐ Any one of the following:           <ul style="list-style-type: none"> <li>- Medical complication present</li> </ul> </li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>- not able to finish RUTF</li> <p>OR</p> <li>- Breastfeeding problem</li> </ul> <p>Ⓑ WFH/L less than -3 z scores OR MUAC less than 115 mm</p>	Complicated Severe Acute Malnutrition Uncomplicated Severe Acute Malnutrition	<ul style="list-style-type: none"> <li><input type="checkbox"/> Give first dose appropriate antibiotic (ampicillin 50 mg/Kg IM and gentamicin 7.5 mg/Kg IM or               <ul style="list-style-type: none"> <li>- Benzylpenicillin 50,000 IU/Kg IM</li> </ul> </li> <li><input type="checkbox"/> Treat the child to prevent low blood sugar (breastfeed or give expressed breast milk or sugar water by cup or NGT)</li> <li><input type="checkbox"/> Keep the child warm</li> <li><input type="checkbox"/> Refer URGENTLY to hospital</li> <li><input type="checkbox"/> Give oral antibiotics amoxicillin DT for 5 days (40 mg/kg twice a day)</li> <li><input type="checkbox"/> Give ready-to-use therapeutic food (RUTF) for</li> </ul>

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
<p>⦿ Or very low weight for age AND ⦿ Able to finish RUTF ⦿ WFH/L between -3 and -2 z-scores OR ⦿ MUAC 115 up to 125 mm ⦿ Or low weight for age</p>	<p><b>(SAM)</b> See section 19.2.2.2 for more details</p> <p><b>Moderate Acute Malnutrition (MAM)</b> See section 19.2.2.1 for more details</p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> a child aged 6 months or more</li> <li><input type="checkbox"/> Counsel the mother on how to feed the child</li> <li><input type="checkbox"/> Assess for possible TB infection</li> <li><input type="checkbox"/> Advise mother when to return immediately</li> <li><input type="checkbox"/> FOLLOW UP in 7 days <ul style="list-style-type: none"> <li>- Reassess child and feeding. If no new problem, review again in 7 days.</li> </ul> </li> <li><input type="checkbox"/> FOLLOW UP in 14 days <ul style="list-style-type: none"> <li>- Reassess and reclassify and continue feeding. Keep checking every 14 days</li> </ul> </li> <li><input type="checkbox"/> Assess the child's feeding and counsel the mother on the feeding recommendations</li> <li><input type="checkbox"/> If feeding problem, counsel and FOLLOW UP in 7 days</li> <li><input type="checkbox"/> Assess for possible TB infection.</li> <li><input type="checkbox"/> Advise mother when to return immediately</li> <li><input type="checkbox"/> FOLLOW UP in 30 days <ul style="list-style-type: none"> <li>- Reassess and reclassify.</li> </ul> </li> </ul>

Clinical Features	Classify As	Management
<ul style="list-style-type: none"> <li>Ⓐ WF-H/L - 2 z-scores or more</li> <li>Ⓑ OR MUAC 125 mm or more</li> </ul>	no acute Mal-nutrition	<ul style="list-style-type: none"> <li>- tell the mother and counsel on nutrition.</li> <li>- If still moderate malnutrition, counsel and FOLLOW UP in one month</li> <li>- If worse, loosing weight, feeding problem: refer</li> </ul> <p><input type="checkbox"/> If child is &lt; 2 years old, assess the child's feeding and counsel the mother on feeding according to the feeding recommendations</p> <p><input type="checkbox"/> If feeding problem, FOLLOW UP in 7 days</p> <ul style="list-style-type: none"> <li>- Reassess and counsel</li> </ul> <p><input type="checkbox"/> If you advise the mother to make significant changes in feeding, ask her to bring the child back again after 30 days to measure the weight</p>

**Note:**

- WFH/L is Weight-for-Height or Weight-for-Length determined by using the WHO growth standards charts
- MUAC is Mid-Upper Arm Circumference measured using MUAC tape in all children 6 months

- RUTF is Ready-to-Use Therapeutic Food for conducting the appetite test and feeding children with severe acute malnutrition. For doses and more information see chapter 19.
- RUTF already contains all the necessary vitamins and minerals (folic acid, iron etc) so there is no need of additional supplements

### 17.3.7 Check for Anaemia

Ask	Look
<input checked="" type="radio"/> In appropriate local language, ask if presence of sickle cell anaemia in the family	<input checked="" type="radio"/> Look for palmar pallor. Is it <input checked="" type="radio"/> Severe palmar pallor? <input checked="" type="radio"/> Some palmar pallor?

**Classify and treat as below**

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
<input checked="" type="radio"/> Severe palmar pallor	Severe Anaemia	<input type="checkbox"/> Refer URGENTLY to hospital
<input checked="" type="radio"/> Some palmar pallor	Anaemia	<input type="checkbox"/> Give ferrous sulphate $\frac{1}{2}$ tab/day if 1-5 years, 1 ml of syrup/day if 2-12 months - If child has severe acute malnutrition and is receiving RUTF, DONOT give iron because there is already adequate amount of iron in RUTF <input type="checkbox"/> Give folic acid 2.5 mg/daily in child with sickle cell anaemia

CLINICAL FEATURES	CLASSIFY AS	MANAGEMENT
		<p><input type="checkbox"/> Give mebendazole if child is 1 year or older and has not had a dose in the previous 6 months</p> <p><input type="checkbox"/> Advise mother when to return immediately</p> <p><input type="checkbox"/> FOLLOW UP in 14 days:</p> <ul style="list-style-type: none"> <li>- Review and give iron tablets every two weeks</li> <li>- If child still has palmar pallor after two months, refer</li> <li>- If better, continue iron treatment for three months after Hb has normalized</li> </ul>
<input checked="" type="radio"/> No palmar pallor	No Anaemia	<p><input type="checkbox"/> If child is less than two years old, assess the child's feeding and counsel the mother according to the feeding recommendation</p> <p><input type="checkbox"/> If feeding problem, FOLLOW UP in five days</p>
<b>Check for HIV Infection</b>		
<b>Ask</b> <ul style="list-style-type: none"> <li><input checked="" type="radio"/> Is the child already enrolled in HIV care?</li> </ul> <b>If not, ask</b> <ul style="list-style-type: none"> <li><input checked="" type="radio"/> Has the mother or child had an HIV test?</li> </ul>		

<b>If yes: decide HIV status</b>	<b>If no, then test</b>
<ul style="list-style-type: none"> <li>○ Mother: POSITIVE or NEGATIVE</li> <li>○ Child: <ul style="list-style-type: none"> <li>- Virological test POSITIVE or NEGATIVE</li> <li>- Serological test POSITIVE or NEGATIVE</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>○ Mother and child status unknown: TEST mother.</li> <li>○ Mother HIV positive and child status unknown: TEST child <ul style="list-style-type: none"> <li>- If below 18 months: do virological testing</li> <li>- If above 18 months, do serological testing</li> </ul> </li> </ul>

**If mother is HIV positive and child is negative or unknown, ASK:**

- Was the child breastfeeding at the time or 6 weeks before the test?
- Is the child breastfeeding now?
- If breastfeeding ASK: Is the mother and child on ARV prophylaxis?

#### Note

- For HIV testing algorithm and result interpretation in children, see section 3.1.2

FEATURES	CLASSIFY AS	MANAGEMENT
<ul style="list-style-type: none"> <li>○ Positive virological test in child</li> </ul>	Confirmed HIV Infection (see section 3.1.3)	<ul style="list-style-type: none"> <li>□ Initiate ART treatment and HIV care</li> <li>□ Give cotrimoxazole prophylaxis</li> <li>□ Assess the child's feeding and provide appropriate counselling to the mother.</li> </ul>

FEATURES	CLASSIFY AS	MANAGEMENT
OR <input checked="" type="radio"/> Positive sero-logical test in a child 18 months or older		<input type="checkbox"/> Advise the mother on home care <input type="checkbox"/> Assess or refer for TB assessment and Isoniazid (INH) preventive therapy (see section 5.2.9.3) <input type="checkbox"/> FOLLOW UP regularly as per national guidelines
<input checked="" type="radio"/> Mother HIV-positive AND negative virological test in a breast-feeding child  or only stopped less than 6 weeks ago OR	HIV Exposed (see section 3.1.4)	<input type="checkbox"/> Give cotrimoxazole prophylaxis till infection can be excluded by HIV testing after cessation of breastfeeding for at least 6 weeks <input type="checkbox"/> Start or continue ARV prophylaxis as recommended <input type="checkbox"/> Do virological test to confirm HIV status: if negative, repeat 6 weeks after cessation of breastfeeding
<input checked="" type="radio"/> Mother HIV-positive, child not yet tested OR <input checked="" type="radio"/> Positive sero-logical test in a child less than 18 months		<input type="checkbox"/> Assess the child's feeding and provide appropriate counselling to the mother <input type="checkbox"/> Advise the mother on home care <input type="checkbox"/> FOLLOW UP regularly as per national guidelines
<input checked="" type="radio"/> Negative HIV test in mother or child	HIV Infection Unlikely	<input type="checkbox"/> Treat, counsel and FOLLOW UP on existing infections

### 17.3.8 Check Immunization, Vitamin A, Deworming

Check immunization card and classify

<input checked="" type="radio"/> Immunization not up to date according to national schedule (see chapter 18)	Child Not Immunized as Per Schedule	<input checked="" type="radio"/> Give all missed doses on this visit <input checked="" type="radio"/> (Include sick child unless being referred) <input checked="" type="radio"/> Give vitamin A if not given in the last 6 months <input checked="" type="radio"/> Give mebendazole or albendazole (if age >1 year) if not given in the last 6 months
<input checked="" type="radio"/> Immunization up to date as per national schedule	Child Immunized as Per Schedule	<input checked="" type="radio"/> Praise the mother <input checked="" type="radio"/> Advise the care-taker when to return for the next dose

### 17.3.9 Assess Other Problems

Assess any other presenting problems (e.g. eye problems, rashes) and manage accordingly

### 17.3.10 Summary of Medicines Used

For each medicine

- Explain to the mother why the medicine is needed
- Calculate the correct dose for the child's weight or age
- Use a sterile needle and syringe for injections
- Accurately measure and administer the dose
- If referral is not possible, follow the instructions given

### 17.3.10.1 Medicines Used Only in Health Centers

DRUG	DOSE	INDICATION	LOC
Ampicillin	50 mg/kg	Pre referral IM dose in very severe disease or severe pneumonia	HC3
Gentamicin	7.5 mg/kg	Pre referral IM dose in very severe disease or severe pneumonia	HC3
Diazepam rectal (suppository or diluted IV ampoule)	0.5 mg/kg	Pre referral treatment of convulsions	HC2
Benzyl penicillin	50,000 IU/kg	Pre referral IM dose in very severe disease or severe pneumonia	HC2
Rectal artesunate	10 mg/kg (see section 2.5.2.2)	Pre referral dose for very severe febrile disease	HC1
Artesunate parenteral	3 mg/kg if < 20 kg, 2.4 mg/kg if > 20 kg	Pre referral IM dose for very severe febrile disease	HC3
Salbutamol inhaler	2 puff	For acute wheezing	HC3

### 17.3.10.2 Medicines for Home Use

Teach mother/caretaker how to give oral medicines at home

- Determine the correct medicine and dose for the child's weight or age

## For each medicine

- Explain the reason for giving the medicine
- Show how to measure a dose
- Watch the mother practice this
  - Ask the mother to give the first dose to her child
  - Explain carefully how to give the medicine
- Include dose, frequency, and duration

Stress the need to complete the full course of treatment even if the child gets better

If child vomits the medicine within one hour from taking it, REPEAT the dose

- Collect, measure/count, pack, and label it separately
- Check the mother's understanding before she leaves

DRUG	DOSE	INDICATION	LOC
<b>Amoxicillin DT 250 mg</b>	Every 12 hours for 5 days  2-12 months: 250 mg  1-3 years: 500 mg  3-5 years: 750 mg	Pneumonia Acute ear infection	<b>HC1</b>
<b>Artemether/lumefantrine 20/120 mg</b>	Every 12 hours for 3 days  2-12 months: 1 tab  1-3 years: 1 tab 3-5 years: 2 tab	Un-complicated malaria	<b>HC1</b>

DRUG	DOSE	INDICATION	LOC
<b>Erythromycin</b>	Every 6 hours for 3 days Child < 2 years: 125 mg 2-5 years: 250 mg	Cholera	HC3
<b>Ciprofloxacin</b>	15 mg/kg every 12 hours for 3 days  If tab 500 mg: Child < 6 months: tab Child 6 months-5 years: ½ tab	Dysentery	HC2
Folic acid	2.5 mg/daily	Anaemia in child with sickle cell anaemia	HC2
<b>Iron ferrous sulphate (with or without folic acid)</b>	Once daily for 14 days, tab 200 mg 1-5 years: ½ tablet Syrup 25 mg/ ml  Child < 1 year: 1 ml	Anaemia in non sicklers	HC2
<b>Cotri-moxazole 120 mg paediatric tablet</b>	< 6 months: 1 tablet 6 months-  5 years: 2 tab/ day (or half adult tablet) Once a day	Prophylaxis in HIV positive and HIV exposed	HC2

DRUG	DOSE	INDICATION	LOC
<b>Mebendazole</b>	Child 1-2 years: 250 mg single dose  Child > 2 years: 500 mg single dose	Routine deworming every six months	HC2
<b>Albendazole</b>	Child 1-2 years: 200 mg single dose  Child > 2 years: 400 mg single dose	Routine deworming every six months	HC1
<b>Paracetamol</b>	Every 6 hours (4 doses/24 hours)  month-years: 125 mg  3-5 years: 250 mg	Fever > 38.5 oC or (ear) pain	HC1
<b>Vitamin A</b>	Up to 6 months: 50,000 IU  6-12 months: 100,000 IU  12 months – 5 years: 200,000 IU	Routine every 6 months from age six months, three doses for persistent diarrhoea, measles at day 0, 1 and four weeks	HC2

DRUG	DOSE	INDICATION	LOC
<b>ORS</b>	As per plan A,B,C  See section 1.1.3	Rehydration	<b>HC1</b>
<b>Zinc</b>	Daily for 10 days  Child 2-6 months: 10 mg (1/2 tablet) Child > 6 months: 20 mg (1 tablet)	Treatment of diarrhoea	<b>HC1</b>
<b>Nystatin syrup</b>	1 ml 4 times daily for 7 days	Oral thrush	<b>HC2</b>
<b>Tetracycline eye ointment</b>	5 mm of ointment inside lower lid, 4 times daily till pus discharge resolves	Eye infection	<b>HC2</b>
<b>Ciprofloxacin ear drops</b>	1-2 drops three times daily	Chronic otitis	
<b>Ready To Use Therapeutic Food RUTF</b>	See chapter 19	Severe malnutrition	<b>HC1</b>



DRUG	DOSE	INDICATION	LOC
ARVs	See section 3.1.3	HIV prophylaxis and treatment	HC3

### 17.3.10.3 Treatment of Local Infections at Home

Teach mother/ caretaker how to treat local infections

- Explain what the treatment is and why it is needed
- Describe the treatment steps as detailed below
- Watch the mother do the first treatment in the clinic (except cough/sore throat remedy)
- Explain how often to do the treatment and for how long
- Provide the required medication for home treatment
- Check that she understands completely before leaving the clinic

INFECTION	TREATMENT
Eye infection	<ul style="list-style-type: none"> <li><input type="checkbox"/> Clean both eyes 4 times daily:           <ul style="list-style-type: none"> <li>- Wash hands</li> <li>- Ask child to close eyes</li> <li>- Use clean cloth with clean water to gently remove pus</li> <li>- Use a different part of the cloth for each eye</li> <li>- Clean each eye from nose-side to ear-side to avoid passing the infection from one eye to the other</li> </ul> </li> <li><input type="checkbox"/> Apply tetracycline eye ointment 1% to each eye 4 times daily after cleaning the eyes           <ul style="list-style-type: none"> <li>- Ask the child to look up</li> <li>- Squirt a small amount (5 mm length) on the inside of the lower eyelid</li> <li>- Wash hands again</li> </ul> </li> <li><input type="checkbox"/> Continue application until the redness has disappeared           <ul style="list-style-type: none"> <li>▪ Do not put anything else into the eye</li> </ul> </li> </ul>

INFECTION	TREATMENT
<b>Ear infection</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Dry the ear at least 3 times daily <ul style="list-style-type: none"> <li>- Roll clean absorbent cloth or soft gauze into a wick</li> </ul> </li>   <li>- Place this in the ear and remove when wet</li> <li>- Replace wick with a clean one</li> <li>- Repeat this process until the ear is dry</li> </ul> <p>In chronic ear infection:</p> <ul style="list-style-type: none"> <li>- Instill ciprofloxacin ear drops 3 times daily for 3 weeks</li> <li>■ Do not put anything else into the ear</li> </ul>
<b>Mouth ulcers</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Treat these twice daily</li> <li><input type="checkbox"/> Wash hands</li> <li><input type="checkbox"/> Wash child's mouth with clean soft cloth moistened with salt water and wrapped around the finger</li> <li><input type="checkbox"/> Paint the mouth with gentian violet aqueous paint 0.5% (if necessary, dilute 1% with an equal volume of water and provide this for the mother to use at home)</li> <li><input type="checkbox"/> Wash hands again</li> <li><input type="checkbox"/> Continue giving gentian violet for 48 hours after ulcers are cured</li> <li><input type="checkbox"/> Give paracetamol for pain relief</li> </ul>
<b>Oral thrush</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Treat for thrush four times daily for seven days</li> <li><input type="checkbox"/> Wash hands</li> <li><input type="checkbox"/> Wash a clean soft cloth with water and use to wash the child's mouth</li> <li><input type="checkbox"/> Instill nystatin 1 ml every six hours</li> <li><input type="checkbox"/> Avoid feeding for 20 minutes after medication</li> </ul>

INFECTION	TREATMENT
	<ul style="list-style-type: none"> <li><input type="checkbox"/> If breastfed, check mother's breasts for thrush and if present treat with nystatin</li> <li><input type="checkbox"/> Advice mother to wash breast after feeds</li> <li><input type="checkbox"/> If baby unable to breastfeed advise mother to feed baby with a cup and spoon .</li> <li><input type="checkbox"/> Give paracetamol of needed for pain</li> </ul>
Sore throat or cough	<ul style="list-style-type: none"> <li><input type="checkbox"/> Use a safe remedy to soothe the throat and relieve cough:           <ul style="list-style-type: none"> <li>- Breastmilk (for exclusively breastfed infant)</li> <li>- Warm (lemon) tea with honey</li> <li>▪ Do not use remedies containing codeine or antihistamines (e.g. chlorphenamine, promethazine)</li> </ul> </li> </ul>

### 17.3.11 Counsel the Mother

#### 17.3.12.1 Feeding Recommendation during Illness

##### For any sick child

- Ⓐ Breastfeed more often and for longer at each feed

##### If not exclusively breastfed

- Ⓐ Increase fluid intake, e.g. give soup, rice water, yoghurt drinks or clean water

##### For a child with diarrhoea

- Ⓐ Giving extra fluid can be lifesaving
- Ⓐ Give fluid according to Plan A or B, depending on the state of dehydration of the child

#### 17.3.12.2 Assessing Appetite and Feeding

- Ⓐ Ask about the child's usual feeding habits during the current illness
- Ⓐ Compare the answers given with the feeding recommendations for the child's age

SITUATION	QUESTIONS
<b>Breastfeeding</b>	<ul style="list-style-type: none"> <li>- Do you breastfeed the child?</li> <li>- How many times during the day?</li> <li>- How many times at night?</li> <li>- Do you give the child any other food or fluids?</li> </ul>
<b>Other food or fluids</b>	<ul style="list-style-type: none"> <li>- What food or fluids?</li> <li>- How many times daily?</li> <li>- What do you use to feed the child?</li> <li>- What foods are available in the home?</li> </ul>
<b>If severe or moderate malnutrition or any special concern about growth (e.g. HIV)</b>	<ul style="list-style-type: none"> <li>- What foods are available at home?</li> <li>- What foods does the child eat?</li> <li>- How large are the servings?</li> <li>- Does the child receive his/her own serving?</li> <li>- Who feeds the child and how?</li> </ul>
<b>During this illness</b>	<ul style="list-style-type: none"> <li>- Has the child's feeding changed?</li> <li>- If yes, how?</li> </ul>
<b>If HIV exposed child</b>	<ul style="list-style-type: none"> <li>- If mother and child on ARVs, and child breastfeeding, check on adherence</li> <li>- If child not breastfeeding, check type, quantity and preparation of substitute milk, including cleaning of utensils</li> </ul>

### 17.3.12.3 Feeding Recommendations

These recommendations are for both sick and healthy children

AGE OF CHILD	FEEDING RECOMMENDATIONS
Birth up to 6 months	<ul style="list-style-type: none"> <li>● Breastfeed as often as your child wants</li> <li>● Look for signs of hunger, such as beginning to fuss, sucking fingers, or moving lips</li> <li>● Breastfeed day and night whenever your baby wants, at least 8 times in 24 hours</li> <li>● Frequent feeding produces more milk</li> <li>● Do not give other foods or fluids</li> <li>● Breast milk is all your baby needs</li> </ul>
6-9 months	<ul style="list-style-type: none"> <li>● Breastfeed as often as your child wants</li> </ul> <p>Also give thick porridge made with maize, cassava, millet, soya flour, or any mix of these. Add sugar and oil, and mix with milk or pounded groundnuts or mixtures of well mashed foods, e.g.</p> <p>matooke, potatoes, cassava, posho (maize or millet), rice. Mix these with fish, beans, or pounded groundnuts. Add green vegetables</p> <ul style="list-style-type: none"> <li>● Give a nutritious snack, e.g. egg, banana, bread: 3 times/day if breastfed or 5 times/day if not</li> <li>● Including animal source foods and vitamin A-rich fruits and vegetables</li> <li>● Start by giving 2 to 3 tablespoons of food. Gradually increase to <math>\frac{1}{2}</math> cups (1 cup = 250 ml)</li> <li>● Give 2 to 3 meals each day</li> <li>● Offer 1 or 2 snacks each day between meals when the child seems hungry</li> </ul>

AGE OF CHILD	FEEDING RECOMMENDATIONS
9 to 12 months	<ul style="list-style-type: none"> <li>● Breastfeed as often as your child wants</li> <li>● Also give a variety of mashed or finely chopped family food, including animal source foods and vitamin A-rich fruits and vegetables</li> <li>● Give 1/2 cup at each meal (1 cup ==250 ml)</li> <li>● Give 3 to 4 meals each day</li> <li>● Offer 1 or 2 snacks between meals. The child will eat if hungry</li> <li>● For snacks, give small chewable items that the child can hold. Let your child try to eat the snack, but provide help if needed</li> </ul>
12-24 months	<ul style="list-style-type: none"> <li>● Breastfeed as often as your child wants</li> <li>● Also give a variety of mashed or finely chopped family food, including animal source foods and vitamin A-rich fruits and vegetables</li> <li>● Give 3/4 cup at each meal (1 cup = 250 ml)</li> <li>● Give 3 to 4 meals each day</li> <li>● Offer 1 to 2 snacks between meals</li> <li>● Continue to feed your child slowly, patiently. Encourage but do not force your child to eat</li> <li>● Breastfeed on demand, day and night</li> <li>● Give adequate servings of complementary foods as above except that you may also add meat to mashed foods</li> </ul>

AGE OF CHILD	FEEDING RECOMMENDATIONS
Age 2 years and over	<ul style="list-style-type: none"> <li>⦿ Give a variety of family foods to your child, including animal source foods and vitamin A-rich fruits and vegetables</li> <li>⦿ Give at least 1 full cup (250 ml) at each meal</li> <li>⦿ Give 3 to 4 meals each day</li> <li>⦿ Offer 1 or 2 snacks between meals</li> <li>⦿ If your child refuses a new food, offer "tastes" several times. Show that you like the food</li> <li>⦿ Be patient. Talk with your child during a meal, and keep eye contact</li> </ul>
	<p><b>Note:</b></p> <ul style="list-style-type: none"> <li>⦿ A good daily diet should be adequate in quantity and include an energy-rich food (for example, thick cereal with added oil); meat, fish, eggs, or pulses; and fruits and vegetables</li> </ul>
Stopping breast feeding	<p>STOPPING BREASTFEEDING means changing from all breast milk to no breast milk. This should happen gradually over one month. Plan in advance for a safe transition.</p> <p><b>Help Mother Prepare:</b></p> <ul style="list-style-type: none"> <li>⦿ Mother should discuss and plan in advance with her family, if possible</li> <li>⦿ Express milk and give by cup</li> <li>⦿ Find a regular supply of formula or milk e.g full cream cow's milk</li> <li>⦿ Learn how to prepare and store milk safely at home</li> </ul>

AGE OF CHILD	FEEDING RECOMMENDATIONS
	<p><b>Help Mother Make Transition:</b></p> <ul style="list-style-type: none"> <li>Ⓐ Teach mother to cup feed (See Counsel the mother in next section)</li> <li>Ⓐ Clean all utensils with soap and water</li> <li>Ⓐ Start giving only formula or cow's milk once baby feeds by cup</li> </ul> <p><b>Stop Breastfeeding Completely:</b></p> <ul style="list-style-type: none"> <li>Ⓐ Express and discard enough breast milk to keep comfortable until lactation stops</li> </ul>
<b>Child with persistent diarrhoea</b>	<p><b>If still breastfeeding</b></p> <ul style="list-style-type: none"> <li>Ⓐ Give more frequent and longer feeds day and night</li> </ul> <p><b>If taking other milk, replace</b></p> <ul style="list-style-type: none"> <li>Ⓐ With increased breastfeeding</li> <li>Ⓐ With fermented milk products, e.g. yoghurt</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>Ⓐ Half the milk with nutritious mashed foods</li> </ul> <p><b>If taking other foods</b></p> <ul style="list-style-type: none"> <li>Ⓐ Follow feeding recommendations above for child's age</li> </ul>

#### 17.3.12.4 Counselling for Feeding Problems

If the child is not being fed as above

- Ⓐ Counsel the mother accordingly
- Ⓐ FOLLOW UP in 5-7 days

PROBLEM	COUNSELLING AND FOLLOW UP
<b>Breastfeeding problems</b>	<ul style="list-style-type: none"> <li>○ Assess breastfeeding</li> <li>○ As required, show mother correct positioning and attachment</li> </ul>
<b>If child &lt;6 months old and taking other milk or foods</b>	<ul style="list-style-type: none"> <li>○ Build the mother's confidence that she can provide all the breast milk needed</li> <li>○ Suggest giving more frequent, longer feeds day and night, and gradually reduce other milk or foods</li> </ul>
<b>If mother is away from the child due to work, etc.</b>	<ul style="list-style-type: none"> <li>○ Suggest she expresses breast milk to leave for the baby</li> </ul>
<b>If other milk needs to be continued</b>	<ul style="list-style-type: none"> <li>○ Breastfeed as much as possible, including at night</li> <li>○ Make sure that any other milk used is an appropriate breastmilk substitute, e.g. cow's milk</li> <li>○ Correctly and hygienically prepared given in adequate amounts</li> <li>○ Finish any prepared milk within 1 hour</li> </ul>
<b>If the child is being given diluted milk or thin porridge</b>	<ul style="list-style-type: none"> <li>○ Remind mother that thick foods rich in energy and nutrients are needed by infants and young children</li> <li>○ Advise her not to dilute the milk</li> <li>○ Advise her to make thicker porridge</li> </ul>
<b>If the mother is using a bottle to feed the child</b>	<ul style="list-style-type: none"> <li>○ Recommend using a cup instead of a bottle</li> <li>○ Show the mother how to feed the child with a cup: press cup on infant's lower lip and allow him to take the milk himself, do not pour the milk into infant's mouth)</li> </ul>

PROBLEM	COUNSELLING AND FOLLOW UP
If the child is not being fed actively	<ul style="list-style-type: none"> <li>Ⓐ Counsel the mother to           <ul style="list-style-type: none"> <li>- Sit with the child and encourage eating</li> <li>- Give the child an adequate serving in a separate bowl</li> </ul> </li> </ul>
If the mother is not giving foods rich in vitamin A	<ul style="list-style-type: none"> <li>Ⓐ Encourage her to provide these regularly, e.g. eggs, green leafy vegetables, carrots, liver, mangoes, yellow sweet potatoes, and other dark orange fruit</li> </ul>
If the child is 6 months and appropriate complementary foods have not been introduced	<ul style="list-style-type: none"> <li>Ⓐ Gradually introduce thick porridge mixed with available protein (e.g. milk); add sugar and fat</li> <li>Ⓑ Gradually introduce mashed foods mixed with relish</li> <li>Ⓒ Add green leafy vegetables and fat to this</li> <li>Ⓓ Give nutritious snacks 3-5 times daily as in feeding recommendations above</li> </ul>
If child eats solid food with insufficient nutrient density or variety	<ul style="list-style-type: none"> <li>Ⓐ Give a variety of mashed food mixtures made with local staples and mixed with animal or plant protein relish</li> <li>Ⓑ Add green leafy vegetables and fat to this</li> <li>Ⓓ Give nutritious snacks 3 - 5 times daily as in feeding recommendations above</li> </ul>

### 17.3.12.5 Mother's Health

- ◆ Counsel mother about her own health
- ◆ If she is sick, provide care for her or refer for further management
- ◆ If she has a breast problem (e.g. engorgement, sore nipples, infection), provide care for her or refer for further help
- ◆ Advise her to eat well to keep up her own strength and health

- ◆ Check immunization status and give Tetanus Toxoid (TT) if needed
- ◆ Make sure each mother has access to:
  - Family planning services
  - Counselling on prevention of STIs, HIV/AIDS
  - Antenatal care (if pregnant)
- ◆ Give additional counselling if the mother is HIV-positive
- ◆ Reassure her that with regular FOLLOW UP much can be done to prevent serious illness, and maintain her and the child's health
- ◆ Emphasize good hygiene, and early treatment of illnesses

## 17.4 INTEGRATED COMMUNITY CASE MANAGEMENT

Integrated Community Case Management (iCCM) of malaria, pneumonia and diarrhoea is a recently adopted strategy for the treatment of common childhood illness at community level by trained Community Health Workers since 2010. It addresses a gap in delivery of curative services to children below 5 years allowing:

- prompt and accessible treatment of uncomplicated malaria, pneumonia and diarrhoea
- identification of danger signs (convulsions, chest in-drawing, unable to feed, vomiting everything, lethargy/ unconsciousness) and pre-referral treatment
- monitoring of newborns during the first week of life,
- counselling and referral if any problem identified.

Community health workers work in close collaboration with the health unit, to which they report and refer cases and from which they receive supplies and supervision.

## Supplies provided to trained community health workers

### ICCM commodities

- ⦿ Respiratory timers and Amoxicillin dispersible tablets for diagnosis and treatment of pneumonia
- ⦿ ORS sachets and Zinc tablets for treatment of diarrhoea
- ⦿ RDTs and ACTs for diagnosis and treatment of uncomplicated malaria
- ⦿ Rectal artesunate for pre referral treatment of complicated malaria.
- ⦿ Examination gloves
- ⦿ Dispensing envelopes
- ⦿ Registers, referral notes and sick job aids

### Other commodities for community health workers

- ⦿ Other preventive treatments: used in prevention and treatment of common conditions and neglected topical diseases like albendazole, azithromycin syrup and tablets, ivermectin, tetracycline eye ointment, praziquantel, COC.

### Treatments prescribed by VHTs

TREATMENT	INDICATION	DOSES
Amoxicillin DT 250 mg	Pneumonia (cough < 21 days + increased respiratory rate)	2-11 months: 1 tab every 12 hours for 5 days RED PACK 1-5 years: 2 tab every 12 hours for 5 days GREEN PACK
Zinc Tablets and ORS	Diarrhoea < 14 days without blood	Zinc 2-6 months: $\frac{1}{2}$ tab once a day for 10 days 6 months to 5 years: 1 tab once a day for 10 days ORS As much as the chid wants but at least $\frac{1}{2}$ cup after each loose stool

TREATMENT	INDICATION	DOSES
ACT	Fever <7 days RDT positive	4 months-2 years: 1 tab every 12 hours for 3 days (YEL-Low PACK)  2-5 years: 2 tab every 12 hours for 3 days (Blue Pack)
Rectal Artesunate	Fever and danger signs, prereferral	4-11 months: 1 capsule 1-3 years: 2 capsules 3-5 years: 3 capsules

## 17.5 CHILD GROWTH WEIGHT STANDARDS CHARTS

The WHO Child Growth Standards charts are used to identify normal growth for children under 5 years, as well as growth problems or trends that suggest that a child is at risk of a problem.

### Weight-for-Age

- Used to show if a child is normal weight or underweight for their age. It should not be used to assess obesity and overweight.

### Disadvantages

- If a child's age is unknown, it is of limited use
- It cannot distinguish between chronic malnutrition (stunting) and acute malnutrition
- Also, if a child has oedema of both feet, fluid retention increases the child's weight, masking what may actually be very low weight.

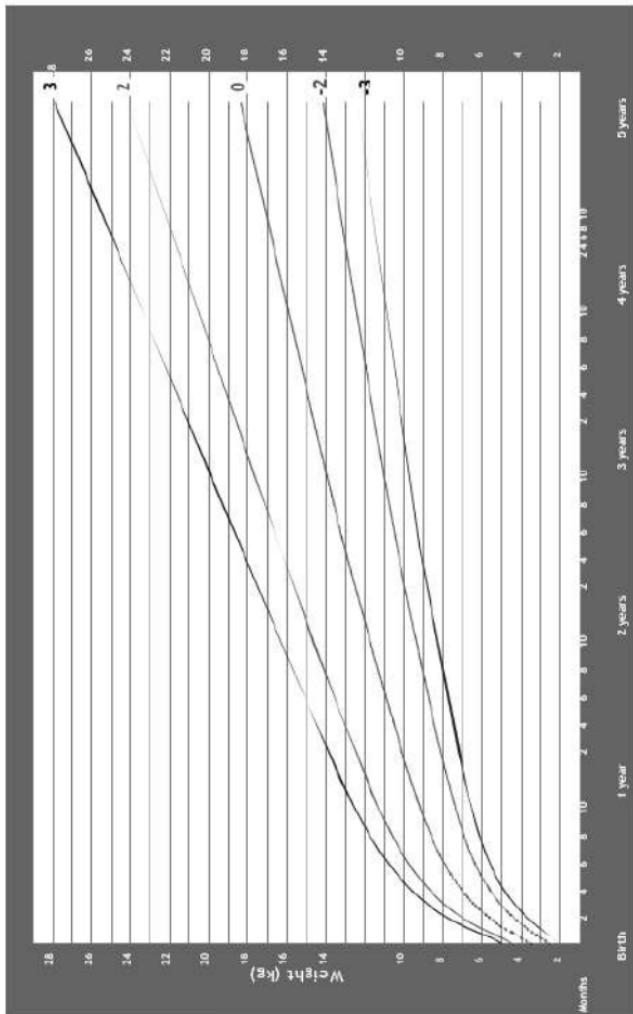
### Weight for-Height/Length

- Used to diagnose acute malnutrition
- The cut-off for severe acute malnutrition is -3 z-scores and below. These children are at a high risk of mortality, but respond quickly and safely to re-feeding using therapeutic foods following recommended guidelines.
- The cut-off for moderate acute malnutrition is -2 to -3 z-scores below.

## Mean Upper Arm circumference (MUAC)

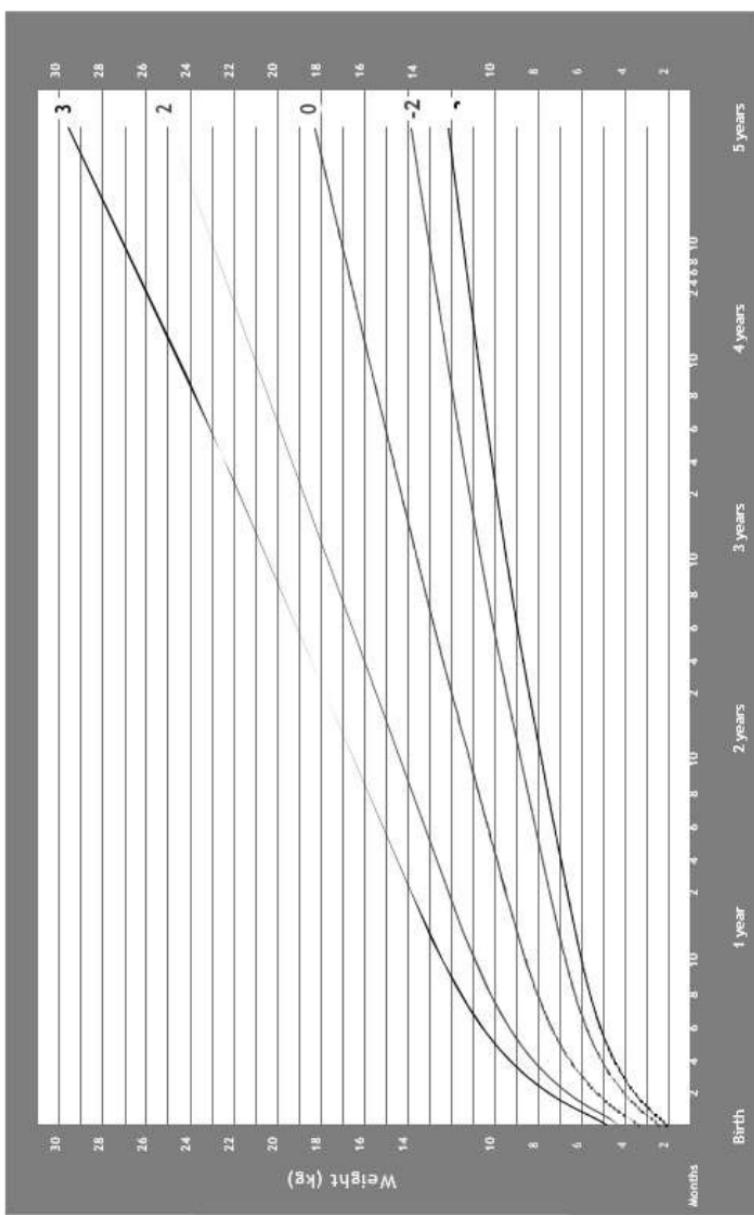
- Used to diagnose acute malnutrition
- The cut off for severe acute malnutrition is 115 mm (11.5 cm) and below.

### Weight-for-age BOYS Birth to 5 years (z-scores)



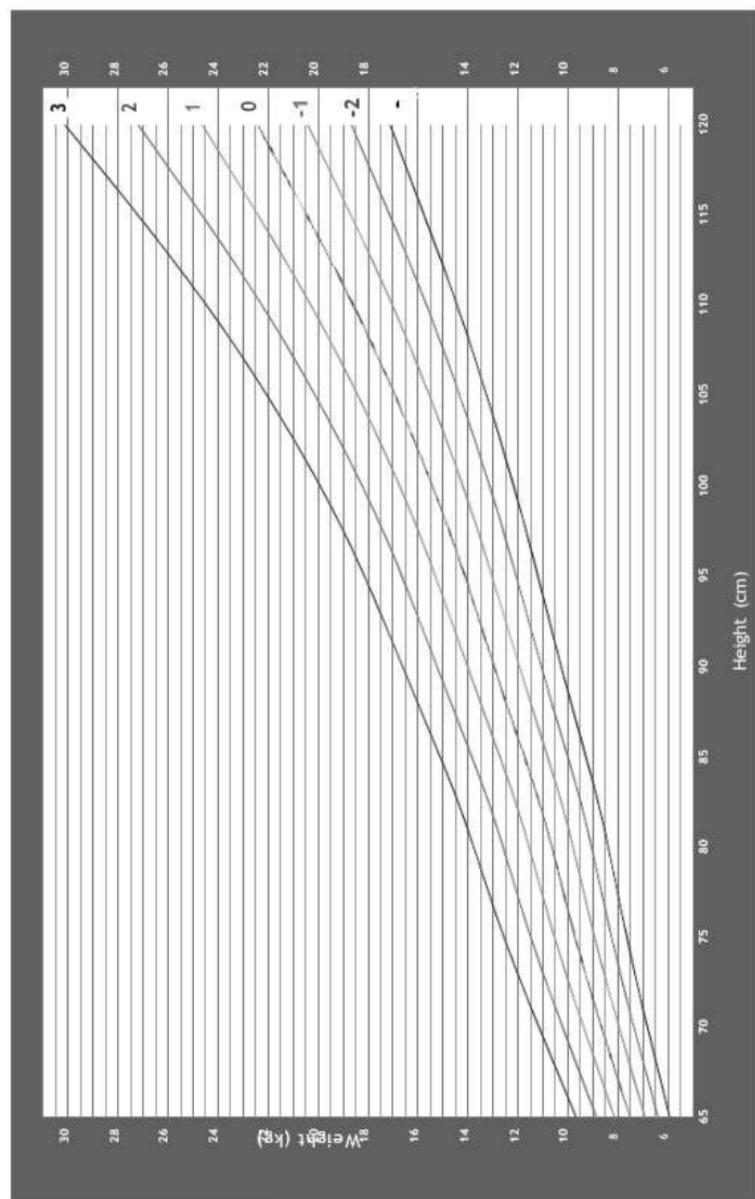
## Weight-for-age GIRLS

Birth to 5 years (z-scores)





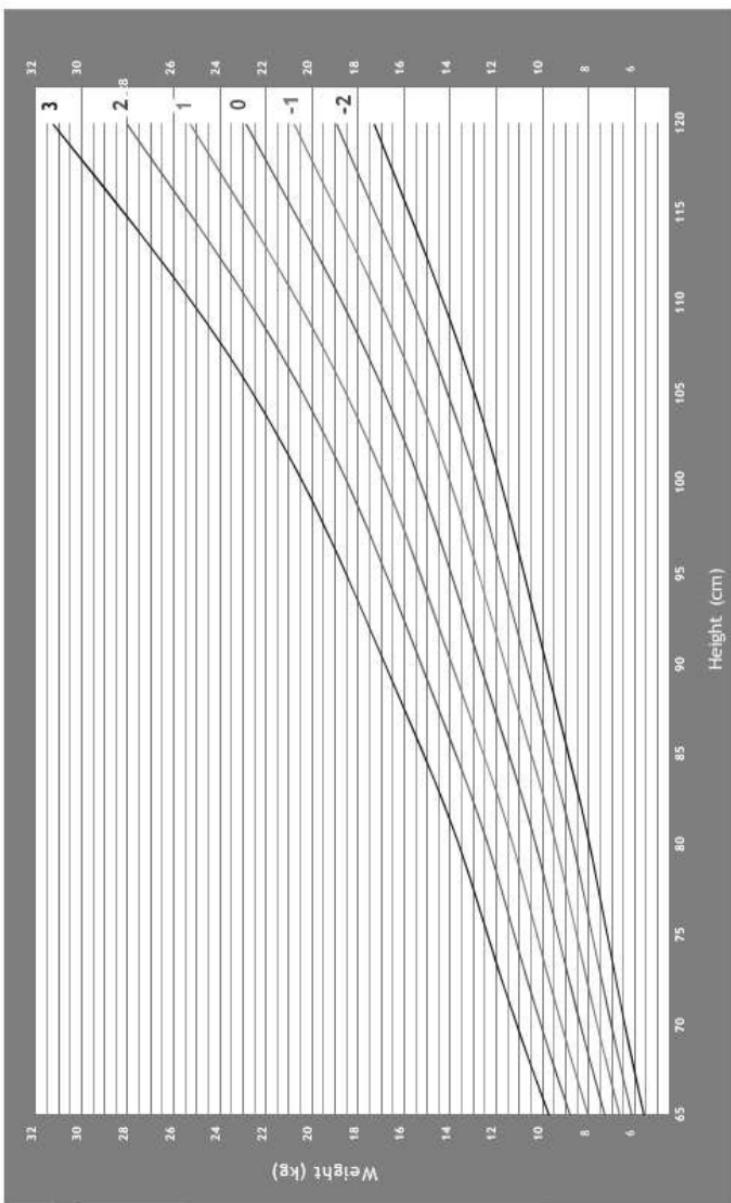
## Weight-for-Height BOYS 2 to 5 years (z-scores)





## Weight-for-Height GIRLS

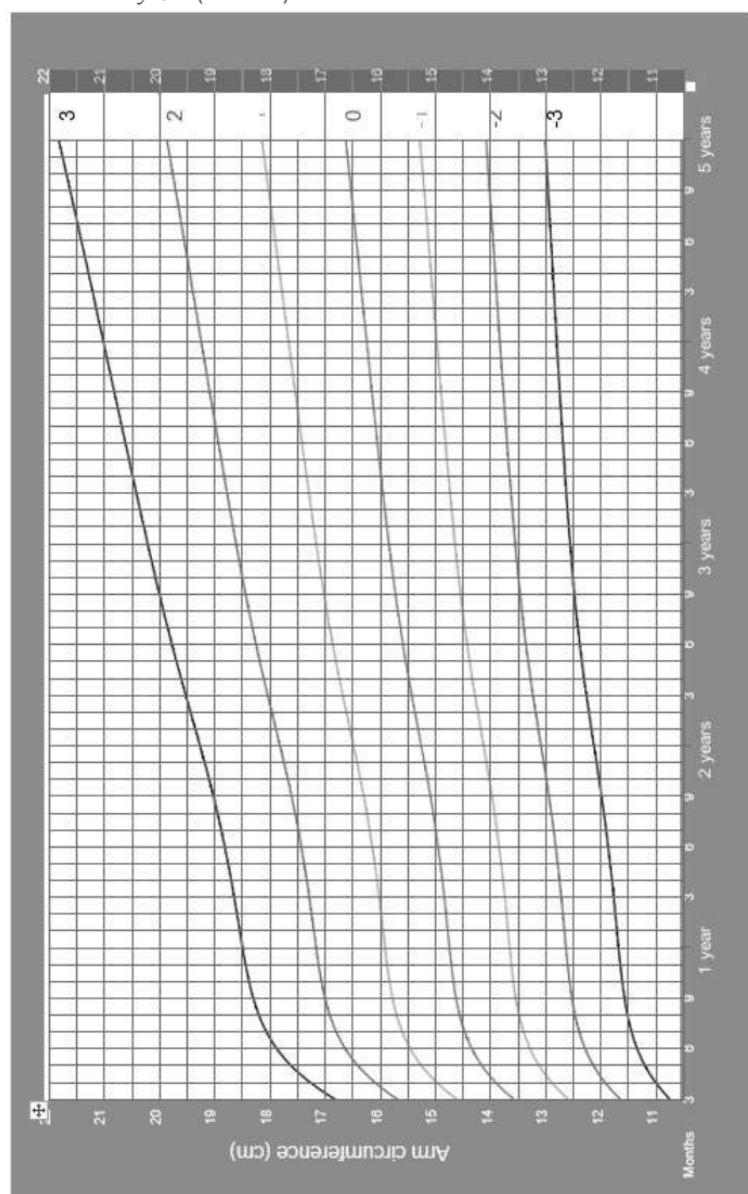
2 to 5 years (z-scores)





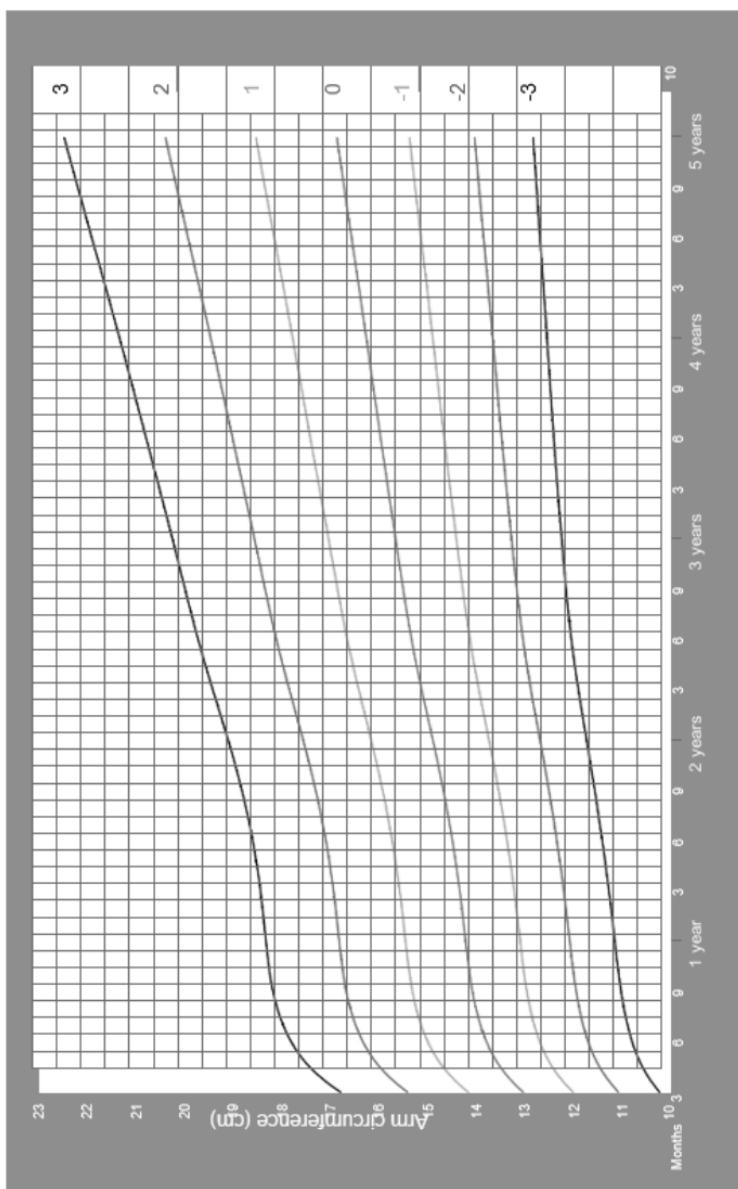
## Arm circumference-for-age BOYS

3 months to 5 years (z-scores)





## Arm circumference-for-age GIRLS 3 months to 5 years (z-scores)





# 18 Immunization

## 18.1 ROUTINE CHILDHOOD VACCINATION

### 18.1.1 National Immunization Schedule

Adapted from the UNEPI/MOH Immunization Schedule, 2022

Vaccine Or Antigen	Age	Dose & Mode Of Administration	Mode Of Administration	Site Of Administration
BCG	At birth (or first contact)	0-11 months: 0.05 mL Above 11 months: 0.1 mL	Intradermally	Right Upper Arm
Hepatitis B	At birth(first contact within the first 7 days of life)	0.5 ml IM	Intramuscular	Outer aspect of left thigh
Oral Polio	4 doses: at birth, 6, 10, and 14 weeks	2 drops	Orally	Mouth
Inactivated Polio Vaccine (IPV)	2 doses: At 6 and 14 Weeks of age	0.5 mL	Intramuscular	Outer aspect of right thigh; 2.5 cm away from PCV site

Vaccine Or Antigen	Age	Dose & Mode Of Administration	Mode Of Administration	Site Of Administration
DPT-HepB + Hib 1	3 doses: at 6, 10 and 14 weeks	0.5 mL	Intramuscular	Outer aspect of left thigh
PCV	3 doses: at 6, 10 and 14 weeks	0.5 mL	Intramuscular	Outer aspect of right thigh
Rota	2 doses: at 6 and 10 weeks	2 drops	orally	Slow admin on inner aspect of cheek
Measles Rubella	2 doses:At 9 and 18 months	0.5 mL	Subcutaneous	Left Upper Arm
Yellow fever	At 9 months	0.5 ml	Subcutaneous	Right Upper Arm
All girls in primary 4 or 10 year old girls outside school	HPV	Give 2 doses IM 6 months apart	Intramuscular	Left Upper Arm

### General principles of routine childhood immunization

- ① The aim is to ensure that all target age groups complete their immunization schedule as above
- ② Age for vaccinations: Give each vaccine at the recommended age or if this is not possible, at any first contact with the child after this age
- ③ BCG vaccination
  - Give this as early as possible in life, preferably at birth
  - Do NOT give BCG vaccine to any child with clinical signs and symptoms of immunosuppression, e.g. AIDS

- Ⓐ Use each vaccine with its corresponding pre-cooled diluent from the same manufacturer
- Ⓐ Polio vaccination (= ‘birth dose’): This is a primer dose of oral polio vaccine (OPV), which should be given ideally at birth but otherwise in the first 2 weeks of life
- Ⓐ DPT-HepB-Hib vaccine
  - Is a combination of DPT vaccine + hepatitis B vaccine (HepB) + haemophilus influenzae type b (Hib) vaccine
  - Minimum interval between each of the doses is 4 weeks
- Ⓐ Measles rubella vaccination
  - ▢ Given at 9 and 18 months of age or first contact after this age
  - ▢ Can also be given to any unimmunised child of 6-9 months
  - ▢ old who has been exposed to measles patients. Children vaccinated in this way must have the vaccination repeated at 9 months of age
  - Ⓐ Vaccination of sick children
    - ▢ Admit and treat any child who is severely ill, and vaccinate at the time of discharge
    - ▢ Minor illness is not a contraindication to vaccination
    - ▢ Screen clients at points of care and administer the due vaccines
    - ▢ Screen clients for vaccine preventable diseases for investigation and notification

## Administration and storage of vaccines

### Storage and transport

- Ⓐ At health units, vaccines should be stored between +2 C to +8 C
- Ⓐ At the district and central vaccine stores (static units) where freezers exist, polio and measles rubella vaccines may be stored for prolonged periods at -20 C
- Ⓐ Do not freeze DPT-HepB-Hib, PCV, IPV, HPV, hepatitis B, yellow fever and TT vaccines
- Ⓐ Never freeze the diluents for BCG, yellow fever and measles vaccines

- Ⓐ Use conditioned ice packs and sponge method for transport

Carefully follow recommended procedures to maintain the cold chain for all vaccines, e.g.:

- ☐ Ensure continuous supply of power/gas
- ☐ Record fridge temperature twice daily (morning and evening, including weekends/public holidays)
- ☐ Use sponge method during each immunization session

### Reconstitution and administration

- Ⓐ Never use the diluents provided for vaccines to mix other injectable medicines
- Ⓐ Never use water for injection as a diluent for vaccine reconstitution

**Do not vaccinate in direct sunlight (always carry out immunization in a building or under a shade)**

- Ⓐ Record every vaccination in the child register and on a tally sheet until child has completed all the antigens
- Ⓐ Use the child register and child health card for tracking drop outs
- Ⓐ A child who received any immunization dose during national immunization campaigns should still get the routine vaccination doses
- Ⓐ Never use any vaccine:
  - After its expiry date
  - When the vaccine vial monitor (VVM) has changed to discard point (stage 3 and 4)
  - If there has been contamination, or contamination is suspected in open vials
  - If the vial labels are lost
  - DPT-HepB-Hib, HepB, PCV, rotavirus vaccine, IPV, HPV, TT/Td that have been frozen

## Adhere to the WHO recommended Multi-Dose Vial Policy (MDVP) as below:

TYPE OF VACCINE	MDVP GUIDELINE
OPV and IPV	<p>Do not use vaccine if:</p> <ul style="list-style-type: none"> <li>Contaminated or has no label</li> <li>The VVM at or beyond discard point (stage 3 &amp; 4)</li> <li>Vials have been opened for 4 weeks</li> <li>Vials opened during outreach</li> <li>Vaccines have not been stored under cold chain conditions</li> </ul>
DPT-HepB-Hib, Hep B, TT,PCV	<p>Do not use vaccine if:</p> <ul style="list-style-type: none"> <li>Contaminated or has no label</li> <li>The VVM is at or beyond discard point</li> <li>Frozen</li> <li>Vials have been opened for 4 weeks or more</li> </ul>
	<p>Vials opened during out-reach</p> <p>Vaccines have not been stored under cold chain conditions</p>
BCG,yellow fever and Measles Rubella	<ul style="list-style-type: none"> <li>● Discard remaining doses in the opened vials of these vaccines after 6 hours</li> <li>● of reconstitution or at the end of the immunization session, whichever comes first</li> </ul>

### Common non-serious side effects of vaccines and patient advice

VACCINE AND SIDE EFFECTS	PATIENT ADVICE
<b>BCG</b> <ul style="list-style-type: none"> <li>● Pain at injection site</li> </ul>	<ul style="list-style-type: none"> <li>● The ulcer that forms at the injection site is a normal and expected reaction that heals by itself and leaves a permanent scar. It should not be covered with anything</li> </ul>

VACCINE AND SIDE EFFECTS	PATIENT ADVICE
<b>DPT-HepB-Hib, PCV</b>	<ul style="list-style-type: none"> <li>Ⓐ Mild reactions at injection site: swelling, pain, redness</li> <li>Ⓐ Fever within 24 hours of the injection</li> <li>Ⓐ Anaphylactic reactions</li> <li>Ⓐ Seizures</li> </ul> <ul style="list-style-type: none"> <li>Ⓐ Do not apply anything to the injection site</li> <li>▢ Take paracetamol if necessary.</li> <li>- If fever continues after 2 doses of paracetamol, report to health facility</li> <li>▢ Wiping the child with a cool sponge or cloth (with water at room temperature) is also good for reducing fever</li> <li>Ⓐ If seizures or severe rash/ difficulty in breathing occurs, return to health facility immediately</li> </ul>
<b>Oral Polio and Rotavirus</b>	<ul style="list-style-type: none"> <li>Ⓐ Short-lived gastrointestinal symptoms (pain, diarrhoea, irritation)</li> </ul> <ul style="list-style-type: none"> <li>Ⓐ Dispose of the child's faeces properly as the virus spreads through the oral-faecal route</li> <li>Ⓐ Wash hands thoroughly after changing the baby's nappies</li> </ul>
<b>Inactivated/Injectable Polio</b>	<ul style="list-style-type: none"> <li>Ⓐ Pain, redness and swelling at injection site</li> <li>Ⓐ Fever, headache, drowsiness,</li> <li>Ⓐ Irritability in infants</li> <li>Ⓐ Diarrhoea, nausea,</li> <li>Ⓐ vomiting</li> </ul> <ul style="list-style-type: none"> <li>Ⓐ Side effects usually mild and should not cause worry</li> <li>Ⓐ Take paracetamol if necessary</li> <li>Ⓐ If fever continues after 2 doses of paracetamol, report to health facility</li> <li>Ⓐ Report any severe reaction to health worker immediately</li> </ul>
<b>Measles rubella</b>	<ul style="list-style-type: none"> <li>Ⓐ Pain, swelling, redness at injection site</li> <li>Ⓐ Fever and skin rash 5-12 days after the vaccine</li> </ul> <ul style="list-style-type: none"> <li>Ⓐ Child may get a mild skin rash and fever after few days; do not worry</li> <li>Ⓐ Do not apply anything to the injection site</li> </ul>

VACCINE AND SIDE EFFECTS	PATIENT ADVICE
<b>Yellow fever</b> <ul style="list-style-type: none"> <li>● Pain, swelling, redness at injection site</li> <li>● Fever and skin rash 5-12 days after the vaccine</li> </ul>	<ul style="list-style-type: none"> <li>● Side effects may occur within 1-2 days of immunization; they are usually mild and should not cause worry</li> <li>● Report to health worker immediately any severe reaction</li> </ul>
<b>HPV</b> <ul style="list-style-type: none"> <li>● Injection site reactions: pain, redness, itching, bruising or swelling</li> <li>● Headaches</li> <li>● General body aches, nausea</li> </ul>	<ul style="list-style-type: none"> <li>● Side effects usually mild and should not cause worry</li> <li>● Report to health worker immediately any severe reaction</li> </ul>
<b>Tetanus Toxoid (TT)</b> <ul style="list-style-type: none"> <li>● Irritation at injection site</li> <li>● Fever, malaise</li> </ul>	<ul style="list-style-type: none"> <li>● Side effects may occur within 1-2 days of immunization; they are usually mild and should not cause worry</li> <li>● Report to health worker immediately any severe reaction</li> </ul>
<b>Hep B Vaccine</b> <ul style="list-style-type: none"> <li>● Pain, redness and swelling at injection site</li> <li>● Fatigue</li> <li>● Fever</li> </ul>	<ul style="list-style-type: none"> <li>● If fever develops, give a single dose of paracetamol</li> </ul>

## OTHER VACCINATIONS

### 18.1.2 Hepatitis B Vaccination

- Since 2005, children are immunised against Hepatitis B in the routine childhood immunization using the DPT-HepB-Hib vaccine at 6, 10, and 14 weeks of age

- Ⓐ For adolescents and adults, it is recommended that the hepatitis B vaccination is given preferably after testing for hepatitis B infection (HBsAg and Anti-HBs). Patients with HIV and pregnant women should be handled on a case by case basis
- Ⓐ Vaccination is recommended for high risk groups, e.g:
  - Health workers in clinical settings and training
  - Intravenous drugs users
  - Persons who frequently receive blood transfusions
  - Recipients of solid organ transplantation
  - High-risk sexual behaviour
  - Partners and household contacts of HBsAg positive patients
  - Support staff in health facilities
- Ⓐ The schedule has three doses: at 0, 1 month after 1st dose, and 6 months after first dose (0, 1, 6 months)
- Ⓐ The storage temperature for the vaccine is 2 C to 8 C
- ▢ Dose: 0.5 mL given intramuscularly on the deltoid muscle (upper arm)
- ▢ Do NOT give vaccine on the buttocks because of low immune response (decreased protective antibody response) and risks of injury to the sciatic nerve

### 18.1.3 Yellow Fever Vaccination

The yellow fever vaccine is live attenuated, and it is reconstituted before use. Ideally, it should be used within 6 hours after reconstitution.

- Ⓐ Dose: 0.5 mL given intramuscularly on the upper arm as a single dose
- Ⓐ The storage temperature for the vaccine is 2 C to 8 C
- Ⓐ Immunity is life-long and international travel certificate is issued once and valid for life.

### 18.1.4 Tetanus Prevention

- Ⓐ All children should be vaccinated against tetanus during routine childhood immunization using the DPT-HepB-Hib vaccine at 6, 10, and 14 weeks of age (see above)
- Ⓐ Neonatal tetanus is prevented by routinely immunising all

pregnant women/women of child-bearing age (15–45 years) against tetanus with Tetanus Toxoid vaccine (see below)

### **18.2.3.1 Prophylaxis Against Neonatal Tetanus**

- Ⓐ Ensure hygienic deliveries, including proper cutting and care of umbilical cords through the use of skilled birth attendants
- Ⓑ Immunise all pregnant women/women of child-bearing age (15 – 45 years) against tetanus with Tetanus Toxoid with diphtheria vaccine (Td)
- Ⓒ Give TT vaccine 0.5 mL IM into the upper arm as per the recommended schedule below:

#### **Routine TT vaccine schedule and the period of protection**

TT DOSE	WHEN GIVEN	DURATION AND LEVELS OF PROTECTION
Td1	At first contact with woman of childbearing age or as early as possible during pregnancy	None
Td2	At least 4 weeks after Td1	3 years; 80% protection
Td3	At least 6 months after Td2	5 years; 95% protection
Td4	At least 1 year after Td3	10 years; 99% protection
Td5	At least 1 year after Td4	30 years; 99% protection

#### **Vaccination Against Adult Tetanus**

- Ⓐ High risk groups such as farm workers, military personnel, miners, safe male circumcision clients, should be vaccinated as in the table above (if not fully immunized) and given regular boosters every 10 years

- ⑤ Patients at risk of tetanus as a result of contaminated wounds, bites, burns, and victims of road traffic accidents be given Antitetanus Immunoglobulin (TIG) and then be vaccinated as indicated in the table below

TREATMENT	LOC
<b>General measures</b>	HC3
<input type="checkbox"/> Ensure adequate surgical toilet and proper care of wounds <b>Passive immunization: give to any patient at risk, except if fully immunized and having had a booster within the last 10 years</b> <input type="checkbox"/> Give IM tetanus immunoglobulin human (TIG): Child <5 years: 75 IU Child 5-10 years: 125 IU Child >10 years/adult: 250 IU <input type="checkbox"/> Double the dose if heavy contamination suspected or if >24 hours since injury was sustained	HC4
<b>Alternative - only if TIG not available:</b>	
<input type="checkbox"/> Antitetanus serum (tetanus antitoxin) 1,500 IU deep SC or IM	
<b>Active immunization</b>	HC3
<b>Unimmunised or partially immunised patients:</b>	
<input type="checkbox"/> Give a full course of vaccination for those who are not immunized at all (3 doses 0.5 mL IM at intervals of 4 weeks)	
<b>Fully immunized patients with booster &gt;10 years before:</b>	
<input type="checkbox"/> Give one booster dose of TT 0.5 mL intramuscularly	
<b>Fully immunised patients who have had a booster dose within the last 10 years</b>	
<input type="checkbox"/> A booster is NOT necessary	
<b>Note</b>	
<ul style="list-style-type: none"> <li>▪ Giving TIG or TT to a fully immunised person may cause an unpleasant reaction, e.g., redness, itching, swelling, and fever, but with a severe injury this is justified</li> </ul>	

## 18.2.4 Vaccination against COVID-19.

### Who should be vaccinated?

- 12 years and above

VACCINE ADMINISTRATION						
Vaccine Name	Dosage	Dose	Dose interval	Device	Route of Admin.	Site of Admin.
Astrazeneca	0.5 ml	2 doses	8 - 12 weeks	0.5 ml auto-disable (AD) syringe		
Sinovac	0.5 ml	2 doses	4 weeks	0.5 ml auto-disable (AD) syringe		
Pfizer-BioNTech	0.3 ml	2 doses	3 - 4 weeks	0.3 ml auto-disable (AD) syringe	Intramuscular (IM)	Left Deltoid Muscle
Moderna	0.5 ml	2 doses	4 weeks	0.5 ml auto-disable (AD) syringe		
Janssen	0.5 ml	1 dose	N/A	0.5 ml auto-disable (AD) syringe		
Sinopharm	0.5 ml	2 doses	3 - 4 weeks	0.5 ml auto-disable (AD) syringe		

The dose interval is 12 weeks for AZ and 4 weeks for all the rest, except J&J which is only one dose

- Ⓐ A booster dose that can be administered at least 6 months after completion of the primary series is recommended for all those aged 50 years and above, health workers, teachers both in pre-primary, primary, secondary, and tertiary institutions, religious leaders, cultural leaders, security personnel, media personnel, drivers and conductors of public transport vehicles, boda boda riders, bar and night club workers, market workers and vendors

Table: COVID Vaccine Matching and mixing (heterologous primary schedules) /Booster dosing

	First Dose	Second Dose OR Booster
1	AstraZeneca	Pfizer or Moderna
2	Pfizer	AstraZeneca
3	Moderna	AstraZeneca
4	Sinopharm	AstraZeneca or Pfizer or Moderna

	First Dose	Second Dose OR Booster
5	Sinovac	AstraZeneca or Pfizer or Moderna
6	Johnson & Johnson	Pfizer or Moderna

Nutrition is the intake of food, considered in relation to the body's dietary needs. Good nutrition – an adequate, well balanced diet combined with regular physical activity – is a cornerstone of good health.

Poor nutrition can lead to reduced immunity, increased susceptibility to disease, impaired physical and mental development, and reduced productivity.

Optimal nutrition means obtaining a balance of macronutrients (carbohydrates, proteins and fats) and micronutrients (vitamins and minerals).

Macronutrients provide energy for organ and tissue functions and growth, and micronutrients are needed in small amounts for chemical processes in the body such as metabolism, growth, and protection against infections.

In addition, plenty of water is needed to build cells and regulate body processes.

# 19

## Nutrition

### 19.1 NUTRITION GUIDELINES IN SPECIAL POPULATIONS

#### 19.1.1 Infant and Young Child Feeding (IYCF)

1. Counsel and support all mothers to initiate breastfeeding within an hour of delivery and exclusively breastfeed their infants for the first six months of life, unless medically contraindicated.
2. Teach mother correct positioning and attachment for breastfeeding, how to express and store breast milk hygienically, and how to feed the child by a cup.
3. Counsel and support parents to introduce adequate, safe, and appropriate complementary foods at 6 months of age, and to continue breast feeding until the child is 2 years.
4. A good diet should be adequate in quantity and include an energy-rich food (e.g. thick cereal with added oil, meat, fish, eggs, legumes, fruits and vegetables)
5. Pregnant women and lactating mothers should consume adequate nutritious foods
6. Recommend exclusive breastfeeding for infants of HIV-infected women for the first 6 months unless the replacement is acceptable, feasible, affordable, sustainable, and safe (AFASS).
7. Malnourished children should be provided with appropriate medical care, nutritional rehabilitation, and follow-up.
8. Encourage mothers of low birth weight infants who can suckle to breastfeed. Assist those who cannot breastfeed to express breast milk and feed the baby.
9. During illness, children should take increased fluids: breastfeed more often, increase amount of milk given, increase fluid intake (e.g. soups, yoghurt, and drinking water). Extra fluid in diarrhoea is especially life-saving
10. For more information on feeding recommendations in infants and young children, see IMCI section 17.3.12.3



## 19.1.2 Nutrition in HIV/AIDS

Good nutrition in HIV/AIDS is important as it helps to:

- ⦿ Prevent malnutrition and wasting
- ⦿ Delay the progress of HIV to AIDS
- ⦿ Enhance the body's ability to fight opportunistic infections
- ⦿ Achieve and maintain optimal body weight and strength

Relieve complications, e.g., diarrhoea, nausea, vomiting, thrush

- ⦿ Improve effectiveness and tolerance of medication
- ⦿ Improve quality of life

**Severe malnutrition is diagnosed when:**

- ⦿ BMI <16 kg/m<sup>2</sup>
- ⦿ Weight loss >10% in past 2 months
- ⦿ MUAC <185 mm (<210 mm if pregnant or postpartum)
- ⦿ Persistent diarrhoea or fever

## Management

TREATMENT	LOC
<p>If patient has other complications</p> <p><input type="checkbox"/> Admit patient and treat infections and rehydrate</p> <p>If patient has no other medical complications</p> <p><input type="checkbox"/> Treat as an outpatient</p> <p><input type="checkbox"/> Promote weight gain with high-energy foods, protein, vitamins and minerals</p> <p><input type="checkbox"/> If ready-to-use therapeutic food is available, give 3 sachets Supplement the patient's diet with multivitamins and minerals, 1-2 tablets per day e.g, a combination of selenium and molinga has been proven to be beneficial per day in adults, in addition to normal food</p> <p>- See next section 19.2 for malnutrition in children</p> <p><input type="checkbox"/> Follow up in 2 weeks, at 1 month, then every 2 months thereafter</p>	HC4 HC3

### 19.1.3 Nutrition in Diabetes

People with diabetes should follow normal nutritional guidelines for the general population, and can eat the same foods as the whole family since everyone benefits from healthy eating.

**Healthy eating and exercise in diabetics help to:**

- Maintain the blood glucose close to normal to prevent complications
- Control cholesterol levels
- Control blood pressure, and reduce the risk of complications such as heart disease and stroke

In addition, diabetics have to take care to balance their food with insulin and oral antidiabetic medications to help manage their blood glucose levels.

Healthy diet involves eating a variety of foods including vegetables, whole grains, fruits, non-fat dairy products, beans, lean meat, poultry, and fish. These are rich in vitamins, minerals and fibre. Avoid processed foods.

#### General advice

- Eat three meals a day. Avoid skipping meals, and space out breakfast, lunch, and evening meal over the day
- At each meal, include moderate amount (around 1/3 of the plate) of starchy carbohydrate foods, e.g., bread, pasta, chapatis, potatoes, yams, noodles, rice, and cereals. Eat more slowly absorbed (low glycaemic index) foods, e.g., pasta, rice, sweet potato and yam, porridge oats, bran, and natural muesli
- Reduce fat in the diet, especially saturated fats. Use unsaturated fats or oils e.g. olive oil, sunflower oil
- Eat more fruit and vegetables. Aim for at least five portions a day. Eat more beans and lentils.
- Limit sugar and sugary foods
- Reduce salt in the diet to 6 g or less per day
- Drink alcohol only in moderation: 1 drink (one beer or one small glass of wine or one shot of spirit) for women and

2 for men as a maximum amount daily. Alcohol has some cardioprotective effect. It should be consumed with food to prevent hypoglycaemia

- ⦿ Don't use products marketed as "diabetic foods, drinks or herbs" (they are expensive and of no benefit)
- ⦿ Routine supplementation with vitamins and minerals without underlying actual deficiency is not beneficial, patients should eat lots of fruits and vegetables e.g, a combination of selenium and molinga has been proven to be beneficial
- ⦿ Obese and overweight patients need to be encouraged to reduce weight using exercise and diet modifications

## 19.2 MALNUTRITION |ICD10 CODE: E40-43

### 19.2.1 Introduction on Malnutrition

Malnutrition is the cellular imbalance between the supply of nutrients and energy and the body's demand for them to ensure growth, maintenance, and specific functions. It includes both under- and over nutrition.

However, the term “malnutrition” commonly refers to undernutrition, and is used as such in these guidelines.

Although malnutrition can affect all ages, however, the early stages, including, foetus, infants and children, are most vulnerable to the effects of undernutrition during the period of their most rapid physical growth and development during the first two years of life.

Malnutrition is a significant contributor to morbidity and mortality among children under 5 years in Uganda. It also makes the prognosis of other diseases poor.

#### Note

- Previously, malnutrition was classified into two types: 1) Protein-Energy Malnutrition (PEM) due to lack of adequate protein and energy in the diet and 2) Micronutrient malnutrition-due to deficiencies in specific micronutrients (vitamins and minerals).
- These causal names are now avoided because protein and energy deficits are likely to be accompanied by deficiencies of other nutrients, and management of malnutrition takes this into consideration.

## Causes/contributing factors to malnutrition

- Immediate causes: diet and disease
- Inadequate quantity and quality of food
- Lack of knowledge on appropriate foods provided to children, poor food preparation, food taboos
- Infections: reduce appetite, increase energy and nutrient utilisation, and limit the ability to absorb or retain nutrients e.g. in diarrhoea, intestinal parasites
- Root causes: food insecurity, poor health services, poor environmental sanitation, natural disasters, excessive workload for women, poor weaning practices, culture, inadequate water supply, low literacy levels, low nutrition advocacy/education
- Underlying causes: poverty, corruption, poor governance, poor infrastructure.

## Consequences of malnutrition

- Impaired growth, physical and mental and development
- Impaired body resistance/immune system
- Increased risk of adult chronic diseases
- Increased risk of mortality
- Increased risk for the cycle of inter-generational malnutrition
- Poor economic well-being for the individual and country

## Differential diagnosis

- Nephrotic syndrome (nephritis)
- Liver disease
- Heart disease
- Malabsorption syndrome
- Malignancy (e.g., gastrointestinal tract cancer, liver cancer/hepatocellular carcinoma)

### 19.2.1.1 Classification of Malnutrition

TYPE	DEFINITION OR FEATURES
<b>Acute</b>	<ul style="list-style-type: none"> <li>⦿ Is an indicator of current nutritional status, reflecting recent weight changes or disruption in nutrient intake</li> <li>⦿ Most appropriate indicator to use in an emergency setting (e.g. due to sudden/ sharp period of food shortage)</li> <li>⦿ Associated with loss of body fat and severe wasting</li> <li>⦿ Children are thinner than their comparable age group of same height</li> <li>⦿ Classified as Moderate or Severe based on anthropometry (measurement of the size, weight and proportions of the human body), biochemistry and clinical assessment</li> </ul>
<b>Chronic</b>	<ul style="list-style-type: none"> <li>⦿ Is an indicator of the nutritional status over-time; chronically malnourished children are shorter (stunted) than their comparable age group</li> </ul>

#### Clinical features of malnutrition

- ⦿ Marasmus: severe wasting, old man's face, excess skin' hangs around the buttocks, ribs and zygoma bones are prominent, scapular blades and extremities (limbs), eyes are sunken
- Apathetic or irritable, appetite is fairly good, skin is almost normal, hair demonstrates some changes but not as dramatic as in Kwashiorkor, organomegaly is rare (liver and spleen enlargement)
- ⦿ Kwashiakor: pitting feet oedema, skin desquamation, hair changes, presence of bilateral pitting oedema (oedema of both feet), moon face

- Appears adequately nourished due to excess extra cellular fluid, but is very miserable, apathetic
- Skin changes (dermatosis, flaky paint dermatitis)
- Hair changes: Silky, straight, sparsely distributed; easily, painlessly pluckable
- Severe pallor of the conjunctiva, mucous membranes, palms, and soles, loss of skin turgor (dehydration)
- Organomegaly (liver, spleen) is common
- Marasmus-kwashiakor: most common form, presents with features of both Marasmus and Kwashiorkor

### **19.2.1.2 Assessing Malnutrition in Children 6 months to 5 years**

The 4 key features used to diagnose acute malnutrition are:

- Weight-for-Height/Length (WFH/L) using WHO growth standards charts (see section 15.5). It is the best indicator for diagnosing acute malnutrition.
- Mean Upper Arm Circumference (MUAC) in mm using a measuring tape (see section 17.5)
- Oedema of both feet (kwashiorkor with or without severe wasting)
- Appetite test: ability to finish portion of ready-to-use therapeutic food (RUTF).

WEIGHT FOR AGE (WFA) reflects both long term (stunting) and short term (wasting) nutritional status, so it is not very useful for diagnosis of acute malnutrition.

It can also miss out oedematous children, who are very malnourished but may have a near-normal weight because of fluid retention.

## Diagnostic criteria

TYPE	CRITERIA
<b>Moderate Acute Malnutrition</b>	<ul style="list-style-type: none"><li><input type="radio"/> WFH/L between -3 and -2 z-scores</li><li><input type="radio"/> Or MUAC 115 up to 125 mm</li><li><input type="radio"/> Or low weight for age</li></ul>
<b>Severe Acute Malnutrition</b>	<p><b>Without complications</b></p> <ul style="list-style-type: none"><li><input type="radio"/> Oedema of both feet (kwashiorkor with or without severe wasting) OR</li><li><input type="radio"/> WFH/L less than -3 z scores OR</li><li><input type="radio"/> MUAC less than 115 mm OR</li><li><input type="radio"/> Visible severe wasting AND</li><li><input type="radio"/> Able to finish RUTF</li></ul> <p><b>With complications</b></p> <ul style="list-style-type: none"><li><input type="radio"/> Oedema of both feet OR</li><li><input type="radio"/> WFH/L less than -3 z scores OR</li><li><input type="radio"/> MUAC less than 115 mm OR</li><li><input type="radio"/> Visible severe wasting AND</li><li><input type="radio"/> Any one of the following:<ul style="list-style-type: none"><li>- Medical complication present OR</li><li>- Not able to finish RUTF</li></ul></li></ul>
<b>Specific micronutrient deficiencies</b>	<ul style="list-style-type: none"><li><input type="radio"/> Vitamin A: xerophthalmia</li><li><input type="radio"/> Vitamin C: scurvy</li><li><input type="radio"/> Vitamin B12 and folic acid: megaloblastic anaemia (see section 11.1.1.2)</li><li><input type="radio"/> Iron: iron-deficiency anaemia (see section 11.1.1.1)</li></ul>

## Investigations

Children with SAM should always be first assessed with a full clinical examination to confirm presence of any danger sign, medical complications, and tested for appetite.

- Assess patient's history of:
- Recent intake of food, loss of appetite, breastfeeding
- Usual diet before current illness (compare the answers to the Feeding Recommendations for the Child's age (section 17.3.12.3)
- Duration, frequency and type of diarrhoea and vomiting
- Family circumstances
- Cough >2 weeks and contact with TB
- Contact with measles
- Known or suspected HIV infection/exposure
- Initial examination for danger signs and medical complications:
- Shock: lethargy or unconscious, cold hands, slow capillary refill (<3 seconds), weak pulse, low blood pressure
- Signs of dehydration
- Severe palmar pallor
- Bilateral pitting oedema
- Eye signs of vitamin A deficiency: dry conjunctiva, corneal ulceration, keratomalacia, photophobia
- Local signs of infection: ear, throat, skin, pneumonia
- Signs of HIV (see WHO Clinical Staging section 3.1.1)
- Fever (37.5 C) or hypothermia (rectal temp <35.5 C)
- Mouth ulcers
- Skin changes of kwashiorkor: hypo- or hyperpigmentation, desquamation, ulcerations all over the body, exudative lesions (resembling burns) with secondary infection (including candida)

- Laboratory tests
- Blood glucose
  - Complete blood count or Hb, malaria, HIV, electrolytes
  - Stool microscopy for ova and cysts, occult blood, and parasites
- Chest X-ray: Look for evidence of tuberculosis or other chest abnormalities
- Conduct an appetite test
  - Assess all children 6 months for appetite at the initial visit and at every follow up visit to the health facility

#### HOW TO DO APPETITE TEST

- Arrange a quiet corner where the child and mother can take their time to eat RUTF. Usually the child eats the RUTF portion within 30 minutes

#### Explain to the mother

- The purpose of assessing the child's appetite
- What RUTF is
- How to give RUTF
  - Wash hands before giving RUTF
  - Sit with child and gently offer RUTF
  - Encourage child to eat without feeding by force
  - Offer plenty of water to drink from a cup during RUTF feeding

#### Offer appropriate amount of RUTF to child to eat:

- After 30 minutes, check if the child was able to finish or not able to finish the amount of RUTF given and decide:
  - Child ABLE to finish at least one third of a packet of RUTF portion (92 g) or 3 teaspoons from a pot within 30 minutes
  - Child NOT ABLE to eat one-third of a packet of RUTF portion (92 g) or 3 teaspoons from a pot within 30 minutes
- Determine WFH/L: Measure the child's height and weight and plot the score on the appropriate chart (boy or girl). Match the value to the z-score on the right y-axis to determine the child's z-score (see section 17.5)
- Measure MUAC: Using a MUAC tape, measure the circumference

of the child's upper arm and plot the score on the appropriate chart (boy or girl, section 17.5). Please note: 1 cm=10 mm, so 11.5 cm = 115 mm.

## 19.2.2 Management of Acute Malnutrition in Children

### General principles of management

- Admit all children with any danger sign, medical complications, pitting oedema or those who fail appetite tests for inpatient care and treatment for complicated SAM.
- Keep them in a warm area separated from infectious children, or in a special nutrition area.
- Children with good appetite and no medical complications can be managed as outpatients for uncomplicated SAM.
- Adequate facilities and staff to ensure correct preparation of therapeutic foods, and to feed child regularly day and night, should be available.
- Accurate weighing machines and MUAC tapes should be available
- Proper records of feeds given and child's measurements should be kept so that progress can be monitored
- Explain to patient/care-giver to handle the child gently

### 19.2.2.1 Management of Moderate Acute Malnutrition

TREATMENT	LOC
<input type="checkbox"/> Assess the child's feeding and counsel the mother on the feeding recommendations	HC3
<input type="checkbox"/> If child has any feeding problem, counsel and follow up in 7 days (see section 17.3.12.4)	
<input type="checkbox"/> Assess for possible TB infection	
<input type="checkbox"/> Advise mother when to return immediately (danger signs)	

TREATMENT	LOC
<p><b>FOLLOW-UP CARE</b></p> <p><b>Follow-up in 30 days</b></p> <ul style="list-style-type: none"> <li>Ⓐ Reassess child and re-classify           <ul style="list-style-type: none"> <li>- If better, praise mother and counsel on nutrition</li> <li>- If still moderate malnutrition, counsel and follow up in 1 month</li> <li>- If worse, loosing weight, or feeding problem: refer</li> </ul> </li> </ul>	

### 19.2.2.2 Management of Uncomplicated Severe Acute Malnutrition

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Give oral antibiotics: amoxicillin DT 40 mg/kg twice a day 40 mg/kg for 5 days</li> <li><input type="checkbox"/> Give ready-to-use therapeutic food (RUTF) for a child aged 6 months (for doses, see next section)</li> <li><input type="checkbox"/> Counsel the mother on how to feed the child (see section 17.3.12.3)</li> <li><input type="checkbox"/> Assess for possible TB infection</li> <li><input type="checkbox"/> Advise mother when to return immediately (danger signs)</li> </ul> <p><b>FOLLOW-UP CARE</b></p> <p><b>After 7 days</b></p> <ul style="list-style-type: none"> <li>▪ Reassess child and feeding. If no new problem, review again in 7 days</li> </ul> <p><b>After 14 days or during regular follow up:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Do a full reassessment of the child: check WFH/L, MUAC, oedema of both feet and do another appetite test</li> </ul> <p><b>If the child has complicated SAM</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Refer URGENTLY to hospital</li> </ul> <p><b>If the child has uncomplicated SAM</b></p>	HC3

- Counsel the mother and encourage her to continue with appropriate RUTF feeding. Ask mother to return again in 14 days

**If the child has moderate acute malnutrition:**

- Advise the mother to continue RUTF. Counsel her to start other foods according to the age appropriate feeding recommendations (see section 17.3.12.3)
- Tell her to return in 14 days. Continue to see the child every 14 days until the child has no more acute malnutrition

**If the child has no acute malnutrition (WFH/L is -2 z-scores or more, or MUAC is 125 mm or more)**

- Praise the mother, STOP RUTF and counsel her about age appropriate feeding recommendations

### 19.2.2.3 Management of Complicated Severe Acute Malnutrition

#### In-patient care

- Ⓐ Refer child to hospital: prevent hypoglycaemia by giving small sips of sugar water, keep the child warm, first dose of antibiotics (ampicillin + gentamicin)
- Ⓑ Triage the children to fast-track seriously ill patients for assessment and care: treat shock, hypoglycaemia, and corneal ulceration, immediately
- Ⓒ General treatment involves 10 steps in two phases: initial stabilisation for 1 week and rehabilitation (for weeks 2-6) as in the table below

ISSUE	STABILISATION		REHABILITATION
	DAYS 1-2	DAYS 3-7	
Hypoglycaemia			
Hypothermia			
Dehydration			
Electrolytes			
Infection			



ISSUE	STABILISATION		REHABILITATION
	DAYS 1-2	DAYS 3-7	WEEKS 2-6
Micronutrients		No iron	*With iron
Initiate feeding			
Catch-up feeding			
Sensory stimulation			
Prepare for follow-up			

### Note

- Iron is given after 2 days on F-100; if patient is taking RUTF, do NOT give iron

## Management of Complications in SAM

### Hypoglycaemia (Blood sugar <3 mmol/L or <54 mg/dL)

- Ⓐ All severely malnourished children are at a risk of hypoglycaemia, and should be given a feed or 10% glucose or sucrose, immediately on admission
- Ⓐ Frequent 2 hour feeding is important

TREATMENT
<b>Immediately on admission</b>
<input type="checkbox"/> Give 50 ml of glucose or sugar water (one rounded teaspoon of sugar in 3 tablespoons of water) orally or by NGT, followed by first feed as soon as possible
<b>If child is able to drink</b>
<input checked="" type="checkbox"/> Give first feed of F-75 therapeutic milk, if available, every 30 minutes for 2 hours, then continue with feeds every 2 hours for 24 hours <ul style="list-style-type: none"> <li>- Then give feeds every 2 or 3 hours, day and night</li> </ul>
<b>If child is unconscious</b>
<input type="checkbox"/> Treat with IV 10% glucose at 5 ml/kg
<input type="checkbox"/> If IV access cannot be quickly established, give 10% glucose or sucrose solution by NGT tube. To make 10% solution, dilute 1 part of 50% glucose with 4 parts of water OR 1 part of glucose 50% with 9 parts of glucose 5%

## TREATMENT

- If IV glucose not available, give 1 teaspoon of sugar moistened with 1-2 drops of water sublingually, and repeat every 20 minutes to prevent relapse
- Monitor children for early swallowing which delays absorption; if it happens, give another dose of sugar
- Start on appropriate IV/IM antibiotics

## Monitoring

If initial blood glucose was low, repeat measurement after 30 minutes

- If blood glucose falls to <3 mmol/L (<54 mg/dL), repeat the 10% glucose or oral sugar solution, and ensure antibiotics have been given
- If it is higher, change to 3 hourly feeds of F-75
- If rectal temperature falls to <35.5 C, or if level of consciousness deteriorates, repeat the blood glucose measurement and treat accordingly

## Prevention

- Feed every 2 hours, starting immediately (see below), or if child is dehydrated, rehydrate first. Continue feeding throughout the night
- Encourage mothers to watch for any deterioration, help feed and keep the child warm
- Check on abdominal distension

## Hypothermia (Axillary temperature <35 C and rectal temperature <35.5 C)

- Often associated with hypoglycaemia or serious infection

## TREATMENT

- Feed child immediately as in hypoglycaemia above
- Warm the child: make sure the child is well covered, especially the head, with cloths, hats, and blankets
  - If available, use a heater but not pointing directly at the child. DO NOT use hot water bottles or fluorescent lamps
- Encourage caretaker/mother to sleep next to her child and kangaroo technique for infants (skin-to-skin contact, direct heat/warmth transfer from mother to child)

**TREATMENT**

- Keep the ward closed during the night and avoid wind drafts inside
- Give appropriate IV or IM antibiotics
- Change wet nappies, clothes and bedding to keep child and bed dry
- Quickly clean the patient with a warm wet towel and dry immediately. Avoid washing the baby directly in the first few weeks of admission

**Monitoring**

- Take child's rectal temperature every 2 hours until it rises to <36.5 C, If using a heater, take it every 30 minutes
- Cover the child at all times, especially at night. Keep head covered with hat to prevent heat loss
- Check for hypoglycaemia

**Dehydration**

- In both oedema and non-oedematous SAM, the margin of safety between dehydration and over-hydration is very narrow. Exercise care and caution to avoid over-hydration and risk of cardiac failure
- Assume that all children with watery diarrhoea or reduced urine output have some dehydration

**TREATMENT**

- Do NOT use IV route for rehydration, except in cases of shock
- Rehydrate slowly, either orally or by NGT using ReSoMal, a specially prepared rehydration solution for malnutrition. The standard ORS has a high sodium and low potassium content, which is not suitable for SAM, except if profuse diarrhoea is present
- Give ReSoMal more slowly than you would when rehydrating a well-nourished child
  - Give 5 ml/kg every 30 minutes for the first 2 hours
  - Then give 5-10 ml/kg per hour for the next 4-10 hours, with F-75 formula. Exact amount depends on how much the child wants, the volume of stool loss and whether the child is vomiting

**If ReSoMal not available:**

- Give half strength standard ORS, with added potassium and glucose as per the ReSoMal recipe below, unless the child has cholera or profuse

TREATMENT
<ul style="list-style-type: none"> <li>- watery diarrhoea</li> <li>- If rehydration still required at 10 hours, give starter F-75</li> <li>- Instead of ReSoMal, at the same times. Give the same volume of starter F-75 as of ReSoMal</li> </ul>
<b>If child is unconscious, in shock or severe dehydration</b>
<p><input checked="" type="checkbox"/> Give IV fluid Darrow's solution or Ringer's lactate and 5% glucose (or if not available, 1/2 saline and 5% glucose at 15 mL/kg the first hour and reassess</p> <ul style="list-style-type: none"> <li>- If improving, give 15 mL/kg in second hour</li> <li>- If conscious, give NGT ReSoMal</li> <li>- If not improving, treat for septic shock</li> </ul>
<b>Monitoring</b>
<ul style="list-style-type: none"> <li>Ⓐ ONLY rehydrate until the weight deficit is corrected and then STOP, DO NOT give extra fluid to "prevent recurrence" (from specialist's notes)</li> <li>Ⓑ During rehydration, respiration and pulse rate should fall and urine passing should start</li> <li>Ⓒ Return of tears, moist mouth, improved skin turgor and less sunken eyes and fontanelle are a sign of rehydration. SAM children will not show these and so weight gain should be measured</li> <li>Ⓓ Monitor progress of rehydration every 30 minutes for 2 hours, then every hour for the next 4-10 hours</li> </ul>
<b>Be alert for signs of overhydration, which is dangerous and can lead to heart failure. Check for:</b>
<ul style="list-style-type: none"> <li>- Weight gain (make sure it is not quick or excessive)</li> <li>- If increase in pulse rate by 25/minute, respiratory rate by 5/minute is present, stop ReSoMal. Reassess after 1 hour</li> <li>- Urine frequency (if child urinated since last check)</li> <li>- Enlarging liver size on palpation</li> <li>- Frequency of stools and vomit</li> </ul>
<b>Prevention</b>
<p><input checked="" type="checkbox"/> Same as in dehydration in well-nourished child, except that ReSoMal is used instead of standard ORS. Give 30-50 ml of ReSoMal (for child &lt;2 years) and 100 ml (for child ≥ 2 years) after each watery stool.</p> <p>- Small, frequent, unformed stools are common in SAM and should not be confused with profuse watery stools, and they do not require treatment</p>

- Continue breastfeeding
- Initiate re-feeding with starter F-75
- Give ReSoMal between feeds to replace stool losses.  
Give 50-100 ml after each watery stool

### Recipe for ReSoMal using the standard WHO ORS

INGREDIENT	AMOUNT
Water	2 litres
WHO-ORS	One 1-litre packet
Sucrose	50 g
Electrolyte/mineral solution	40 ml

### Electrolyte imbalance

- All SAM children have deficiencies of potassium and magnesium, which may take up to 2 weeks to correct
- Oedema is partly due to potassium deficiency and sodium retention
- Do not treat oedema with diuretics
- Giving high sodium doses could kill the child

TREATMENT
<ul style="list-style-type: none"> <li><input type="checkbox"/> Give extra potassium (3-4 mmol/kg per day) f Give extra magnesium (0.4-0.6 mmol/kg per day) f Add extra potassium and magnesium to the feeds. If not already pre-mixed, add 20 ml of the combined electrolyte/mineral solution to 1 litre of feed, or use pre- mixed sachets for SAM</li> <li><input type="checkbox"/> Use ReSoMal to rehydrate</li> <li><input type="checkbox"/> Prepare food without added salt</li> </ul>

### Infections

- In SAM, usual signs of bacterial infection, e.g. fever, are usually absent, yet multiple infections are common.
- Assume all SAM cases have an infection, and treat with

antibiotics immediately. Hypoglycaemia and hypothermia are often signs of severe infection

## TREATMENT

### Broad spectrum antibiotics

- Benzylpenicillin 50,000 IU/kg IM or IV every 6 hours Or ampicillin 50 mg/kg every 6 hours for 2 days f Then, oral amoxicillin 25-40 mg/kg every 8 hours for
- 5 days PLUS
- Gentamicin 7.5 mg/kg once a day for 7 days
- Measles vaccination
- If child is 6 months and not vaccinated, or was vaccinated before 9 months of age. Delay vaccination if child is in shock

### Other specific infections

- Treat other specific infections if diagnosed as appropriate, e.g., malaria, pneumonia, dysentery, soft-tissue infections, meningitis, TB, HIV
- If parasitic worms are diagnosed, delay treatment until the rehabilitation phase. Give albendazole 200-400 mg single dose
  - In endemic areas, give mebendazole orally twice a day
  - for 3 days to all SAM children 7 days after admission
  - If HIV diagnosed, start ART as soon as possible after stabilisation of metabolic complications

### Monitoring

- If child is still anorexic after 7 days of antibiotic treatment, continue for a full 10-day course. If anorexia persists, reassess child fully

## Micronutrient deficiencies

- All SAM children have vitamin and mineral deficiencies
- Anaemia is common, but DO NOT give iron initially, instead wait until the child has a good appetite and has started gaining weight, usually in the second week, because iron can make infections worse
- RUTF already contains adequate iron so do not add. F-100 does not contain iron, so iron supplements are needed

- Ⓐ F-75, F-100 and RUTF already contain multivitamins (including vitamin A and folic acid) zinc and copper. Additional doses are not needed
- Ⓑ If there are no eye signs or history of measles, then do not give a high dose of vitamin A as therapeutic foods already contain adequate amounts

## Management

TREATMENT
<b>ONLY IF child has signs of vitamin A deficiency like corneal ulceration or history of measles</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Give Vitamin A on day 1, and repeat on days 2 and 14</li> </ul> <p>Child &lt;6 months: 50,000 IU</p> <p>Child 6-12 months: 100,000 IU</p> <p>Child &gt;12 months: 200,000 IU</p>
<b>Note:</b> If a first dose was given in the referring centre, treat on days 1 and 14 only
<b>Iron</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Give iron in the second week of nutritional rehabilitation           <ul style="list-style-type: none"> <li>- Do not give in the stabilization phase</li> <li>- Do not give in children receiving RUTF</li> </ul> </li> <li><input type="checkbox"/> Start iron at 3 mg/kg per day after 2 days on F-100 catch-up formula</li> </ul> <p>If child is not on any pre-mixed therapeutic foods, give the following micronutrients daily for at least 2 weeks</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Folic acid at 5 mg on day 1; then 1 mg daily Multivitamin syrup 5 ml</li> <li><input type="checkbox"/> Zinc 2 mg/kg per day</li> <li><input type="checkbox"/> Copper at 0.3 mg/kg per day</li> <li><input type="checkbox"/> Other vitamins and minerals e.g, a combination of selenium and moringa has been proven to be beneficial</li> </ul>

## Initial Re-Feeding during Stabilisation Phase

In the initial phase, feeding should be gradual.

The essential features of initial feeding are:

- Frequent (every 2-3 hours) oral small feeds of low osmolality and low lactose. Never leave the child alone or forcefeed the child, as this can cause aspiration pneumonia
- Nasogastric tube feeding if the child is eating £ 80% of the amount offered at two consecutive feeds
- Calories at 100 kcal/kg per day (do not exceed)
- Protein at 1-1.5 g/kg per day
- Liquid at 130 ml/kg per day or 100 ml/kg per day if child has severe oedema
- Milk-based formulas, such as F-75 (with 75 kcal and 0.9 g protein/100 ml), will be satisfactory for most children
  - Starter F-75 formula can be commercially supplied or locally prepared from basic ingredients
  - In children who get osmotic diarrhoea with commercial preparation, prepare a cereal based F75 as in the table overleaf

## TREATMENT

- If child is breastfeeding, continue breastfeeding but add the prescribed amounts of the starter formula as in the table below:

Days	Frequency	Volume/ kg feed	Volume/ kg per day
1-2	2 hours	11 ml	130 ml
3-5	3 hours	16 ml	130 ml
6	4 hours	22 ml	130 ml

- Feed from a cup or bowl. Use a spoon, dropper or syringe to feed very weak children
- Teach the mother or caregiver to help with the feeding
- Night feeds are essential, since long periods without a feed may lead to hypoglycaemia and death

- If child is vomiting, during or after a feed, estimate amount vomited and offer that amount again. If child keeps vomiting, offer half the amount of feed twice as often (e.g. every 1 hour) until vomiting stops

## Monitoring

### Monitor and record:

- Amounts of feed offered and left over
- Vomiting
- Stool frequency and consistency
- Daily body weight

### Recipe for refeeding formula F-75 and F-100

If pre-mixed formulas are not available, prepare as below

Ingredient	F-75 (Starter) Cereal-Based*	F-100 (Catch-Up)
Dried skimmed milk	25 g	80 g
Sugar	70 g	50 g
Cereal flour	35 g	—
Vegetable oil	27 g	60 g
Electrolyte/mineral solution mix	20 g	20 g
Water: make up to 1000 ml	1000 ml	1000 ml

### Note

- Cook cereal-based formula for 4 minutes and add mineral/vitamin mix after cooking

## Transition phase

This phase is designed to prepare the child for phase 2 or outpatient management (catch up growth).

### Signs that a child is ready for transition:

- Return of appetite
- No episodes of hypoglycaemia (metabolically stable)
- Reduction in or disappearance of all oedema

Make a transition from starter formula to catch-up formula, gradually over 2–3 days. DO NOT switch at once.

## Management

TREATMENT
<ul style="list-style-type: none"><li><input type="checkbox"/> Make a gradual transition from starter F-75 to catch-up formula F-100 or RUTF over 2–3 days, as tolerated</li><li><input type="checkbox"/> Give RUTF or a milk-based formula, e.g, F-100 containing 100 kcal/100 mL and 2.9 g of protein per 100 ml. Replace starter F-75 with an equal amount of catch- up F-100 for 2 days.</li><li><input type="checkbox"/> If RUTF is available</li><li><input type="checkbox"/> Start with small but regular meals of RUTF and encourage child to eat often (first, 8 meals per day, and later, 5–6 meals per day)</li><li><input type="checkbox"/> If child cannot eat whole amount of RUTF per meal in the transition phase, top-up with F-75 to complete the feed, until child is able to eat a whole RUTF meal</li><li><input type="checkbox"/> If child cannot take at least half of the RUTF in 12 hours, stop RUTF and give F-75. Try introducing RUTF again in 1–2 days until the child is able to take adequate amount</li><li><input type="checkbox"/> If still breastfeeding, offer breast milk first before each RUTF feed</li></ul>

**If RUTF is not available or child does not accept it, give F-100**

- In the first 2 days, give F-100 every 3–4 hours (the same amount of F-75 that they were being given). Do not increase volume for 2 days
- On the 3rd day, increase each successive feed by 10 ml until child finishes the meal
- If the child does not finish the meal, offer the same amount for the next meal
- Keep adding 10 ml until the child leaves a bit of most of his meals (i.e. point at which intake is likely to have reached 200 ml/kg per day)

**TREATMENT**

- If child is being breastfed, encourage mother to breastfeed in between F-100 rations
- After a gradual transition, give:
  - Frequent feeds, unlimited amounts
  - 150-220 kcal/kg per day
  - 4-6 g of protein/kg per day

**Caution**

- F-100 should never be given to take home. Transition to RUTF

**Monitoring**

- Monitor the child at least every 4 hours during transition
- Return child to stabilization phase if:
  - Child develops loss of appetite, cannot take 80% of the feeds, develops or increased oedema, medical conditions not improving, any signs of fluid overload, significant re-feeding diarrhoea

**Avoid causing heart failure**

Early signs of congestive heart failure (e.g. rapid pulse, fast breathing, basal lung crepitations, enlarging liver, gallop heart rhythm, raised jugular venous pressure)

If pulse is increased by 25 beats/minute and breathing rate by 5 breaths/minute, and the increase is sustained for two successive 4-hourly readings, then:

- Reduce volume fed to 100 ml/kg per day for 24 hours
- Ⓐ Then gradually increase as follows:
  - 115 ml/kg per day for next 24 hours
  - 130 ml/kg per day for the following 48 hours
  - Ⓐ Then, increase each feed by 10 ml as described earlier

## Recommended amounts for RUTF

Child's Weight (Kg)	Transition Phase	Rehabilitation Phase	
		Packets Per Day (92 G, 500 Kcal)	Packets Per Day (92 G, 500 Kcal)
4-4.9	1.5	2	14
5-6.9	2.1	2.5	18
7-8.4	2.5	3	21
8.5-9.4	2.8	3.5	25
9.5-10.4	3.1	4	28
10.5-11.9	3.6	4.5	32
>12kg	4.0	5	35

### Patient instructions on how to give RUTF

- Ⓐ Wash hands before giving the RUTF
- Ⓑ Sit with child on the lap and gently offer RUTF
- Ⓒ Encourage child to eat RUTF without force-feeding
- Ⓓ Give small, regular meals of RUTF and encourage child to eat 5-6 meals a day
- Ⓔ If still breastfeeding, continue offering breast milk first before every RUTF feed
- Ⓕ Give only the RUTF for 2 weeks, if breastfeeding continue to breastfeed and gradually introduce foods recommended for the age (see section 17.3.12.3)
- Ⓖ When introducing recommended foods, ensure that the child completes his daily ration of RUTF before giving other foods
- Ⓗ Offer plenty of clean water, to drink from a cup, when the child is eating the RUTF



## Catch-up growth or rehabilitation phase

### Criteria for transfer from transition phase

- Ⓐ Good appetite (child takes >80% of daily ration of RUTF)
- Ⓐ Significantly reduced oedema or no oedema
- Ⓐ Resolved medical complications and completed parenteral antibiotics
- Ⓐ Clinically well and alert

### After the transition phase

Children with complicated SAM can be transferred to outpatient care during rehabilitation phase. The child will require continuing care as an outpatient to complete rehabilitation and prevent relapse.

- Ⓐ Carefully assess the child and the available community support
- Ⓐ Refer the child for rehabilitation in outpatient care or to a community feeding programme if possible, otherwise keep the child admitted

TREATMENT
<p><b>If the child cannot be managed as outpatient (e.g. no easily accessible nutritional rehabilitation services where the child lives)</b></p> <ul style="list-style-type: none"><li><input type="checkbox"/> Keep the child admitted until full discharge from nutritional program</li><li><input type="checkbox"/> Continue with RUTF or F-100, but increase amount as the child gains weight</li></ul>
<p><b>If the child can be managed as outpatient</b></p> <ul style="list-style-type: none"><li><input type="checkbox"/> Discharge the mother with 2-week supply of RUTF according to the table above</li></ul>

**TREATMENT**

- Counsel caregivers on outpatient treatment and link them to a community nutritional programme if available. Ensure that mother/caregiver:
  - Brings back the child for weekly supplements
  - Is available for child care

Has received specific counselling on appropriate child feeding practices (types, amount, frequency) and basic hygiene

- Has resources to feed child (if not, give advice on available support)

**Monitoring (by rate of weight gain)**

- Weigh child every morning before feeding, and plot the weight
- Calculate and record weight gain every 3 days as g/kg per day

**For example**

Current weight of child = 6300 g Weight 3 days ago = 6000 g

Weight gain in grams:  $6300 - 6000 = 300 \text{ g}$  Average daily weight gain =  $300 \text{ g} \div 3 \text{ days} = 100 \text{ g/day}$

Child's average weight:  $(6000 + 6300) \div 2 = 6150 \text{ g}$   
(6.15 kg)

Divide by child's average weight in kg:  $100 \text{ g/day} \div 6.15 \text{ kg} = 16.3 \text{ g/kg per day}$

**If the weight gain is:**

- Poor (<5 g/kg per day), child needs a full reassessment
- Moderate (5-10 g/kg per day), check if intake targets are being met or if infection has been overlooked
- Good (>10 g/kg/day): continue rehabilitation

**Sensory stimulation**

Provide:

- Tender loving care
- A cheerful, stimulating environment

- Ⓐ Structured play therapy for 15-30 minutes/day
- Ⓐ Physical activity as soon as the child is well enough
- Ⓐ As much maternal involvement as possible (e.g., comforting, feeding, bathing, playing)
- Ⓐ Provide suitable toys and play activities for the child

#### **19.2.2.4 Treatment of Associated Conditions**

##### **Eye problems**

TREATMENT
If child has signs of vitamin A deficiency like corneal ulceration <ul style="list-style-type: none"> <li><input type="checkbox"/> Give vitamin A on day 1, repeat on days 2 and 14           <ul style="list-style-type: none"> <li>Child &lt;6 months: 50,000 IU</li> <li>Child 6-12 months: 100,000 IU</li> <li>Child &gt;12 months: 200,000 IU</li> </ul> </li> </ul> <p>If a first dose was given in the referring centre, treat on days 1 and 14 only</p>
If eyes show corneal clouding or ulceration, give care below to prevent corneal rupture and lens extrusion <ul style="list-style-type: none"> <li><input type="checkbox"/> Instil chloramphenicol or tetracycline eye drops 4 times a day, for 3-5 days</li> <li><input type="checkbox"/> Instil atropine eye drops, 1 drop 3 times a day for 3-5 days</li> <li><input type="checkbox"/> Cover with saline soaked pads</li> <li><input type="checkbox"/> Bandage the eyes</li> </ul>

##### **Skin lesions in kwashiorkor**

Usually due to zinc deficiency. The child's skin quickly improves with zinc supplementation. In addition:

TREATMENT
<ul style="list-style-type: none"> <li><input type="checkbox"/> Bathe or soak affected areas for 10 minutes per day in</li> <li><input type="checkbox"/> 0.01% potassium permanganate solution</li> </ul>

**TREATMENT**

- Apply barrier cream (zinc and castor oil ointment or petroleum jelly) to the raw areas, and gentian violet or nystatin cream to skin sores
- Avoid using nappies so that the perineum can stay dry

**Severe anaemia****TREATMENT****Severe anaemia**

- Give blood transfusion in the first 24 hours ONLY IF:
  - Hb is <4 g/dL
  - Hb is 4-6 g/dL, and the child has respiratory distress
- Use smaller volumes and slower transfusion than for a well-nourished child. Give:
  - Whole blood, 10 mL/kg over 3 hours
  - Furosemide, 1 mg/kg at the start of the transfusion

**If child has signs of heart failure**

- Give 10 mL/kg of packed cells, as whole blood may worsen heart failure

**Note**

- Children with SAM and oedema may have redistribution of fluid leading to apparent low Hb, which does not require transfusion

**Monitoring**

- Monitor pulse and breathing rates, listen to lung fields, examine abdomen for liver size, check jugular venous pressure every 15 minutes during transfusion
  - If either breathing rate increases by 5 breaths/minute or heart rate increases by 25 beats/minute, transfuse more slowly
  - If there are basal lung crepitations or an enlarging liver, stop transfusion and give IV furosemide IV at 1 mg/kg

## Persistent diarrhoea

### TREATMENT

If Giardiasis suspected or confirmed by stool microscopy

- Give metronidazole 7.5 mg/kg every 8 hours for 7 days

### If due to lactose intolerance (very rare)

Diagnosed if profuse watery diarrhoea only occurs after milk-based feeds are begun and stops when they are withdrawn or reduced

- Replace feeds with yoghurt or a lactose free infant formula
- Reintroduce milk feeds gradually in the rehabilitation phase

### Osmotic diarrhoea

Suspect if diarrhoea worsens substantially with hyperosmolar F-75 and ceases when sugar and osmolality are reduced

- Use a cereal-based starter F-75, or if necessary, a commercially available isotonic starter
- Introduce catch-up F-100 or RUTF gradually

### 19.2.2.5 Discharge from Nutritional Programme

Discharge children with SAM from nutritional treatment ONLY IF:

- Weight-for-height or length is at least -2 z score and they have no oedema for at least 2 weeks, or
- Mid-upper-arm circumference is 125 mm and they have no oedema for at least 2 weeks
- The indicator used at admission should be the same one used during follow-up. If only pitting oedema was used at diagnosis, then either WFH/L or MUAC can be used for follow-up
- Percentage weight gain should not be used as a criterion

Feeding after discharge from nutritional programme Counsel the mother on feeding and other issues as in the table below

### Feeding instructions

- Feed child at least 5 times a day with meals that contain high energy and high protein content (100 kcal and 2-3 g protein per 100 g of food)
- Give high energy snacks between meals (e.g., milk, banana, bread, biscuits)
- Assist and encourage child to complete each meal
- Give food separately to child so their intake can be checked
- Breastfeed as often as the child wants

### Additional instructions

- How to continue any needed medications at home
- Danger signs to bring child back for immediate care
- When and where to go for planned follow-up: at 1 week, 2 weeks, 1 month, 3 months, and 6 months; then twice a year until when the child is 3 years old
- Where and when to take child for growth monitoring and promotion on monthly basis up to 2 years
- When to return for next immunisation, vitamin A, and deworming
- How to continue stimulating the child at home with play activities

### Follow-up

PlanWhen child is discharged, make a follow-up plan until full recovery, with the appropriate clinic (e.g., OPD, nutrition clinic or local health worker/clinic).

- Weigh the child weekly after discharge
- If child fails to gain weight over 2 weeks, loses weight between 2 measurements, develops loss of appetite or oedema, refer child back to hospital for a full reassessment

Monitor child periodically after discharge from the nutritional programme to prevent relapse: at 1 week, 2 weeks, 1 month, 3 months, and 6 months; then twice a year until when the child is 3 years old

### 19.2.3 SAM in Infants Less than 6 Months

SAM in infants <6 months is rare. An organic cause or failure to thrive should be considered and treated. Admit the infant with SAM if any of the following are present:

- Ⓐ General danger signs or serious condition
- Ⓑ Recent weight loss or failure to gain weight
- Ⓒ Ineffective breastfeeding (attachment, positioning, or sucking) directly observed for 15-20 minutes

Any pitting bilateral oedema of feet

- Ⓐ Any medical problem needing more assessment
- Ⓑ Any social issue needing detailed assessment or intensive support e.g depression of caretaker

#### Management

TREATMENT
<p><b>Initial Phase</b></p> <ul style="list-style-type: none"><li>☐ Admit child</li><li>☐ Give parenteral antibiotics to treat possible sepsis and appropriate treatment for other medical complications</li><li>☐ Re-establish effective breastfeeding by mother or give infant formula, safely prepared and used</li><li>☐ In infants with SAM and oedema, give infant formula (preferably) or if not available, F-75 or diluted F-100 (use 1.5 litres instead of 1 litre)</li><li>☐ For infants with SAM and NO oedema, give expressed breast milk; if not possible, give commercial infant formula, F-75 or diluted F-100 in this order of preference</li><li>☐ Assess the physical and mental health of mothers or caretakers. Provide relevant treatment and support</li></ul>

**TREATMENT****Discharge**

- ⦿ Infants can be transferred to outpatient care if:
  - All clinical conditions, medical complications and oedema are resolved, or if child is clinically well and alert
  - Child is breastfeeding effectively or feeding well
  - Weight gain is satisfactory, e.g., above median WHO growth velocity standards or >5 g/kg per day for 3 successive days
- ⦿ Before discharge, verify immunisation status, link mothers and caregivers with community follow-on support and ensure that child is breastfeeding well, has an adequate weight gain and has WFL -2 Z scores

**19.2.4 Obesity and Overweight**

ICD10 CODE: E66

Overweight and obesity are an abnormal or excessive fat accumulation that presents a risk to health. It is a risk factor for many diseases and is linked to many deaths. Body mass index (BMI) is a simple index of weight-for-height used to classify overweight and obesity in adults.

$$\text{BMI} = \frac{\text{Weight (in kilograms)}}{\text{Height (in metres) squared (m}^2\text{)}}$$

**Interpretation of BMI values in adults**

CLASSIFICATION	CRITERIA
Underweight	BMI <18
Healthy body weight	BMI 18 to 25
Overweight	BMI 25 to 30 or waist circumference >88 cm (F) or >102 (M)

CLASSIFICATION	CRITERIA
Obesity	BMI >30 or waist circumference >88 cm (F) or >102 (M)

In children, age needs to be considered when defining overweight and obesity

CLASSIFICATION	CRITERIA
Underweight	BMI <18
Healthy body weight	BMI 18 to 25
Overweight	WFH >2 standard deviations above WHO Child Growth Standards median
Obesity	WFH >2 standard deviations above WHO Child Growth Standards median

For WHO Child Growth Standards Charts, see 17.5

## Causes

- ⦿ High energy (i.e. calorie) intake: eating too much, eating a lot of fatty food
- ⦿ Low expenditure of energy: sedentary lifestyle, no exercise or limited activity
- ⦿ Disease: hypothyroidism, diabetes mellitus, pituitary cancer

## Raised BMI is a major risk factor for:

- ⦿ Cardiovascular disease: heart disease and stroke
- ⦿ Diabetes mellitus
- ⦿ Musculoskeletal disorders: osteoarthritis
- ⦿ Some cancers: endometrial, breast, ovarian, prostate, liver, kidney, gallbladder, kidney
- ⦿ Obstructive sleep apnoea
- ⦿ Fatty liver, gallstones

## Clinical features

- Overweight
- Difficulty breathing
- Poor sleeping patterns
- Joint damage due to weight
- Low fertility
- Poor self-image, antisocial, depression
- In children, also increased risk of fractures, hypertension, cardiovascular disease, insulin resistance

## Investigations

- Blood pressure
- Blood glucose
- Cholesterol

## Management

TREATMENT	LOC
<ul style="list-style-type: none"><li>□ Advise patient to reduce carbohydrate and fat intake and increase fruit, fibre and vegetable intake</li><li>□ Refer patient to a nutritionist for individualised diet counselling, and to compile a diet plan</li><li>□ Advise patient to control appetite, participate in hobbies, treat any depression</li><li>□ Advise patient to increase physical activity and exercise daily. Advise to start slowly and build up gradually</li><li>□ Warn the patient of their high risk of diabetes, heart disease, hypertension, stroke, and general poor health Encourage patient not to give up even when the weight loss process is slow</li></ul>	HC2

## Prevention and health education

- Society and community choices: make healthier food the most accessible, available, and affordable food, and regular physical activity

② Individuals should:

- Limit energy intake from total fats and sugars: reduce fatty meat, palm cooking oil (replace with sunflower, olive, corn oil)
- Increase consumption of fruits and vegetables, as well as legumes, whole grains and nuts
- Engage in regular physical activity (60 minutes a day for children and 150 minutes spread through the week for adults)
- Stop other habits that increase risk of non-communicable diseases, e.g., tobacco smoking, alcohol abuse

# 20 Eye Conditions

## 20.1 INFECTIONS AND INFLAMMATORY EYE CONDITIONS

### 20.1.1 Notes on Use of Eye Preparations

- Eye drops: Apply 1 drop every 2 hours until the condition is controlled, then reduce frequency
- Eye ointment: If used alone, apply 3-4 times daily; if used with drops, apply at night only
- Continue treatment for 48 hours after healing

### 20.1.2 Conjunctivitis ("Red Eye")

ICD10 CODE: H10

Inflammation of the conjunctiva of the eye.

#### Causes

- Infection: Bacterial or viral
- Trauma: Chemicals, foreign bodies
- Smoke, allergy

#### Clinical features

- Watery discharge (viral or chemicals)
- Pus discharge (bacteria)
- Cornea is clear and does not stain with fluorescein
- Visual acuity is normal
- Redness (usually both eyes but may start/be worse in one; usually reddest at outer edge of the eye)
- Swelling and itching (may be present)



## Differential diagnosis

- Corneal ulcer (tends to be in one eye only, redness is greatest near the cornea, pain is often great)

## Investigations

- Clinical features are diagnostic
- Pus swab for culture and sensitivity

## Management

TREATMENT	LOC
<b>Infective conjunctivitis</b> <ul style="list-style-type: none"> <li>□ Apply chloramphenicol or gentamicin eye drops 2 or 3 hourly for 2 days then reduce to 1 drop every 6 hours for 5 days</li> <li>□ Change treatment as indicated by results of culture and sensitivity where possible</li> </ul>	<b>HC2</b>
<b>Note</b> <p>NB. Gonococcal conjunctivitis should be treated aggressively and in line with management of Sexually Transmitted Infections (see section 3.2.9)</p> <b>Allergic conjunctivitis</b> <ul style="list-style-type: none"> <li>□ Cold compresses and facial hygiene</li> <li>□ Betamethasone or hydrocortisone eye drops every 1-2 hours until inflammation is controlled then apply 2 times daily</li> <li>□ Limit use of steroid eye drops to short durations</li> </ul>	
<b>Caution</b> <ul style="list-style-type: none"> <li>□ Do not use steroid preparations unless you are sure of the diagnosis as they may mask infections</li> </ul>	

## Prevention

- Personal hygiene; daily face washing
- Avoid irritants and allergens
- 

### 20.1.3 Stye (Hordeolum)

ICD10 CODE: H00

A localized infection of the hair follicle of the eyelids

#### Cause

- *Staphylococcus aureus*

#### Clinical features

- Itching in the early stages
- Swelling, pain and tenderness
- Pus formation
- May burst spontaneously

#### Differential diagnosis

- Other infections of the eyelids
- Blepharitis

#### Management

TREATMENT	LOC
<ul style="list-style-type: none"><li><input type="checkbox"/> Usually, the stye will heal spontaneously</li><li><input type="checkbox"/> Avoid rubbing eye as this might spread the infection</li><li><input type="checkbox"/> Apply a warm/hot compress to the eye</li><li><input type="checkbox"/> Apply tetracycline eye ointment 1% 2-4 times daily until 2 days after symptoms have disappeared</li><li><input type="checkbox"/> Remove the eye lash when it is loose</li></ul>	HC2

## Prevention

- Ⓐ Remove any loose eyelashes
- Ⓐ Good personal hygiene

### 20.1.4 Trachoma

ICD10 CODE: A71

A chronic infection of the outer eye caused by Chlamydia trachomatis, transmitted through direct personal contact, shared towels and cloths, and flies that have come into contact with the eyes or nose of an infected person. It is a common cause of blindness.

#### Clinical features

- Ⓐ Early stages: reddening of eye, itching, follicles (grain-like growth) on conjunctiva
- Ⓐ If repeated untreated infections: scar formation on eyelids causing the upper eyelid to turn inwards (entropion) and the eyelashes to scratch the cornea
- Ⓐ Scarring of the cornea leading to blindness

#### Differential diagnosis

- Ⓐ Allergic conjunctivitis (chronic)
- Ⓐ Other chronic infections of the eye

#### Management

TREATMENT	LOC
Antibiotics	HC3
<input type="checkbox"/> Tetracycline eye ointment 1% twice daily for <input type="checkbox"/> 4-6 weeks (until the infection/inflammation has disappeared) <input type="checkbox"/> Or erythromycin 500 mg every 6 hours for 14 days <input type="checkbox"/> Child: 10-15 mg/kg per dose <input type="checkbox"/> Or azithromycin 1 g stat; child 20 mg/kg stat	HC4
If there are any complications	
<input type="checkbox"/> Refer to specialist <input type="checkbox"/> Surgery for the entropion	

## Prevention

- Good personal hygiene, regular face washing
- Good hygiene during deliveries
- Education of public on trachoma, and environmental control

### 20.1.5 Keratitis

ICD10 CODE: H16

Inflammation of the cornea.

#### Causes

- Infection: Bacterial, viral, or fungal; leading to corneal ulceration
- Trauma: Chemical, foreign bodies

#### Clinical features

- Redness and tearing
- Fear of light
- Cornea is not clear and will stain with fluorescein in the case of corneal ulcer (pattern of staining depends on the causative agent, for example dendritic in viral keratitis)
- Visual acuity is usually reduced
- Condition is often unilateral
- The eye is painful

#### Investigations (where facilities are available)

- Full ocular examination
- Fluorescein stain to confirm diagnosis
- Pus swab for gram stain, culture and sensitivity
- Corneal scraping for microscopy, culture and sensitivity

## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Admission is mandatory for young children, one-eyed patients, non-improvement after 72 hours of treatment, large ulcers (&gt;4 mm diameter), associated ocular complications such as hypopion or scleritis</li> </ul>	H
<b>Treat the specific cause</b>	
<ul style="list-style-type: none"> <li><input type="checkbox"/> If bacterial, apply gentamicin eye drops alternately with chloramphenicol eye drops 1-2 hourly until infection is controlled</li> <li><input type="checkbox"/> If viral, acyclovir eye ointment 5 times daily for herpes simplex and viral keratitis</li> <li><input type="checkbox"/> If fungal, natamycin ophthalmic suspension 5%</li> <li><input type="checkbox"/> Or econazole eye drops</li> <li>- Supportive treatment</li> <li><input type="checkbox"/> Atropine eye drops to relieve pain</li> <li><input type="checkbox"/> Vitamin A capsules for children</li> <li><input type="checkbox"/> Surgery may be necessary in some circumstances i.e. conjunctival flap and tarsorrhaphy</li> <li><input type="checkbox"/> Debridement (chemical/mechanical)</li> </ul>	HC2 HC4 RR HC4
<b>Caution</b>	
<ul style="list-style-type: none"> <li><input type="checkbox"/> DO NOT use topical corticosteroids in patients with infective keratitis</li> </ul>	

### 20.1.6 Uveitis

ICD10 CODE: H20

Inflammation of the uvea of the eye. It is classified as either anterior (involves iris and ciliary body) or posterior (involves choroid which is the posterior part of the uvea).

#### Causes

- Ⓐ Systemic diseases (TB, HIV, lymphoma, autoimmune disease, leprosy, toxoplasmosis)
- Ⓐ Cytomegalovirus (CMV)
- Ⓐ Post-trauma
- Ⓐ Idiopathic

## Clinical features

- ⦿ Anterior uveitis: Involves the iris and ciliary body, pain, photophobia, ciliary infection, poor vision, small and irregular pupil, cells and flare in the anterior chamber, and keratic precipitates
- ⦿ Posterior uveitis: Involves choroid, poor vision, cells in the vitreous

## Investigations

- ⦿ Investigation of uveitis is broad and requires a high index of suspicion
- ⦿ Diagnosis of uveitis requires expertise and can only be confirmed by slit lamp examinations

## Management

TREATMENT	LOC
If at HC2 and HC3	HC2
<input type="checkbox"/> Do not give any medicine <input type="checkbox"/> Explain seriousness of the condition to the patient <input type="checkbox"/> Refer urgently to a qualified eye health worker	HC4
Anterior uveitis	RR
<input type="checkbox"/> Topical steroids eye drops <input type="checkbox"/> Periocular steroids may be used in severe anterior uveitis <input type="checkbox"/> Atropine eye drops to relieve pain <input type="checkbox"/> Refer bilateral cases, and where there is poor vision and associated ocular complications	
Posterior uveitis	
<input type="checkbox"/> Treat the primary condition if any <input type="checkbox"/> Topical, periocular and systemic steroids <input type="checkbox"/> Atropine/Cyclopegics to relieve pain in anterior uveitis	

## Prevention

- ⦿ Wear protective goggles when hammering, sawing, chopping, grinding etc.



- Warn children playing with sticks about risk of eye injuries

### **20.1.7 Orbital Cellulitis      ICD10 CODE: H05.01**

Orbital cellulitis is a sudden acute inflammation of the tissues around the eye.

#### **Causes**

- Children- most common cause is post sinus infection by
- Haemophilus influenza
- Adults- common causes are *Staphylococcus aureus*, *Streptococcus pneumonia* and beta-haemolytic streptococcus
- Risk factors
- Sinus infection, tooth extraction, orbital trauma

#### **Clinical features**

- Painful swelling of the eye
- Pain in the eye especially on eye movements
- Decreased vision
- Fever and headache

#### **Differential diagnosis**

- Infection - Cavernous sinus thrombosis
- Endocrine dysfunction - Dysthyroid exophthalmos
- Idiopathic inflammation - Orbital myositis, orbital pseudotumour, Wegener's granulomatosis
- Neoplasm with inflammation, e.g. Burkitt's lymphoma

#### **Investigations**

- Good history taking and examination

#### **Management**

TREATMENT	LOC
<input type="checkbox"/> This is an emergency and needs immediate referral to the ophthalmologist	H

## Prevention

- Prompt treatment of sinus and dental infections
- Complete immunization schedule for children, more especially Hib vaccine (included in the pentavalent DPT/HepB/Hib vaccine)

### **20.1.8 Postoperative Endophthalmitis** ICD10 CODE: H44.0

Postoperative endophthalmitis is the severe inflammation involving both the anterior and posterior segments of the eye after intraocular surgery.

#### Cause

- Perioperative introduction of microbial organisms into the eye, followed by inflammation

#### Clinical features

- Decreased vision, and permanent loss of vision
- Bacterial endophthalmitis: pain, redness, lid swelling, and decreased visual acuity
- Fungal endophthalmitis: blurred vision, pain, and decreased visual acuity

#### Investigations

- Vitreal tapping for gram stain
- Culture and sensitivity

#### Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> It is a medical emergency and treatment should be instituted within an hour of presentation, especially in severe cases</li> <li><input type="checkbox"/> Refer to an ophthalmologist immediately</li> <li><input type="checkbox"/> Admit patients with severe endophthalmitis and treat aggressively with topical, periocular and where possible intravitreal injections of:</li> </ul>	H RR

TREATMENT	LOC
<input type="checkbox"/> Antibiotics: vancomycin or ceftriaxone - Atropine to relieve pain	H RR

## Prevention

- Ⓐ Apply povidone iodine 5% in the conjunctival sac for a minimum of 3 minutes prior to surgery and 10% povidone iodine painting of the periocular skin

### 20.1.9 Xerophthalmia ICD10 CODE: E50

Dryness of the part of the eye ball exposed to air and light Cause

- Ⓐ Vitamin A deficiency

## Clinical features

- Ⓐ Starts with night blindness
- Ⓐ Followed by dryness of the conjunctiva and cornea
- Ⓐ Eventually the cornea melts away, the eye perforates, and total blindness occurs

## Differential diagnosis

- Ⓐ Trachoma, corneal injury

## Management

TREATMENT	LOC
<input type="checkbox"/> Give vitamin A on day 1, repeat on days 2 and 14 Adult and child >1 year: 200,000 IU Child 6-12 months: 100,000 IU Child <6 months: 50,000 IU  If eyes show corneal clouding or ulceration, give care below to prevent corneal rupture and lens extrusion <input type="checkbox"/> Instil chloramphenicol or tetracycline eye drops 4 times a day, for 3-5 days <input type="checkbox"/> Instil atropine eye drops, one drop 3 times a day for 3-5 days	HC2     HC4

## Prevention

- Ⓐ Good balanced diet especially for children, women, and institutionalised persons, e.g., prisoners, long-term hospital in-patients, boarding school students, etc.
- Ⓐ Routine Vitamin A supplementation
- ▢ Child <5 years with measles or malnutrition: 100,000 IU
- ▢ All mothers after delivery: 200,000 IU
- ▢ A child above one year: 200,000 IU every 6 months

## 20.2 DECREASED OR REDUCED VISION CONDITIONS

### 20.2.1 Cataract ICD10 CODE: H27

Opacity of the lens inside the eye. It is the most common cause of blindness in Uganda.

#### Risk factors

- Ⓐ Old age
- Ⓐ Diabetes (high blood sugar)
- Ⓐ Certain drugs e.g. corticosteroids
- Ⓐ Eye injuries

#### Clinical features

- Ⓐ Reduced vision
- Ⓐ Pupil is not the normal black colour but is grey, white, brown, or reddish in colour
- Ⓐ Condition is not painful unless caused by trauma
- Ⓐ Eye is not red unless condition is caused by trauma

#### Management

TREATMENT	LOC
▢ Refer for cataract surgery	HC4

## 20.2.1.1 Paediatric Cataract ICD10 CODE: H26.0

Cataract in children is unique as it may interfere with the normal development of vision resulting in lazy eye (amblyopia).

### Causes

- Ⓐ Hereditary/genetic disorders
- Ⓐ Intrauterine infections (TORCHES)
- Ⓐ Drugs, trauma, metabolic diseases, e.g. Diabetes
- Ⓐ Unknown

### Symptoms

- Ⓐ A white pupil
- Ⓐ Older children may complain of poor vision
- Ⓐ “Dancing eyes” (nystagmus), squints

### Investigations

- If at HC2 or HC3, reassure patient and refer to hospital

### Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li>□ Condition is managed surgically under general anaesthesia</li> <li>□ Surgery can be done as early as one month of age</li> <li>□ Patching/occlusion therapy in case of lazy eyes (amblyopia)</li> <li>□ Aphakic children /those less than one year who are not implanted should be given aphakic glasses or contact lenses</li> </ul>	RR

### Prevention

- Ⓐ Wear protective goggles when hammering, sawing, chopping, grinding, etc.
- Ⓐ Caution children playing with sticks about risk of eye injuries

## 20.2.2 Glaucoma

ICD10 CODE: H40

Glaucoma is a group of disorders characterised by a loss of visual field associated with cupping of the optic disc and optic nerve damage. Although glaucoma is associated with raised intra-ocular pressure (IOP), it can also occur when this pressure is within the normal range.

Glaucoma is classified as either open-angle or angle-closure glaucoma. Primary open-angle glaucoma is the most common.

### Risk factors for open-angle glaucoma

- Ⓐ Older age, black people, family history, genetics
- Ⓐ Vascular dys-regulation (migraine, vasospasm, abnormalities in ocular blood flow), low ocular perfusion pressure, diabetes
- Ⓐ Ocular factors: Raised intra-ocular pressure, myopia, central corneal thickness – thinner corneas associated with increased risk

### Clinical features

#### Open angle glaucoma

- Ⓐ Mostly asymptomatic
- Ⓐ History of gradual loss of vision in affected eye or loss of visual field
- Ⓐ Often suspected after seeing cupping of optic disc on routine fundoscopy or finding elevated intra-ocular pressure on screening

#### Angle-closure glaucoma

- Ⓐ Sudden onset of severe eye pain and redness, associated with nausea, vomiting and headache
- Ⓐ Loss of vision in the affected eye
- Ⓐ Coloured halos or bright rings around lights
- Ⓐ Hazy-looking cornea



- Fixed, semi-dilated pupil
- Shallow anterior chamber
- Severely elevated IOP. When palpated with a finger, the affected eye feels hard, compared to the other eye
- If IOP rises more slowly, the patient may be asymptomatic with gradual loss of vision

## Management

- Goal of treatment is to arrest/delay progress of the disease, not for visual improvement. Therapy is usually life long
- Angle-closure glaucoma is a medical emergency that requires urgent reduction of intra ocular pressure

**Refer all suspects to specialist**

TREATMENT	LOC
<b>Open-angle glaucoma</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Timolol 0.5% eye drops given 1 drop 12 hourly</li> <li><input type="checkbox"/> Angle-closure glaucoma (acute)</li> <li><input type="checkbox"/> For urgent reduction of IOP, give mannitol 20% by slow IV infusion until IOP is reduced</li> <li><input type="checkbox"/> Reduce intracocular pressure with acetazolamide tablets 500 mg single dose followed by 250 mg every 6 hours</li> <li><input type="checkbox"/> Plus timolol 0.5% drops 1 drop 12 hourly</li> </ul>	RR
<b>Caution</b> <ul style="list-style-type: none"> <li>▪ Avoid timolol eye drops in patients with asthma, heart block and uncontrolled heart failure</li> </ul>	

### 20.2.3 Diabetic Retinopathy

ICD10 CODE: E10.31, E11.31

A disease in which small blood vessels are damaged due elevated blood sugar over a prolonged period of time.

## Risk factors for Diabetic Retinopathy

- Longer duration and poor control of diabetes
- Hypertension, kidney diseases
- Pregnancy (associated with rapid disease progression)
- High Body mass index (BMI), sedentary lifestyle
- Smoking and alcohol use

## Clinical features

- Patients can present either with a sudden painless loss of vision or gradual and progressive loss of vision. It may also be discovered on routine examination

## Investigations

- Conduct a thorough eye examination
- Other investigations: fundus photography, optical coherence tomography, fluorescein angiography

## Management

TREATMENT	LOC
<p>Involves any or a combination of:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Pan retinal photocoagulation (PRP)</li> <li><input type="checkbox"/> Anti-Vascular Endothelial growth factor (VEGF) eye injections</li> <li><input type="checkbox"/> Posterior Vitrectomy</li> <li><input type="checkbox"/> Low vision rehabilitation</li> </ul>	RR

## Prevention

- ◆ Control of diabetes and other risk factors

### 20.2.4 Refractive Errors

ICD10 CODE: H52

This is the inability of images to be focused properly on the retina. The most common refractive errors are long sightedness, short sightedness, presbyopia and astigmatism.

## Clinical features

Refractive Error	Causes	Clinical Features
<p>Hyperopia, long-sightedness or far-sightedness, also termed hypermetropia can be physiological (axial or refractive) or pathological (mal-development, anatomical or drug-induced) in nature.</p>	<ul style="list-style-type: none"> <li>◆ Axial etiology (length of the eye, small eyes)</li> <li>◆ Refractive etiology (power of the eye)</li> <li>◆ Trauma</li> <li>◆ Paralysis of accommodation</li> </ul>	<ul style="list-style-type: none"> <li>◆ Blurred vision, eye strain</li> <li>◆ Lazy eye</li> <li>◆ Squint/ crossed eye</li> <li>◆ Headaches</li> </ul>
<p>Myopia, short-sightedness or near-sightedness It can be simple (length and power), pathological/degenerative (mal-development or anatomical) in nature, induced or pseudomyopia.</p> <p>Presbyopia It is an age-related visual impairment. It results from the gradual decrease in accommodation expected with age and can have multiple effects on quality of vision and quality of life.</p>	<ul style="list-style-type: none"> <li>◆ Axial etiology (length of the eye, big eyeball)</li> <li>◆ Refractive etiology (power of the eye)</li> <li>◆ Ocular disease, e.g. keratoconus</li> <li>◆ Trauma</li> <li>◆ Age (35- 40 years)</li> <li>◆ Hyperopia (accommodative demand, especially if uncorrected)</li> <li>◆ Ocular disease/trauma (removal or injury to lens, ciliary body or zonules)</li> </ul>	<ul style="list-style-type: none"> <li>◆ Blurred distance vision</li> <li>◆ Flashes &amp; floaters (high myopia)</li> <li>◆ Asthenopia (eyestrain, headaches, etc.)</li> <li>◆ Blurred near vision</li> <li>◆ Difficulty seeing at usual near working distance</li> <li>◆ Asthenopia (fatigue, eye strain, headaches, etc.)</li> </ul>

REFRACTIVE ERROR	CAUSES	CLINICAL FEATURES
	<ul style="list-style-type: none"> <li>◆ Systemic diseases (diabetes, etc)</li> <li>◆ Drug side-effect</li> <li>◆ Occupation (near vision demands)</li> </ul>	<ul style="list-style-type: none"> <li>◆ Drowsiness</li> <li>◆ Diplopia (double vision)</li> </ul>

## Investigations

- History (blurred vision, asthenopia, etc.)
- Visual Acuity (distance, near and pinhole)
- Refraction
- Ocular motility, Binocular Vision and Accommodation
- Ocular health assessment (slit lamp, fundus assessment)

## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Optical correction with spectacles or contact lenses</li> <li><input type="checkbox"/> Vision therapy/orthoptics (for pseudomyopia) f For presbyopia: multifocal lenses f Refractive Surgery</li> </ul>	HC4

### 20.2.5 Low Visio ICD10 CODE: H54

This is a loss of eyesight that makes everyday tasks difficult. A person with low vision finds it difficult or impossible to accomplish activities such as reading, watching television, driving a car or recognizing faces.

When vision cannot be improved with regular eyeglasses, medicine or surgery, people with low vision need rehabilitation to learn how to make the most of their remaining sight and keep their independence.

### 20.2.25.1 Vision Loss

ICD10 CODE: H54

Classification patterns of vision loss include:

CLASSIFICATION	FEATURES
<b>Central vision</b>	This is the detailed vision we use when we look directly at something. Age-related Macular degeneration (AMD) affects central vision. Diabetic retinopathy can affect central or peripheral vision
<b>Peripheral vision</b>	This is the less detailed vision we use to see everything around the edges. Glaucoma affects peripheral vision first. Strokes can affect one side of the peripheral vision
<b>Contrast sensitivity</b>	This is the ability to distinguish between objects of similar tones like milk in a white cup or to distinguish facial features. All eye problems can decrease contrast sensitivity
<b>Depth perception</b>	This is the ability to judge the position of objects. New vision loss in one eye can affect depth perception, such as the height of a step
<b>Visual processing</b>	The lens in our eye focuses light rays onto our retina. The retina converts these light rays into signals that are sent through the optic nerve to our brain, where they are interpreted as the images we see. A problem with any of these processes affects our vision in various ways

## Causes of vision loss

- ◆ Congenital (e.g., prenatal or postnatal trauma, genetic or developmental abnormalities)
- ◆ Hereditary (e.g., retinitis pigmentosa or Stargardt's macular degeneration)
- ◆ Acquired conditions (e.g., ocular infection or disease, trauma, age-related changes, or systemic disease)

## Clinical features

- ◆ Loss of the ability to read standard-sized print
- ◆ Difficulty performing work-related tasks or leisure activities
- ◆ Inability to recognise faces or familiar people

## Investigations

- History, visual Acuity
- Refraction
- Ocular motility
- Binocular Vision Assessment

- Visual Field Assessment
- Ocular Health Assessment: external examination, Slit lamp exam, tonometry, fundoscopy with dilated pupil

## Management

TREATMENT	LOC
<input type="checkbox"/> Low vision aids <input type="checkbox"/> Mobility instruction and community-based rehabilitation <input type="checkbox"/> Co-management with optometrist, low vision worker, community rehabilitation worker <input type="checkbox"/> Counselling services (psychiatric, psychological and social work) <input type="checkbox"/> Occupational therapy	HC4

## 20.3 TRAUMA AND INJURIES TO THE EYE

A common cause of blindness in Uganda.

### 20.3.1 Foreign Body in the Eye      ICD10 CODE: T15

Presence of an external object or substance in the eye.

#### Causes

- ◆ Solids: dust, insects, metal or wood particles
- ◆ Liquids: Splashes of irritating fluids

#### Clinical features

- ◆ Severe pain, tears, or redness
- ◆ Foreign body (FB) may be visible

#### Differential diagnosis

- ◆ Other injury or trauma

## Management

TREATMENT	LOC
<input type="checkbox"/> Make a thin 'finger' of moistened cotton wool, move eyelid out of the way, and gently remove FB	HC2 HC4

TREATMENT	LOC
<p><input type="checkbox"/> If this fails, refer to an Eye Specialist</p> <p><b>For irritating fluids in the eye</b></p> <p><input type="checkbox"/> Wash the eye with plenty of clean water or normal saline</p> <p><b>If the cornea is damaged</b></p> <p><input type="checkbox"/> Apply tetracycline eye ointment 1%, cover the eye, and refer to an Eye Specialist</p>	HC2 HC4

### 20.3.2 Ocular and Adnexa Injuries

An injury to the eye may result in vision loss. It is important to recognize serious eye injuries and give appropriate treatment or refer to a specialist immediately.

#### Cause

- ◆ Blunt injury from a blunt object like a ball or a fist
- ◆ A perforating injury from a sharp object, like, a knife, high velocity projectiles from explosives
- ◆ Exposure to chemicals
- ◆ Thermal injuries

#### 20.3.2.1 Blunt Injuries ICD10 CODE: S05.1

A blunt object striking the eye with great force may result in minor or severe injury to the eye.

Different structures of the eye maybe involved.

#### Clinical features

ANATOMICAL STRUCTURE INVOLVED	CLINICAL FEATURES
<b>Lids, cornea, and the conjunctiva</b>	Eyelid swelling and subcutaneous bleeding. The degree of swelling may be mild to severe. There may be corneal abrasions and conjunctival swelling and sub conjunctival haemorrhages

ANATOMICAL STRUCTURE INVOLVED	CLINICAL FEATURES
<b>Anterior chamber, lens, vitreous or retina</b>	<p>Decreased visual acuity is an indication that the injury involved either the anterior chamber, lens, vitreous, or retina.</p> <p>All the above will result in poor vision and are potentially blinding conditions.</p>
<b>Orbital bones</b>	<p>A blunt injury may cause orbital bone fractures. The commonest is a fracture of the ethmoid bone.</p> <p>The patient may present with swelling of the eye and proptosis if there is haemorrhage in the orbit or a sunken or retracted eyeball depending on the site of the fracture.</p> <p>The patient may also complain of double vision (Diplopia)</p>

## Management

TREATMENT	LOC
<input type="checkbox"/> Assess the visual acuity, and if this is normal and there are no signs/symptoms of orbital bone fracture give: <ul style="list-style-type: none"> <li>- Gentamicin or chloramphenicol eye drops or tetracycline eye ointment</li> </ul>	HC2
<ul style="list-style-type: none"> <li>- Pain reliever – Paracetamol</li> <li>- A cold compress maybe helpful in lid swelling</li> </ul> <input type="checkbox"/> If the visual acuity is poor, pad the eye, give a pain reliever and REFER URGENTLY THE PATIENT TO A SPECIALIST as this is an indication of injury to deeper structures	HC4

### 20.3.2.2 Penetrating Eye Injuries

ICD10 CODE: S05.2-6

Penetrating eye injuries are common in children and adults and result from injury by a sharp object.

## Management

TREATMENT	LOC
<b>Eyelid Injuries</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> A cut involving the lid margin needs to be repaired under magnification so that the margin is well approximated, otherwise, if not well repaired, it will heal with a coloboma effect</li> <li>- A cut involving the eye lids may injure the lacrimal system if located in the medial aspect of the lid</li> </ul>	HC4
<b>Corneal and Scleral Perforations</b> <p>All perforations of the cornea or sclera are serious injuries and may lead to blindness.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Apply an eye shield to protect the eye, give a pain reliever and refer the patient immediately to an Ophthalmologist</li> <li><input type="checkbox"/> At the secondary or tertiary level the treatment of corneal/scleral lacerations is immediate repair with 10/0 sutures under an operating microscope, or if the laceration is extensive, an immediate evisceration of the eye should be performed</li> </ul>	HC2 RR

### 20.3.2.3 Chemical Injuries to the Eye ICD10 CODE: S05.8

Various chemicals may injure the eye when they come into contact with the eyes or face. The commonest are acidic or alkaline chemical products.

Acids and Alkaline products will cause serious injuries to the lids, cornea, and conjunctivae.

## Management

TREATMENT	LOC
<b>First Aid</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> On exposure to acid or chemical products, the eyes should be immediately irrigated with copious amounts of water as a first aid treatment</li> </ul>	HC2

TREATMENT	LOC
<p><b>At health facility</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> On arrival at a medical centre, continue irrigation with normal saline to wash out the entire chemical</li> <li><input type="checkbox"/> After irrigation of the eye, apply tetracycline eye ointment and pad the eye, and refer to an ophthalmologist immediately</li> <li><input type="checkbox"/> Tear gas, which is used in crowd dispersion can cause the eyes to sting and tear copiously. The individual should irrigate the eyes with plenty of water <ul style="list-style-type: none"> <li>- Tear gas injury is usually short lived and does not usually require treatment</li> </ul> </li> </ul>	<b>HC2</b> <b>HC4</b>

## 20.4 OCULAR TUMOURS

### 20.4.1 Retinoblastoma      ICD10 CODE: C69.2

It is the most common primary cancer of the retina and affects young children mostly under 5 years. It is curable if detected and treated early.

#### Clinical features

- ◆ White pupil (leukocoria)
- ◆ Squint
- ◆ Redness and swelling of the eye
- ◆ Glowing in the dark or cat's eye reflex

#### Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Ocular examination by midwives immediately after birth for early diagnosis</li> <li><input type="checkbox"/> Refer urgently (within 72 hours) all children suspected to have retinoblastoma to an ophthalmologist</li> </ul>	<b>HC3</b> <b>RR</b>

## 20.4.2 Squamous Cell Carcinoma of Conjunctiva

ICD10 CODE: C69.0

Squamous cell carcinoma (SCC) of the conjunctiva is a cancer on the surface of the eye that tends to occur in older people (average age of diagnosis is 60 years), and young adults (30-40 years) with HIV/AIDS.

### Clinical features

- ◆ Eye irritation, discomfort or foreign body sensation
- ◆ Red eye
- ◆ Growth/tumour on eyeball that may exhibit the following features:
  - Leucoplakic (white), flesh-coloured or red patch
  - Rounded, elevated growth with a gel-like appearance
  - Large dilated blood vessels leading to the tumour
  - In early disease, the tumour often appears in the bulbar conjunctiva nasally, temporally or at the limbus

**NB:** Squamous cell carcinoma should be suspected in cases of chronic conjunctivitis that lasts longer than 3 months.

### Investigations

- Excision (total) biopsy for histopathological examination

### Differential diagnosis

- ◆ Pterygium, solar keratosis, pinguecula

### Management

TREATMENT	LOC
<input type="checkbox"/> Refer patient to ophthalmologist and eventually to cancer treatment center	RR

# 21 Ear, Nose & Throat Conditions

## 21.1 EAR CONDITIONS

### 21.1.1 Foreign Body in the Ear

ICD10 CODE: T16

Fungal infection usually confined to the mucous membranes and external layers of skin. Severe forms are usually associated with immunosuppressive conditions, such as HIV/AIDS, diabetes, pregnancy, cancer, prolonged antibiotic use, and steroids.

#### Causes

Common foreign bodies (FB) include:

- ⦿ Insects (flies, cockroaches, ants), seeds, beads, stones
- ⦿ Children: Usually insert the FB themselves, or their peers may do it
- ⦿ Adults: Usually insects, cotton buds
- ⦿ Occasionally the FB may penetrate adjacent parts and lodge in the middle ear

#### Clinical features

- ⦿ Blockage, FB may be seen
- ⦿ Noise in the ear if it is a live FB like an insect
- ⦿ Hearing loss

If attempts have been made to remove the FB:

- ⦿ Bleeding/discharge from the ear

## Management

TREATMENT	LOC
<b>Smooth round FBs</b> <ul style="list-style-type: none"><li><input type="checkbox"/> Syringe the ear with clean lukewarm water</li><li><input type="checkbox"/> If FB cannot be removed by syringing, remove with a foreign body hook<ul style="list-style-type: none"><li>- General anaesthesia may be essential in children</li><li>- and sensitive adults</li><li>- Do NOT use forceps to try to grasp round objects, as this will only push them further in the ear</li></ul></li></ul>	<b>HC3</b>
<b>Other FBs</b> <ul style="list-style-type: none"><li><input type="checkbox"/> If there is an edge to grab, remove with Hartmann (crocodile) forceps</li></ul>	
<b>Insects</b> <ul style="list-style-type: none"><li><input type="checkbox"/> Kill these by inserting clean cooking oil or water into the ear, then syringe out with warm water</li><li><input type="checkbox"/> Cockroaches are better removed by a crocodile forcep since they have hooks on their legs that make removal by syringing impossible</li></ul>	<b>HC3</b>
<b>Impacted seeds</b> <ul style="list-style-type: none"><li><input type="checkbox"/> Do NOT use syringing with water as the seed may swell and block the ear<ul style="list-style-type: none"><li>- Refer immediately to ENT specialist if you cannot remove with a hook</li></ul></li><li><input type="checkbox"/> Suction may be useful for certain FBs</li></ul>	

### 21.1.2 Wax in the Ear

ICD10 CODE: H61.2

An accumulation of wax in the external ear. Wax in the ear is normal and usually comes out naturally from time to time. It may accumulate to form a wax plug and cause a problem for the patient.

## Causes

- Excessive and/or thick wax production
- Small, tortuous and/or hairy ear canal
- Use of ear pads

## Clinical features

- Blocked ears
- Buzzing sound
- Sometimes mild pain

## Management

TREATMENT	LOC
<b>General measures</b> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Soften the wax by inserting drops of Vegetable oil or Glycerine or Sodium bicarbonate into the ear 3 times a day for a few days. After this the wax may fall out on its own</li> <li><input checked="" type="checkbox"/> Syringe the ear carefully with clean warm water when the wax is soft</li> </ul>	<b>HC2</b>
<b>Caution</b> <p>Advise the patient not to poke anything into the ear in an attempt to clean it, as this may damage the eardrums</p> <p>Do not syringe if (a) there is history of discharge and (b) if there is pain</p>	

### 21.1.3 Otitis External

ICD10 CODE: H60

Infection of the external ear canal, which may be localised (furunculosis) or generalised (diffuse)



## Causes

Bacterial, fungal, viral infections

## Clinical features

- Ⓐ Pain, tenderness on pulling the pinna (external ear)
- Ⓐ Itching (especially for fungal infections)
- Ⓐ Swelling
- Ⓐ Pus discharge

## Differential diagnosis

- Ⓐ Foreign body
- Ⓐ Otitis media (especially with pus discharge)
- Ⓐ Traumatic injury

## Investigations

- Good history and physical examination are important in making a diagnosis
- If there is a discharge: Pus swab for microscopy, C&S
  - If discharge is white or black, it is fungal
  - If discharge is yellow, it is bacterial

## Management

TREATMENT	LOC
<input type="checkbox"/> Thoroughly clean external ear canal <input type="checkbox"/> Apply antibiotic drops, e.g., Chloramphenicol ear drops 0.5% 2 drops into the ear every 8 hours for 14 days <input type="checkbox"/> Give analgesics e.g., Paracetamol	<b>HC2</b>
If severe	<b>HC4</b>
<input type="checkbox"/> Cloxacillin 250-500 mg every 6 hours for 5-7 days <input type="checkbox"/> Child: 12.5-25 mg/kg per dose	

TREATMENT	LOC
If fungal infection is suspected <ul style="list-style-type: none"> <li><input type="checkbox"/> Remove any crusting by syringing</li> <li><input type="checkbox"/> Apply Clotrimazole solution once a week for 4-8 weeks</li> <li><input type="checkbox"/> Or fluconazole 200 mg once a day for 10 days</li> </ul>	<b>HC3</b>

## 21.1.4 Otitis Media (Suppurative)

ICD10 CODE: H66

An acute or chronic infection of the middle ear occurring mostly in children <2 years

### Causes

- Ⓐ Bacterial infection, e.g., Streptococcus pneumoniae, Haemophilus influenzae
- Ⓐ Commonly follows an acute infection of the upper respiratory tract

### Clinical features

- Ⓐ Acute onset of pain in the ear, redness of the ear drum
- Ⓐ Fever
- Ⓐ Pus discharge for <14 days
- Ⓐ Bulging of the eardrum

### In chronic otitis media

- Ⓐ On and off pus discharge from one or both ears for >14 days
- Ⓐ No systemic symptoms

### Differential diagnosis

- Ⓐ Foreign body in the ear
- Ⓐ Otitis externa and media with effusion
- Ⓐ Referred ear pain, e.g., from toothache



## Investigations

- Good history and physical examination are important in making a diagnosis
- Pus swab for microscopy, C&S

## Management

TREATMENT	LOC
<b>Acute infection</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Amoxicillin 500 mg every 8 hours for 5 days</li> <li><input type="checkbox"/> Child: 15 mg/kg per dose</li> <li><input type="checkbox"/> Or erythromycin 500 mg every 6 hours in penicillin allergy</li> <li><input type="checkbox"/> Child: 10-15 mg/kg per dose</li> <li><input type="checkbox"/> Give analgesics, e.g., Paracetamol as required</li> <li><input type="checkbox"/> Review after 5 days</li> </ul>	<b>HC2</b>
<b>Chronic infection</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Systemic antibiotics are NOT recommended: they are not useful and can create resistance</li> <li><input type="checkbox"/> Aural irrigation 2-3 times a day           <ul style="list-style-type: none"> <li>- 1 spoon of hydrogen peroxide in 1/2 glass of clean lukewarm water</li> <li>- Gently irrigate ear using a syringe without needle</li> <li>- Avoid directing the flow towards the tympanic membrane</li> <li>- Gently irrigate ear using a syringe without needle</li> <li>- Avoid directing the flow towards the tympanic membrane</li> </ul> </li> </ul>	<b>HC3</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Dry by wicking 3 times daily for several weeks, until the ear stays dry</li> <li><input type="checkbox"/> Each time after drying, apply 2-4 drops of ciprofloxacin ear drops 0.5% into the ear</li> </ul>	<b>HC3</b>

TREATMENT	LOC
<input type="checkbox"/> Do NOT allow water to enter the ear	HC3
<b>Note</b>	
Refer if complications occur, e.g., meningitis, mastoid abscess (behind the ear), infection in adjacent areas, e.g., tonsils, nose	

## Prevention

- Ⓐ Health education, e.g., advising patients on recognizing the discharge of otitis media (believed by some to be “milk in the ear”)
- Ⓐ Early diagnosis and treatment of acute otitis media and upper respiratory tract infections
- Ⓐ Treat infections in adjacent area, e.g., tonsillitis

### 21.1.5 Glue Ear (Otitis Media with Effusion) ICD10 CODE: H65

A non-suppurative otitis media

#### Causes

- Ⓐ Blockage of the Eustachian tube by: adenoids, infection in the tube, thick mucoid fluid and tumours of the postnasal space
- Ⓐ Unresolved acute otitis media
- Ⓐ Viral infection of the middle ear
- Ⓐ Allergy

#### Clinical features

- Ⓐ Hearing impairment (the main feature)
- ▢ Often fluctuant, e.g., in children: “this child hears when s/ he wants to and sometimes ignores you”
- Ⓐ Presence of non-purulent fluid in middle ear
- Ⓐ Buzzing noise in ears/head
- Ⓐ Retracted or bulging ear drum
- Ⓐ Loss of usual colour of ear drum (dull eardrum)

## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Eliminate known or predisposing causes</li> <li><input type="checkbox"/> Chlorphenamine 4 mg every 12 hours for 10 days           <ul style="list-style-type: none"> <li>- Child 1-2 years: 1 mg every 12 hours</li> <li>- Child 2-5 years: 1 mg every 6 hours (max: 6 mg daily)</li> <li>- Child 6-12 years: 2 mg every 6 hours (max: 12 mg daily)</li> </ul> </li> <li><input type="checkbox"/> Plus xylometazoline nasal drops 0.1% or ephedrine 2 drops every 8 hours for 2 weeks Child: Use 0.05% drops</li> <li><input type="checkbox"/> Exercises: Chewing, blowing against closed nose tends to open the tube</li> </ul> <p>If effusion persists &gt;6 weeks in spite of the above:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Refer to ENT specialist</li> </ul>	HC4

### 21.1.6 Mastoiditis

ICD10 CODE: H70.0

Inflammation of the mastoid bone behind the ear

#### Causes

- Usually a complication of suppurative otitis media

#### Clinical features

- Severe pain felt over the mastoid bone
- Swelling in post auricular area (pinna is pushed down and forward)
- Current or history of pus discharge from the ear
- Fever
- Mental confusion is a grave sign of intracranial spread of infection (Refer to ENT surgeon immediately)

## Differential diagnosis

- Ⓐ Inflamed lymph node behind ear

## Investigations

- Ⓑ Diagnosis mainly by clinical features
- Ⓑ X-ray: Useful in chronic mastoiditis
- Ⓑ Blood: Full blood count, shows leucocytosis
- Ⓑ Examine ear with otoscope

## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li>☐ Admit urgently; give emergency treatment</li> <li>☐ Ceftriaxone 2-4 g by IV or deep IM once daily for 10-14 days           <ul style="list-style-type: none"> <li>- Child: 50-80 mg/kg once daily</li> <li>- Divide IM doses over 1 g between 2 sites</li> </ul> </li> <li>☐ Plus metronidazole 400 mg every 8 hours for 10-14 days           <ul style="list-style-type: none"> <li>- Child: 7.5 mg/kg per dose</li> </ul> </li> <li>☐ Surgical drainage may be necessary to remove pus if an abscess has formed</li> <li>☐ Refer urgently for specialist care</li> </ul>	HC4

## 21.2 NASAL CONDITIONS

### 21.2.1 Foreign Body in the Nose ICD10 CODE: T17.0

Usually occurs in children <5 years

#### Causes

- Ⓐ Seeds, e.g., bean, peas, ground nut



- Ⓐ Paper, foam rubber (e.g., mattress foam)
- Ⓐ Beads, stones, metal objects

## Clinical features

- Ⓐ Usually inserted by the child, and therefore mostly found in the right-hand nasal cavity
- Ⓐ Foreign body noticed by child/parent
- ☐ May be visible or felt
- ☐ Sharp object may cause bleeding
- Ⓐ Unilateral foul-smelling discharge from the nose

## Differential diagnosis

- Ⓐ Infection in the nose, sinuses, or adenoids

## Investigations

- Usually not required (Clinical diagnosis is enough)
- X-rays may be helpful in case of metallic objects like wires or ball bearings

## Management

TREATMENT	LOC
<input type="checkbox"/> Sit the child up or wrap in a blanket	HC2
<b>First aid</b>	
<input type="checkbox"/> Blow through the mouth while blocking the unaffected side of the nose	
<b>Other methods of removal</b>	
<b>Paper or foam rubber</b>	
<input type="checkbox"/> Grasp firmly and remove with a fine forceps, e.g., Tilley's forceps	
<b>Other objects</b>	

TREATMENT	LOC
<input type="checkbox"/> Carefully pass a blunt hook behind the object, and then gently pull it out	<b>HC2</b>
If the above fails	<b>HC2</b>
<input type="checkbox"/> Refer to an ENT specialist	

## Prevention

- Ⓐ Caution children about placing objects in mouth, nose, and ears

### **21.2.2 Epistaxis (Nose Bleeding)**

ICD10 CODE: R04.0

Bleeding from the nostrils, which may be arterial or venous

## Causes

- Ⓐ Local: nose-picking, trauma, nose infections, tumours
- Ⓐ General: hypertension, bleeding disorders, pertussis, Sickle-cell trait/disease, renal failure, often familial
- Ⓐ Can also be a symptom of serious disease, e.g., typhoid, malaria, viral fevers such as Ebola

## Clinical features

- Ⓐ On examination, site of bleeding from nose may be seen
- Ⓐ Signs and symptoms of shock if bleeding is severe
- Ⓐ Signs and symptoms of predisposing cause

## Differential diagnosis

- Ⓐ Clinical assessment to exclude any of above causes

## Investigations

- Ⓐ Blood: Full blood count, platelet count

## Management

TREATMENT	LOC
<b>First Aid</b>	<b>HC2</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Sit the patient up (if the patient is not in shock) and tilt head forward not backwards to avoid pooling of blood in posterior pharynx</li> <li><input type="checkbox"/> Instruct patient to pinch the nose between the finger and the thumb for 15 minutes, breathe through the mouth, and spit out any blood</li> </ul>	
<b>If bleeding continues</b>	
<ul style="list-style-type: none"> <li><input type="checkbox"/> Impregnate a gauze strip with Soft paraffin or Tetracycline eye ointment and pack into the nose using forceps</li> <li><input type="checkbox"/> Leave gauze in place for 24-48 hours</li> </ul> <p><b>If bleeding still does not stop after this period</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Refer to hospital for further management</li> </ul>	

## Prevention

- Ⓐ Avoid picking the nose
- Ⓐ Treat/control predisposing conditions

### 21.2.3 Nasal Allergy

ICD10 CODE: J30

An abnormal reaction of the nasal tissues to certain allergens, which tends to start in childhood. Vasomotor rhinitis starts in the 20s and 30s.

## Causes

- Ⓐ Predisposing
- Ⓐ Hereditary: Family history of similar or allied complaints
- Ⓐ Infections may alter tissue permeability
- Ⓐ Psychological and emotional factors in vasomotor rhinitis

## Precipitating

- Ⓐ Changes in humidity and temperature
- Ⓐ Dust mite, infections
- Ⓐ Certain foods; drugs, e.g. acetylsalicylic acid
- Ⓐ Alcohol, aerosols, fumes

## Clinical features

- Ⓐ Often present in school age children
- Ⓐ Sometimes preceded or followed by eczema or asthma. Less common in persons >50 years old
- Ⓐ Paroxysmal sneezing
- Ⓐ Profuse watery nasal discharge
- Ⓐ Nasal obstruction, variable in intensity and may alternate from side to side
- Ⓐ Postnasal drip (mucus dripping to the back of the nose)

## Investigation

- Ⓑ Careful history is most important
- Ⓑ Large turbinates on examining the nose

## Differential diagnosis

- Ⓐ Nasal infection
- Ⓐ Foreign body
- Ⓐ Adenoids (in children)

## Management

TREATMENT	LOC
<input type="checkbox"/> Avoid precipitating factors (most important)	HC2
<input type="checkbox"/> Reassure the patient	

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Antihistamines, e.g., Chlorphenamine 4 mg every 12 hours for up to 21 days, then as required thereafter if it recurs</li> <li><input type="checkbox"/> Nasal decongestants, e.g., Pseudoephedrine or xylometazoline</li> <li><input type="checkbox"/> Surgery may be required if there is obstruction of the nose</li> </ul>	HC2

**Caution**

Do NOT use vasoconstrictor nasal drops, e.g. Pseudoephedrine and Xylometazoline for >7 days or repeatedly, since they can cause rebound congestion and alter the nasal environment making structures hardened

## 21.2.4 Sinusitis (Acute)

ICD10 CODE: J01

Inflammation of air sinuses of the skull

### Causes

- Allergy
- Foreign body in the nose
- Viruses, e.g., rhinovirus, often as a complication of URTI
- Dental focal infection
- Bacteria, e.g., Streptococcus pneumoniae, Haemophilus influenzae, Streptococcus pyogenes

### Clinical features

- Rare in patients <5 years
- Pain over cheek and radiating to frontal region or teeth, increasing with straining or bending down
- Redness of nose, cheeks, or eyelids
- Tenderness to pressure over the floor of the frontal sinus immediately above the inner canthus

- Referred pain to the vertex, temple, or occiput
- Postnasal discharge
- A blocked nose
- Persistent coughing or pharyngeal irritation
- Hyposmia

### Differential diagnosis

- Common cold, allergic rhinitis
- Foreign body in the nose
- Nasal polyps, adenoids rhinitis

### Investigations

- C&S of the discharge
- X-ray of sinuses

### Management

TREATMENT	LOC
<p><b>General measures</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Steam inhalation may help clear blocked nose</li> <li><input type="checkbox"/> Analgesics e.g. Paracetamol</li> <li><input type="checkbox"/> Nasal irrigation with normal saline</li> </ul> <p>If there are signs of bacterial infection (symptoms persisting &gt; 1 week, unilateral facial pain, worsening of symptoms after an initial improvement)</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Amoxicillin 500 mg every 8 hours for 7-10 days</li> </ul>	<b>HC2</b>

TREATMENT	LOC
<p><input type="checkbox"/> Child: 15 mg/kg per dose</p> <p>If there is a dental focus of infection</p> <p><input type="checkbox"/> Extract the tooth</p> <p><input type="checkbox"/> Give antibiotics e.g. Amoxicillin plus Metronidazole (see Gingivitis, section 23.2.5)</p> <p><input type="checkbox"/> If there is a foreign body in the nose</p> <p><input type="checkbox"/> Refer to hospital for removal</p>	<b>HC2</b>

### Notes

Do NOT use antibiotics except if there are clear features of bacterial sinusitis, e.g., persistent ( $> 1$  week) purulent nasal discharge, sinus tenderness, facial or periorbital swelling, persistent fever

## 21.2.5 Atrophic Rhinitis

Chronic infection of the nasal mucosa in which various components become thinner (atrophy) due to fibrosis of the terminal blood vessels.

### Cause

- Ⓐ Unknown but associated with: HIV/AIDS, poor socio-economic status, syphilis, rhinoscleroma (early stages)

### Clinical features

- Ⓐ Tends to affect both nasal cavities
- Ⓐ Affects females more than males
- Ⓐ Foul stench not noticed by patient who cannot smell
- Ⓐ Crusts and bleeding points in the nose
- Ⓐ Epistaxis when crusts separate
- Ⓐ Sensation of obstruction in the nose
- Ⓐ Nasal airway very wide

## Investigations

- C&S of smear of nasal material
- X-ray: To exclude sinusitis
- Differential diagnosis
- Atrophy from other causes

## Management

TREATMENT	LOC
<p><input type="checkbox"/> Clean nasal cavities twice daily to remove crusts (most important)</p> <p><input type="checkbox"/> Syringe nose or douche it with warm normal saline</p> <p><input type="checkbox"/> Or sodium bicarbonate solution 5% (dissolve 1 teaspoon of powder in 100 ml cup of warm water)</p> <p><input type="checkbox"/> Then apply tetracycline eye ointment 1% inside the nose twice daily</p> <p>- Give amoxicillin 500 mg every 8 hours for 14 days For rhinoscleroma: Give 1 g every 8 hours for 6 weeks</p> <p>If atrophic rhinitis not better or is worse after 2 weeks</p> <p><input type="checkbox"/> Refer to ENT specialist</p>	<b>HC3</b> <b>HC4</b>

## Prevention

- Treat/eliminate known causes, such as syphilis

### 21.2.6 Adenoid Disease

ICD10 CODE: J35.02, J35.2

Enlargement/inflammation of nasopharyngeal tonsil. Common in small children.

## Clinical features

May be due to enlargement, inflammation, or both

- Ⓐ Obstruction of the nose leading to mouth breathing, difficulty eating, snoring, jaw deformities
- Ⓐ Obstruction of Eustachian tube leading to hearing loss, which fluctuates due to fluid in middle ear ("Glue ear")
- Ⓐ Recurrent otitis
- Ⓐ Discharge from the nose
- Ⓐ Recurrent cough
- Ⓐ Physical and other developmental retardation, e.g. small size for age

## Investigations

- Ⓐ Diagnosis is usually based on history
- Ⓐ X-ray for neck soft tissue: lateral view shows narrowing of the post-nasal space

## Differential diagnosis

- Ⓐ Other causes of nasal obstruction and discharge, e.g., rhinitis, FB, deviated septum, sinusitis
- Ⓐ Dental and jaw diseases or abnormalities

## Management

TREATMENT	LOC
<b>Mild (If symptoms are not marked)</b>	
<input type="checkbox"/> Give conservative treatment with chlorpheniramine 1-2 mg daily (depending on age) for 7 days <input type="checkbox"/> Topical nasal steroids if available	<b>HC2</b>

TREATMENT	LOC
Moderate and Severe (If symptoms are marked or do not improve on treatment) <ul style="list-style-type: none"> <li>Ⓐ Refer to ENT surgeon for surgery</li> </ul>	

## 21.3 THROAT CONDITIONS

### 21.3.1 Foreign Body (FB) in the Airway ICD10 CODE: T17

Mostly occurs in children <5 years

#### Cause

- Ⓐ Types of FBs include seeds (groundnuts, beans, maize) plastics, rubber, metal wires, ball bearings
- Ⓐ Usually inhaled from the mouth
- Ⓐ Child is chewing, laughing, or crying or there is a sudden disturbance, which opens the vocal cords so the object is inhaled

#### Clinical features

- Ⓐ Sudden onset of choking followed by stridor (noisy breathing) or
- Ⓐ Cough, difficulty in breathing, wheezing
- Ⓐ Hoarseness of voice if FB stuck at the vocal cords
- Ⓐ Symptoms start suddenly, some symptoms may be transient (may disappear after a short period), but complications may present few days later (sudden death, intractable pneumonia)
- Ⓐ Upper airway obstruction as shown by: flaring of the nostrils, recession of the chest inlet and/or below the ribs, rapid chest movements and reduced air entry (usually on the right side)

#### Investigations

- Ⓐ Once the history and examination are suggestive, investigations can be omitted to save time

- Chest x-ray may show lung collapse, hyperinflation, mediastinal shift, shift of heart shadow

## Management

TREATMENT	LOC
<p><b>Child</b></p> <ul style="list-style-type: none"> <li>□ If chocking, attempt to dislodge it by 3 cycles of 5 back slaps/5 chest compressions (for infants) or Heimlich manoeuvre (for children)</li> <p>Do not do blind finger sweeps. If a foreign body is visible in the mouth, remove it with a Magill forceps</p> <li>□ If severe respiratory distress, refer to higher level for airway visualization. Give oxygen if necessary</li> </ul>	<b>HC2</b>
<p><b>Adult</b></p> <ul style="list-style-type: none"> <li>□ Dislodge large FB, e.g. chunk of meat, from the pharynx by cycles of 5 back slaps and Heimlich manoeuvre (standing behind the patient with both arms around the upper abdomen and giving 5 thrusts) <ul style="list-style-type: none"> <li>- If patient pregnant or very obese: Perform 6-10 chest thrusts with patient lying on the back</li> </ul> </li> <li>□ If still suspect of FB, refer for airway visualization</li> </ul>	

## Prevention

- Do not give groundnuts or other small hard food items to children <2 years
- If a child is found with objects in the mouth, leave the child alone to chew and swallow or gently persuade the child to spit out the object
- Do not struggle with/force the child

## 21.3.2 Foreign Body in the Food Passage

ICD10 CODE: T18

### Causes

- Ⓐ Types of FBs commonly involved include:
- ▢ Fish or chicken bones, often lodging in the tonsils, behind the tongue, or in the pharynx, occasionally in the oesophagus
- Ⓐ Coins, especially in children. Coins are particularly likely to be ingested. Disc battery is particularly dangerous and requires immediate referral

### Clinical features

- Ⓐ Difficulty and pain in swallowing
- ▢ Patient winces as he attempts to swallow
- Ⓐ Drooling of saliva
- Ⓐ Patient may point to where foreign body is stuck with a finger (pointing sign)
- Ⓐ FB may be seen, e.g., in tonsil, pharynx

### Differential diagnosis

- Ⓐ Infection in pharynx
- Ⓐ Trauma by foreign body
- Ⓐ Medication ulcer (e.g. doxycycline)

### Investigations

- Ⓐ X-ray may reveal radio-opaque FB
- ▢ Coins may appear on X-rays done for other reasons
- Ⓐ Many FBs are radiolucent
- ▢ Look for a gas shadow if in the oesophagus

## Management

- ⦿ The approach depends upon the type of object ingested, the location of the object, and the patient's clinical status.
- ⦿ If negative radiographs, no symptoms and the FB does not belong to a dangerous category (magnets, disc batteries, sharp long objects, superabsorbent polymer), expectant management is advised.
- ⦿ If patient is symptomatic and/or the object is dangerous, immediate referral for further management.

TREATMENT	LOC
<input type="checkbox"/> Allow only clear fluids <input type="checkbox"/> Do NOT try to dislodge/move the FB with solid food <ul style="list-style-type: none"> <li>- This may push it into the wall of the oesophagus causing infection and sometimes death</li> </ul> <input type="checkbox"/> Give IV infusion if unable to swallow liquids or if oral fluid intake is poor	<b>HC2</b>
If FB is invisible on X-ray or symptoms persist >24 hours from time of ingestion <ul style="list-style-type: none"> <li><input type="checkbox"/> Refer to hospital with ENT facility</li> </ul> If FB is visible in the pharynx, tonsil, etc. <ul style="list-style-type: none"> <li><input type="checkbox"/> Grasp and remove it with long forceps</li> </ul> If patient tried to push FB with solid food: <ul style="list-style-type: none"> <li><input type="checkbox"/> Give broad-spectrum antibiotic cover with amoxicillin 500 mg every 8 hours for 5 days</li> </ul>	

## Prevention

- ⦿ Keep potential FBs out of children's reach
- ⦿ Advise on care in eating, i.e., not taking in too large pieces of food, chewing thoroughly before swallowing
- ⦿ Advise once a FB is stuck to avoid trying to "push" it down with solid food as this may sometimes be fatal

## 21.3.3 Pharyngitis (Sore Throat) | ICD10 CODE: J02

Inflammation of the throat

### Causes

- Ⓐ Most cases are viral
- Ⓐ Bacterial: commonly Group A haemolytic Streptococci, diphtheria in non-immunized children
- Ⓐ Gonorrhoea (usually from oral sex)
- Ⓐ May also follow ingestion of undiluted spirits
- Ⓐ Candida albicans in the immunosuppressed

### Clinical features

- Ⓐ Abrupt onset
- Ⓐ Throat pain
- Ⓐ Pain on swallowing
- Ⓐ Mild fever, loss of appetite, general malaise
- Ⓐ In children: nausea, vomiting, and diarrhoea
- Ⓐ The presence of runny nose, hoarseness, cough, conjunctivitis, viral rash, diarrhea suggests viral infection
- Ⓐ The presence of tonsilar exudates, tender neck glands, high fever, and absence of cough suggest a bacterial pharyngotonsillitis (see section 21.3.4)

### Differential diagnosis

- Ⓐ Tonsillitis, epiglottitis, laryngitis
- Ⓐ Otitis media if there is referred pain

### Investigations

- Ⓐ Throat examination with torch and tongue depressor
- Ⓐ Throat swab for microscopy, C&S

- Blood: Full blood count
- Serological test for haemolytic streptococci (ASOT)

TREATMENT	LOC
<p>Supportive care</p> <p>Most cases are viral and do not require antibiotics</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Keep the patient warm</li> <li><input type="checkbox"/> Give plenty of (warm) oral fluids e.g., tea</li> <li><input type="checkbox"/> Give analgesics, e.g., Paracetamol for 3 days</li> <li><input type="checkbox"/> Review the patient for progress</li> </ul> <p>For Streptococcal pharyngitis: see section 21.3.4</p>	<b>HC2</b>
<p>Notes</p> <p>If not properly treated, streptococcal pharyngitis may lead to acute rheumatic fever and retropharyngeal or peritonsillar abscess</p> <ul style="list-style-type: none"> <li>- Therefore ensure that the full 10-day courses of antibiotics are completed where applicable</li> </ul>	

### 21.3.4 Pharyngo-Tonsillitis

ICD10 CODE: J03

Inflammation of the tonsils

#### Cause

- Streptococcal infection (most common)
- Viral infection (less common)

#### Clinical features

- Sudden onset, most common in children
- Sore throat
- Fever, shivering, headache, vomiting
- Tonsils enlarged and with exudate and cervical lymph nodes

#### Complications

- Local: peritonsillar cellulitis and abscess (quinsy),

- Ⓐ Systemic complications: bacterial endocarditis, glomerulonephritis, rheumatic fever (see section 4.1.9)

## Differential diagnosis

- Ⓐ Pharyngitis
- Ⓐ Submandibular lymphadenitis
- Ⓐ Investigations
- Ⓐ Throat swab: For C&S

## Management

TREATMENT	LOC
<p><b>Bacterial pharyngotonsillitis</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Phenoxymethylpenicillin 500 mg every 6 hours for 10 days</li> <li><input type="checkbox"/> Child: 10-20 mg/kg per dose</li> <li><input type="checkbox"/> Or Benzathine penicillin 1.2 MU IM single dose</li> <li><input type="checkbox"/> Child: &lt;30 kg: 30,000 IU/kg</li> </ul> <p>If allergic to penicillin</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Erythromycin 500 mg every 6 hours for 10 days</li> <li><input type="checkbox"/> Child: 12.5 mg/kg per dose</li> </ul> <p><b>Viral pharyngotonsillitis</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Treat symptomatically with analgesics and increased oral fluids</li> </ul>	<b>HC2</b>

### 21.3.5 Peritonsillar Abscess (Quinsy) ICD10 CODE: J36

An abscess between the tonsil capsule and the lateral wall of the pharynx

#### Cause

- Ⓐ Follows (often mild) tonsillitis attack

#### Clinical features

- Ⓐ Severe throat pain
- Ⓐ Fever, headache, malaise, rigors may occur
- Ⓐ Inability to open the mouth; salivation and dribbling



- Ⓐ Bad mouth odour
- Ⓐ Thickened muffled (unclear) speech
- Ⓐ Ear pain
- Ⓐ Enlarged cervical lymph nodes
- Ⓐ Tonsil and soft palate reddish and oedematous
- Ⓐ Swelling pushing the uvula to opposite side
  - May be pointing (bulging collection of pus)

### Differential diagnosis

- Ⓐ Tumour
- Ⓐ Tonsillitis
- Ⓐ Abscess in the pharynx

### Investigations

- Carry out C&S on pus if present or after drainage

### Management

TREATMENT	LOC
<b>Early stages: Disease of adolescents and adults</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Conservative management</li> <li><input type="checkbox"/> Bed rest</li> <li><input type="checkbox"/> Adult: Benzylpenicillin 2 MU IV or IM every 6 hours for 48 hours then switch to amoxicillin 500 mg every 8 hours to complete a total of 7 days</li> </ul> <b>If not better in 48 hours</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Ceftriaxone 1 g IV once daily for 7 days Child: 50 mg/kg IV</li> <li><input type="checkbox"/> Plus metronidazole 500 mg IV every 8 hours Child: 10 mg/kg IV every 8 hours</li> </ul>	
	<b>HC2</b>

TREATMENT	LOC
<p>If unable to take oral fluids</p> <ul style="list-style-type: none"><li><input type="checkbox"/> Set up an IV drip e.g. Normal saline</li></ul> <p>When swelling is marked</p> <ul style="list-style-type: none"><li><input type="checkbox"/> Surgery (which should be done by a trained person)<ul style="list-style-type: none"><li>- Suction facility will be needed</li><li>- Carry out incision and drainage at the most pointing area with the protected tip of no.11 surgical blade</li></ul></li><li><input type="checkbox"/> 6 weeks later: Refer for tonsillectomy as this condition might recur</li></ul>	

### Prevention

- Prompt and adequate treatment of tonsillitis

# 22 Skin Diseases

## 22.1 BACTERIAL SKIN INFECTIONS

### 22.1.1 Impetigo                    ICD10 CODE: L01

A very superficial bacterial infection of the epidermis (upper/outer layer of skin), bullous and non bullous impetigo

#### Cause

- Streptococcus or staphylococcus infection, or both

#### Clinical features

- Common in children, although it can also occur in adults.
- Lesions usually on face, head, and hands as bullae, or small brown crusts on an erythematous base
- In some cases, large flaccid bullae containing pus and serum are formed commonly in the axilla and groin

#### Differential diagnosis

- Pemphigus foliaceus

#### Investigations

- Pus swab for Gram stain
- Culture and sensitivity (exudate from unroofed lesion)

## Management

TREATMENT	LOC
<b>Cleaning</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Clean affected area with chlorhexidine solution 0.05%</li> </ul> <b>Antiseptic: if infection mild and localised (&lt;5 lesions)</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Apply gentian violet aqueous paint 0.5% every 12 hours for 3 days</li> <li><input type="checkbox"/> OR apply silver sulphadiazine 1% cream 12 hourly for 5 days OR apply Mupirocin(supirocin) 2% 8 hourly for 5 to 7 days.</li> </ul> <b>Antiseptic: if infection mild and localised (&lt;5 lesions)</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Apply gentian violet aqueous paint 0.5% every 12 hours for 3 days</li> <li><input type="checkbox"/> OR apply silver sulphadiazine 1% cream 12 hourly for 5 days</li> <li><input type="checkbox"/> Keep skin clean by frequent washing and drying</li> <li><input type="checkbox"/> Use soap and water to soften, and gently remove any superficial crusts</li> </ul> <b>Systemic antibacterial: if signs of regional or systemic spread, e.g., pyrexia, &gt;5 lesions</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Cloxacillin 250–500 mg every 6 hours before food for 7 days Child: 12.5–25 mg/kg per dose</li> <li><input type="checkbox"/> Or in penicillin allergy, erythromycin 250–500 mg every 6 hours for 7 days Child: 7.5 mg/kg per dose</li> </ul>	HC2
<b>Note</b>	
<p>Impetigo is contagious until the lesions have dried up</p> <p>Isolate/ separate from other patients – in case of admission</p>	



## Prevention

- Ⓐ Proper hygiene with use of antiseptic soap

### 22.1.2 Boils (Furuncle)/Carbuncle

ICD CODE: L02

A boil or furuncle is a deep-seated infection of the hair follicles with a walled-off collection of pus. A carbuncle is a cluster of interconnected furuncles.

## Cause

- Ⓐ Bacterial infection with *Staphylococcus aureus*, leading to the collection of pus

## Clinical features

- Ⓐ Common in people with poor general health, diabetes, or the debilitated
- Ⓐ Painful mass, warm, and tender
- Ⓐ Swelling becomes fluctuant, may point after 3 days

## Differential diagnosis

- Ⓐ Acne
- Ⓐ Epidermal cyst
- Ⓐ Lipoma
- Ⓐ Lymphadenitis

## Investigations

- Pus swab for Gram staining and C&S
- If recurrent, check for diabetes mellitus and HIV infection

## Management

TREATMENT	LOC
<p><b>General measures</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Intermittent warm compresses to allow lesion to point</li> <li><input type="checkbox"/> Incise and drain when ready (most fluctuant point), then cover with dressing (pack cavity)</li> </ul> <p><b>Antibiotics</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> May be useful if instituted early and in carbuncles, lesions on face and in immunocompromised patients</li> <li><input type="checkbox"/> Cloxacillin 250-500 mg every 6 hours before food for 5 days           <ul style="list-style-type: none"> <li>- Child: 12.5-25 mg/kg per dose</li> </ul> </li> <li><input type="checkbox"/> OR in penicillin allergy patients, erythromycin</li> <li><input type="checkbox"/> 500 mg every 6 hours           <ul style="list-style-type: none"> <li>- Child: 7.5 mg/kg per dose</li> </ul> </li> </ul>	<b>HC2</b>
<p><b>Prevention</b></p> <ul style="list-style-type: none"> <li><input checked="" type="radio"/> Personal hygiene with use of antiseptic soap</li> </ul>	

### 22.1.3 Cellulitis and Erysipelas

ICD10 CODE: L03

Cellulitis is an acute inflammation of the skin involving the dermis and subcutaneous tissues, caused mainly by streptococci and staphylococci. Erysipelas has a raised demarcated border, whereas the border is not distinct in cellulitis.

#### Causes

- Streptococcus and S. Aureus, in adults
- Haemophilus influenza type b in children under 3 years

- ⑤ Cellulitis is sometimes caused by other organisms e.g, pseudomonas picked from bath tubs to a lesser extent

### Predisposing factors

- ⑤ Minor trauma
- ⑤ Pre-existing lesion such as ulcer or erosion
- ⑤ Iatrogenic, via intra venous therapy (cannulation) and prolonged hospitalization

### Clinical features

- ⑤ Erythema (reddening)
- ⑤ Pain, swelling +/- loss of function, tenderness
- ⑤ Acute localised swelling and oedema
- ⑤ In erysipelas, lesions are more superficial and have a defined raised margin
- ⑤ Skin becomes tense and shiny in advanced stages
- ⑤ Regional lymphadenitis may be present

### Differential diagnosis

- ⑤ Lymphoedema
- ⑤ Acute osteomyelitis
- ⑤ Deep vein thrombosis (DVT)
- ⑤ Blunt trauma/fracture

### Investigations

- Pus swab for Gram staining and culture and sensitivity

NB; Investigations depend on differential diagnosis list, e.g. Xray, Doppler, CBC.etc.

## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Elevate the affected limb</li> <li><input type="checkbox"/> Give an analgesic e.g., paracetamol 1 g every 6-8 hours as required, Child: 10 mg/kg</li> <li><input type="checkbox"/> Antibiotics: cloxacillin 250-500 mg every 6 hours before food for 7 days           <ul style="list-style-type: none"> <li>- Child: 12.5-25 mg/kg per dose</li> </ul> </li> <li><input type="checkbox"/> OR in penicillin allergy, erythromycin 500 mg every 6 hours           <ul style="list-style-type: none"> <li>- Child: 7.5 mg/kg per dose</li> </ul> </li> </ul> <p>If severe</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> IV ceftriaxone           <ul style="list-style-type: none"> <li>- Adult: 1 g every 12 hours for 3 days</li> <li>- Child: 50 mg/kg</li> </ul> </li> <li><input type="checkbox"/> Then oral antibiotics to complete 1 week of antibiotics</li> </ul>	<b>HC3</b>

## 22.2 VIRAL SKIN INFECTIONS

### 22.2.1 Herpes Simplex

ICD10 CODE: B00

A viral infection transmitted by direct contact, and characterized by a localized primary lesion, latency, and recurrence. Lesions can be oral {lips, oral mucosae – (HSV 1)} or genital- (HSV 2).

#### Cause

- Herpes simplex virus types 1 and 2

#### Clinical features

TYPE OF HERPES	FEATURES
Herpes simplex: Primary infection	<ul style="list-style-type: none"> <li><input checked="" type="radio"/> May be asymptomatic</li> </ul>

TYPE OF HERPES	FEATURES
Herpes simplex: Primary infection	<ul style="list-style-type: none"> <li>⦿ In some cases, there may be fever, malaise, gingivostomatitis, and vesicular lesions in the oropharynx, commonly on lips.</li> <li>⦿ If genital infection, painful vesicular eruption in the genital area</li> <li>⦿ Meningoencephalitis and eczema herpeticum in patients with atopic eczema, may be the complications</li> </ul>
Herpes simplex Reactivation of primary infection	<ul style="list-style-type: none"> <li>⦿ Recurrent Herpes labialis and genitalis</li> <li>⦿ Severe in the immunosuppressed</li> </ul>

### Differential diagnosis

- ⦿ Aphthous ulcer
- ⦿ Other causes of genital sores, e.g., syphilis
- ⦿ Other causes of meningoencephalitis

### Investigations

- ⦿ No routine investigation necessary. Diagnosis is clinical

### Management

TREATMENT	LOC
<p>Symptomatic treatment</p> <ul style="list-style-type: none"> <li>◻ Clean lesions with antiseptic, e.g. chlorhexidine solution 0.05%</li> <li>◻ Or diluted hydrogen peroxide solution 6% f In severe or extensive infection, acyclovir 400 mg every 8 hours by mouth for 7 days <ul style="list-style-type: none"> <li>- Child: 100-200 mg 5 times a day for 5-7 days</li> </ul> </li> </ul>	<b>HC2</b>

TREATMENT	LOC
<p><b>Note</b></p> <p>Acyclovir only works if it is started within 48 hours of the first symptoms</p>	

## Prevention

Provide health education on

- Ⓐ Personal hygiene
- Ⓐ Avoiding direct contact with infected people
- Ⓐ Use of gloves and condoms as applicable

### **22.2.2 Herpes Zoster (Shingles) ICD10 CODE: B02**

An acute cutaneous infection involving primarily the dorsal root ganglia, usually of a single dermatome. It is characterised by a vesicular eruption in areas supplied by peripheral sensory nerves in the affected root ganglia.

#### Cause

- ◻ Varicella zoster virus, usually reactivated from the virus that entered the cutaneous nerves during an earlier episode of chicken pox and remained in a latent form. This usually occurs during low immunity.
  - For chickenpox, see section 2.3.2

#### Clinical features

- Ⓐ Pre-eruptive pain, itching or burning: generally localized to the dermatome, precedes the eruption by 4-5 days
- Ⓐ The above are followed by characteristic crops of very painful vesicles on the side supplied by affected nerve
- Ⓐ Mild chills, fever, malaise

#### Differential diagnosis

- Ⓐ Chicken pox
- Ⓐ Herpes simplex



## Investigations

- Clinical diagnosis is sufficient
- Serology test for HIV, if sero-status not known

## Management

TREATMENT	LOC
<b>Symptomatic and supportive treatment</b> <ul style="list-style-type: none"> <li>□ Clean lesions with antiseptic, e.g. chlorhexidine solution 0.05%</li> <li>□ Or diluted hydrogen peroxide solution 6%</li> <li>□ Apply calamine lotion 2–3 times daily</li> <li>□ Analgesics for neuropathic pain e.g. amitriptyline 25 mg nocte, or carbamazepine 200 mg nocte as necessary</li> <li>□ Oral aciclovir 800 mg 5 times a day for 7 days can be given, especially if the disease is diagnosed very early or is disseminated</li> </ul>	HC2
<b>If the lesions involve the eye</b> <ul style="list-style-type: none"> <li>□ Refer to an ophthalmologist (Eye Specialist)</li> </ul>	

## Prevention

- Protect high-risk individuals (e.g., the immuno-suppressed) from direct contact with the disease

## 22.3 FUNGAL SKIN INFECTIONS

### 22.3.1 Tinea

ICD10 CODE: B35

Superficial infection caused by dermatophytes or malassezia fungi, which invade dead tissue of the skin and its appendages (stratum corneum, nails and hair). They are not very infectious but are usually recurrent. Common in children, 4 – 14 years of age

## Causes

- ⦿ Microsporum canis- from animal to human (commonest cause worldwide) or T. rubrum

## Clinical features

- ⦿ Features (and name of the infection) depend on the body part affected as in table below:

Body Part Affected	FEATURES
Tinea capitis	<ul style="list-style-type: none"> <li>⦿ Alopecia, scaly patches with hairs broken off when very short</li> <li>⦿ The lesion may sometimes be inflamed with multiple pustules-Kerion, (pockets of pus)</li> <li>⦿ Especially in children (4- 14 years and immuno-suppressed)</li> </ul>
Tinea corporis (ringworm)	<ul style="list-style-type: none"> <li>⦿ Single or multiple plaques on hairless skin except, palm, sole and groin, especially the face, trunk or limbs.</li> <li>⦿ Well-demarcated, scaly and raised border with a relatively clear centre</li> <li>⦿ Pruritus</li> </ul>
Tinea (or pityriasis) versicolor	<ul style="list-style-type: none"> <li>⦿ A chronic yeast infection caused by malassezia furfur- a normal flora.</li> <li>⦿ Well-defined round/oval patches on the chest, upper back, face and arms.</li> <li>⦿ Not scaly, but peels off when scratched</li> <li>⦿ Rare in children, onset usually around puberty.</li> </ul>

Body Part Affected	FEATURES
Tinea (or pityriasis) versicolor	<ul style="list-style-type: none"> <li>⦿ Treatment; topical application or shampoo; ketoconazole, clotrimazole, miconazole. In severe form, parental application may be used.</li> <li>⦿ NB: griseofulvin SHOULD not be used cause p. versicolor is an yeast infection – not by dermatophyte hence not effective.</li> </ul>
Nails (Onychomycosis)	<ul style="list-style-type: none"> <li>⦿ Thickened, discolored nails; can be white, yellow, green, or black</li> <li>⦿ Brittle nails that break easily</li> </ul>
Tinea capitis	<ul style="list-style-type: none"> <li>⦿ Bald, scaly patches with hairs broken off when very short</li> <li>⦿ The lesion may sometimes be inflamed with multiple pustules (pockets of pus)</li> <li>⦿ Especially in children and immune-suppressed</li> </ul>
Tinea corporis (ringworm)	<ul style="list-style-type: none"> <li>⦿ Single or multiple plaques on the face, trunk or limbs</li> <li>⦿ Well demarcated, scaly and raised border with relatively clear centre</li> <li>⦿ Pruritus</li> </ul>
Tinea (or pityriasis) versicolor	<ul style="list-style-type: none"> <li>⦿ A chronic fungal infection of large areas of skin</li> <li>⦿ Well-defined round/oval patches</li> <li>⦿ Pale or discolored spots on the skin, e.g., chest, back, face</li> <li>⦿ Not scaly, but peels off when scratched</li> <li>⦿ Rare in children, onset usually around puberty</li> </ul>

Body Part Affected	FEATURES
Nails (Onychomycosis)	<ul style="list-style-type: none"> <li>⦿ Thickened, discolored nails, can be white, yellow, green, or black</li> <li>⦿ Brittle nails that break easily</li> </ul>
Tinea pedis (Athlete's foot)	<ul style="list-style-type: none"> <li>⦿ White scaling usually between the 4th and 5th toes or between the 3rd and 4th toes on one foot only</li> <li>⦿ Scales, vesicles, cracks, erosion</li> <li>⦿ Burning or itching between toes and under foot especially when shoes and socks are removed</li> <li>⦿ May be secondary bacterial infection</li> </ul>

### Differential diagnosis

- ⦿ Seborrhoeic dermatitis, eczema, contact dermatitis
- ⦿ Alopecia areata
- ⦿ Jiggers, hookworm, candida
- ⦿ Cellulitis, psoriasis
- ⦿ Maceration from tight footwear

### Investigations

- ⦿ Scales from the active edge of the lesions are scraped off, placed in 10-20% potassium hydroxide (KOH) for 30 minutes, and examined microscopically for mycelia
- ⦿ Culture of specimen on Sabouraud's agar

### Management

TREATMENT	LOC
Tinea capitis	

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Oral griseofulvin 10 mg/kg /day as single dose once daily after meals for 6 weeks</li> <li><input type="checkbox"/> Do NOT treat with topical antifungal agents; they cannot get to the site of infection</li> </ul> <p><b>Tinea corporis (ringworm)</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Apply Whitfield's ointment (benzoic acid + salicylic acid) 12 hourly until 2 weeks after lesions clear</li> <li><input type="checkbox"/> Clotrimazole 1% cream twice a day</li> <li><input type="checkbox"/> Or miconazole 2% cream 12 hourly for 2-3 weeks</li> </ul> <p>If topical treatment fails</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Griseofulvin 10 mg/kg for 3 weeks</li> </ul>	HC2
<p>Pityriasis versicolor</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Apply clotrimazole cream 12 hourly until lesions disappear</li> <li><input type="checkbox"/> Or miconazole 2% cream 12 hourly for 2-3 weeks</li> </ul> <p>If topical treatment fails</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Fluconazole 300 mg once weekly for 2 weeks</li> </ul> <p>NB; Griseofulvin should not be used</p>	HC3
<p>Nails (Onychomycosis)</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Oral griseofulvin 10 mg/kg per day as single dose once daily after meals for 6-12 months</li> </ul> <p><b>Tinea pedis (Athletes foot)</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Apply clotrimazole cream 12 hourly, continue for 14 days after the lesions have healed</li> <li><input type="checkbox"/> Or miconazole cream as above</li> <li><input type="checkbox"/> Apply powder (not necessarily medicated) to the feet rather than to the shoes</li> </ul>	HC3

TREATMENT	LOC
<input checked="" type="checkbox"/> For persistent or non-responsive infection, oral griseofulvin 10 mg/kg /day as single dose once daily after meals for 4-8 weeks	HC3

**Note on griseofulvin**

- Double the dose in severe infections
- Take with fatty food
- Do NOT use for tinea versicolor ( pityriasis)
- Advise female patient to not get pregnant while on treatment
- Men should avoid fathering children while on treatment

### Prevention and health education

- Ⓐ Clean all contaminated objects, e.g., combs, brushes
- Ⓐ Avoid sharing contaminated combs, towels, clothes, etc.
- Ⓐ Advise patient on the need to persist with the long durations of treatment to completely clear infection
- Ⓐ Personal foot hygiene is important. Keep feet clean and dry. Wash socks daily
- Ⓐ If patient has repeat fungal infections, refer him/her for HIV, diabetes counselling and testing.

## 22.4 PARASITIC SKIN INFECTIONS

### 22.4.1 Scabies

ICD10 CODE: B86

Contagious skin disease associated with severe itch

#### Cause

- Ⓐ A parasitic mite, Sarcoptes scabiei hominis
- Ⓐ Transmitted by direct skin contact with infected person



## Clinical features

- Ⓐ Intense itching, especially at night
- Ⓐ Wheals, papules, vesicles, and thread-like burrows
- ▢ Common in flexural areas, i.e., wrists and inter-digital creases, axillae, nipples, buttocks, and genitalia
- Ⓐ Scratching spreads mites to other areas leading to widespread, intensely pruritic eruption
- Ⓐ Secondary infection is common

## Differential diagnosis

- Ⓐ Papular urticaria, atopic or seborrhoeic dermatitis
- Ⓐ Drug eruptions
- Ⓐ Onchocerciasis
- Ⓐ Contact dermatitis

## Investigations

- Microscopic identification of mites - diagnosis is largely clinical, their eggs or faeces obtained from the vesicles or mite burrows.

## Management

TREATMENT	LOC
<b>General measures</b> <ul style="list-style-type: none"> <li>▢ Close contacts and all family members in the household-symptomatic and asymptomatic, should be treated</li> <li>▢ Wash with hot water and iron all linen which has touched the infected skin</li> </ul>	HC2
<b>Medicine treatment</b> <ul style="list-style-type: none"> <li>▢ Wash (scrub) the body well</li> </ul>	

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Apply benzyl benzoate lotion 25% to the whole body from the scalp to the soles of the feet but taking care to avoid contact with the eyes. apply at bed time and wash off in the morning. Repeat 2 times except in pregnant women</li> <li><input type="checkbox"/> Give an antihistamine to relieve itching: tablet chlorpheniramine 4 mg every 8 hours for 3 days           <ul style="list-style-type: none"> <li>- Child: 1- 2 mg per dose</li> <li>- Cetirizine 10mg at bed time for 5 – 7 days-in Adults.</li> </ul> </li> </ul> <p>If treatment ineffective or unsuitable</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Ivermectin 200 micrograms single dose (avoid in pregnancy, and in children &lt;15 kg or below 12 years)</li> <li><input type="checkbox"/> For complete eradication of mites, repeat the dose after 7 days</li> </ul> <p>If secondary infection is present</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Give an antibiotic as in boils (see section 22.1.2)</li> </ul>	HC2
	HC3

## Prevention

- Ⓐ Personal hygiene (washing clothes and regular bathing)
- Ⓐ Avoid close contact with infected people

### 22.4.2 Pediculosis/Lice

ICD10 CODE: B85

Infestation by lice, usually in the hairy parts of the body. Usually found on the scalp, armpits, chest or pubic area.

## Cause

- Ⓐ Pediculosis humanus (capitis, corporis, pubis)
- Ⓐ Usually transmitted directly by person-to-person contact but may also be transmitted indirectly via the clothing, towels, and bedding of infested persons



## Clinical features

- Severe itching of affected areas, scratch marks
- Nits (white eggs) attached to hairs
- Direct observation of lice
- Continued scratching may lead to secondary bacterial infection and eczemas
- Differential diagnosis
- Seborrhoeic dermatitis

## Investigations

- Direct observation of lice/nits

## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Shave the affected area</li> <li><input type="checkbox"/> Apply pediculocide to kill lice           <ul style="list-style-type: none"> <li>- Apply benzyl benzoate lotion 25% and leave on overnight</li> <li>- Child 2-12 years: dilute the lotion with an equal part of water before application</li> <li>- Child &lt;2 years: dilute 1 part of lotion with 3 parts of water, leave on for 12 hours. Apply ONLY once</li> <li>- Comb with a fine toothed comb if not shaved</li> </ul> </li> </ul>	HC2

### Note

#### Head lice

Do not use undiluted Benxyl Benzoate A in children <2 years. It is very irritating to the eyes

If the head is not shaved, ensure that the BBA is massaged well into the scalp

Soak all brushes and combs in BBA for at least 2 hours

TREATMENT	LOC
Pubic lice Treat all sexual partners at the same time	

## Prevention

- Ⓐ Personal hygiene (washing clothes and regular bathing)
- Ⓐ Avoid close contact with infected people
- Ⓐ Treat the whole family
- Ⓐ Avoid sharing combs, towels, etc

### 22.4.3 Tungiasis (Jiggers)

ICD10 CODE: B88.1

An infestation by the burrowing flea *Tunga penetrans*. Commonly affects the feet, hands, elbows, and sometimes buttocks.

## Cause

- Ⓐ A burrowing sand flea, *Tunga penetrans*

## Risk factors

- Ⓐ Travel to areas with *T. penetrans*
- Ⓐ Walking bare feet
- Ⓐ Living in same house with domestic animals such as pigs, dogs and rodents like rats

## Clinical features

- Ⓐ Punctum or ulceration, often described as a white patch with a black dot on affected area
- Ⓐ There may be redness and swelling around affected site
- Ⓐ A serosanguineous exudate may ooze from the central opening, and eggs may be seen with the naked eye
- Ⓐ Lesions can be painful and very itchy



## Complications

- Ⓐ Tissue necrosis, suppuration, gangrene
- Ⓐ Disability, disfigurement

## Differential diagnosis

- Ⓐ Cercarial dermatitis, scabies
- Ⓐ Creeping eruption (*ancylostoma* species)
- Ⓐ Tick or flea bite, myiasis

## Investigations

- Ⓐ Clinical features are diagnostic

## Management

TREATMENT	LOC
<b>Self-healing</b> <ul style="list-style-type: none"> <li>☐ In many cases tungiasis will heal on its own as the burrowed flea dies within 2–5 weeks, and naturally sloughs off as the skin sheds</li> </ul>	HC2
<b>Surgical removal</b> <ul style="list-style-type: none"> <li>☐ Physical removal of the flea using sterile forceps, or needles, or safety pins</li> </ul>	
<b>Medicine treatment and suffocation of flea</b> <p>Apply Dimethicone oil for treatment of tungiasis</p> <ul style="list-style-type: none"> <li>☐ Wash the feet or the affected part of the body thoroughly with soap</li> <li>☐ Let the feet or body part dry</li> <li>☐ Apply a few drops on the black dot of the identified jiggers</li> <li>☐ Repeat after 10 minutes</li> </ul>	

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> For severe cases you may require to rubrubbing the oil into the crevices</li> <li><input type="checkbox"/> A single treatment as above is enough but can be repeated after two weeks in situations of severe infestation</li> </ul> <p><b>Precautions</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Avoid contact with eyes. In case of contact, wash the eye with plenty of clean water</li> <li><input type="checkbox"/> The oil is highly inflammable. Avoid sitting near open fires after applying Dimeticone.</li> <li><input type="checkbox"/> Store the unused oil away from open fire and children</li> </ul> <p><b>Contraindications:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Do not use dimeticone on people with known hypersensitivity reactions to any of the Dimeticone oils</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Apply benzyl benzoate 25% emulsion twice daily to the affected area for 6 days</li> <li><input type="checkbox"/> Immerse affected area in potassium permanganate 0.05% once a day for 10 minutes for 10 days</li> <li><input type="checkbox"/> Then follow with application of thickpetroleum jelly or 20% salicylated petroleum jelly vaseline) daily for 7 days</li> </ul> <p><b>If secondary bacterial infection</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Treat as per boils (see section 22.1.2)</li> </ul>	HC2
<b>Note</b>	
Health education to prevent secondary bacterial infections such as cellulitis, and tetanus	

## Prevention

- Spray the ground with insecticide such as malathion
- Protect feet with socks and shoes
- Dry laundry on a line instead of the ground
- Do not share housing with animals. Animals such as goats, pigs, cows can all be infested with jiggers
- Keep floors clean and dust free
- Health education

## 22.5 INFLAMMATORY AND ALLERGIC SKIN CONDITIONS

### 22.5.1 Acne ICD10 CODE: L70

Acne is a common chronic skin disease caused by blockage and/or inflammation of hair follicles and sebaceous glands. It commonly occurs in puberty and adolescence and is associated with hormonal changes.

#### Causes

Acne develops as a result of the following four factors:

- Release of inflammatory mediators into the skin
- Follicular hyperkeratinization with subsequent plugging of the follicles

#### Causes

- Acne develops as a result of the following four factors:
- Release of inflammatory mediators into the skin
- Follicular hyperkeratinization with subsequent plugging of the follicles
- Propionibacterium acnes follicular colonization
- Excess sebum production

## Clinical features

- Typically affects face, and upper part of chest and back
- Inflammatory papules, pustules and nodules
- Infected parts may be painful
- Cysts and scars in severe cases
- May worsen during menstruation

## Differential diagnosis

- Furuncles
- Molluscum contagiosum

## Investigations

- Clinical features are largely diagnostic

## Management

TREATMENT	LOC
<p><b>General measures</b></p> <ul style="list-style-type: none"><li>□ Reassure patient. Inform him or her that diet plays no role in acne</li><li>□ Drink water regularly</li><li>□ Clean face twice daily with mild soap and water</li><li>□ Do not use strong soap</li><li>□ Commercial facial wash cleansers can decrease skin oiliness</li><li>□ Do not use oil, cream or petroleum jelly</li><li>□ Do not touch or press the foci</li><li>□ Sunshine is helpful, but avoid sunburn</li><li>□ If acne is getting worse or pustular, refer to a dermatologist</li></ul>	HC2

TREATMENT	LOC
Topical medicine treatment	HC4
<input type="checkbox"/> Benzoyl peroxide 2.5% to 10%, applied at night for not more than 4 months	
Systemic antibacterials	HC2
<input type="checkbox"/> Only use if acne is severe and creams are unavailable	
<input type="checkbox"/> Duration of treatment depends on response. May last 6 months to one year	
<input type="checkbox"/> Doxycycline 100 mg once daily for 6-12 months.	HC3
<input type="checkbox"/> Review treatment monthly to ascertain response	
<input type="checkbox"/> OR erythromycin 500 mg every 6 hours for 1 month, during pregnancy or breast feeding	
<input type="checkbox"/> Refer to dermatologist if no response occurs	
Oral contraceptives	HC4
<input type="checkbox"/> Combined oral contraceptive (see Family Planning, section 15.2.3)	

## 22.5.2 Urticaria/Papular Urticari

ICD10 CODE: L50

An acute, sub-acute or chronic inflammation of the skin, caused by endogenous or exogenous agents. Urticaria is an itchy skin rash.

### Causes

- Ⓐ Endogenous: familial, also associated with other allergic diseases
- Ⓑ Exogenous: agents include sunlight, chemicals, certain foods, insect bites

### Clinical features

- Ⓐ Inflammation of skin: transient itching hives and wheals
- Ⓑ Papular urticaria: vesicles, redness, oedema, oozing in case of insect bites

## Differential diagnosis

- Fungal and bacterial infections of the skin
- Helminth infestations

## Investigations

- No satisfactory investigations for skin allergy
- Blood: haemogram to demonstrate eosinophilia
- Stool: microscopy to exclude worms

TREATMENT	LOC
<p>Establish the cause and treat accordingly. Identify what the patient is allergic to.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Give an analgesic e.g., paracetamol for any pain or discomfort as necessary</li> <li><input type="checkbox"/> Avoid acetylsalicylic acid</li> <li><input type="checkbox"/> Give an antihistamine to relieve itching; chlorphenamine 4 mg every 8 hours Child: 1-2 mg per dose</li> <li><input type="checkbox"/> Or promethazine 25 mg at night. Increase to every 12 hours if necessary Child: 1 mg/kg daily in 1-2 divided doses</li> </ul> <p>If severe/unresponsive</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Prednisolone 1 mg/kg orally once a day for 3-5 days</li> </ul>	HC2

## Prevention

- Avoid contact with known allergens
- Treat helminth infections

### 22.5.3 Eczema (Dermatitis)

ICD10 CODE: L20, L23

Acute or chronic superficial inflammation of the skin



## Cause

- Ⓐ Allergic dermatitis: reaction to food, chemicals, plants, jewellery or other substances
- Ⓐ Atopic dermatitis: unknown cause

## Clinical features

- Ⓐ Vesicles (acute stage)
- Ⓐ Itchy rash with dry rough scaly skin especially in flexural areas-(in Atopic Eczema)
- Ⓐ Oozing due to secondary bacterial infection, causing regional lymphadenopathy and fever

## Differential diagnosis

- Ⓐ Seborrhoeic dermatitis
- Ⓐ Tinea corporis
- Ⓐ Psoriasis

## Management

TREATMENT	LOC
<ul style="list-style-type: none"><li>☐ Remove/avoid cause if known</li><li>☐ Apply betamethasone cream 0.1% every 12 hours for 2 weeks on affected parts, EXCEPT the face and genital areas</li><li>☐ If face or genitalia affected, apply hydrocortisone cream 1% every 12 hours for 2 weeks</li><li>☐ Give an antihistamine to relieve itching; chlorphenamine 4 mg every 8 hours Child: 1-2 mg per dose</li><li>☐ OR promethazine 25 mg at night; increase frequency to every 12 hours if necessary Child: 1 mg/kg daily in 1-2 divided doses</li></ul>	HC2

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Moisturizers (eg; Vaseline petroleum jelly) twice daily after bath to keep the body moist.</li> </ul> <p>If evidence of secondary infection, treat according to cause.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Give a systemic antibiotic as in impetigo (section 22.1.1) If viral or fungal infection, treat as shown in respective sub sections).</li> </ul>	HC2
	HC4

## Prevention

- Ⓐ Avoid contact with allergens, Advise on light dressing in hot weather to avoid sweating, advise on bathing habits like; reduce on frequency of bathing – at most twice daily, use soft sponge.

### 22.5.4 Psoriasis

ICD10 CODE: L40

A chronic recurrent skin disease characterized by scaling, reddened papules or plaques on the scalp, back of the elbows and front of the knees. Psoriasis commonly affects skin and joints plus nails.

The lesions tend to appear at sites of trauma (Koebner's reaction).

## Cause

- Ⓐ Unknown, but usually genetically transmitted
- Ⓐ About 30% of cases have a family history

## Clinical features

- Ⓐ Usually in patients 25-40 years old
- Ⓐ Gradual onset of distinct, red scaling papules which coalesce to form plaques
- Ⓐ Adherent, silvery white scales, which reveal bleeding points when removed (Auspietz sign)
- Ⓐ Worsening psoriasis may lead to total erythroderma
- Ⓐ Extra articular feature, e.g., pitting or thickening of nail plate with accumulation of debris under the nail plate



## Differential diagnosis

- Fungal infection, lichen planus
- Mycosis fungoides
- Seborrhoeic dermatitis
- Medicine-induced eruptions

## Investigations

- Diagnosis is largely clinical
- KOH microscopy to exclude fungal infection
- Blood: Serum uric acid, rheumatoid factor, and anti- nuclear factor and histology to rule out other diseases like rheumatoid arthritis, SLE, skin malignancies etc.

## Management

TREATMENT	LOC
<input checked="" type="checkbox"/> Remove scales, then apply medicine as below <b>Mild cases (lesions &lt;10% of the body)</b> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Give high potent topical steroids, e.g. clobetasolo propionate 0.05% cream applied on the lesions twice a day 2- 4 weeks</li> <li><input checked="" type="checkbox"/> Apply crude coal tar ointment 1% at night for 2 weeks</li> </ul>	HC4
<b>Severe cases (lesions &gt;20% of the body surface area)</b> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Refer for specialist management</li> <li><input checked="" type="checkbox"/> Remove scales, then apply medicine as below</li> </ul>	RR
<b>Mild cases (lesions &lt;20% of the body)</b> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Give topical steroids, e.g. betamethasone cream applied on the lesions once in the morning</li> </ul>	

TREATMENT	LOC
<input type="checkbox"/> Apply crude coal tar ointment 1% at night for 2 weeks <b>Severe cases (lesions &gt;20% of the body surface area)</b>	HC4
<input type="checkbox"/> Refer for specialist management	RR
<b>Caution</b>	
Drugs that precipitate/exacerbate psoriasis include lithium, beta-blockers, antimalarials and systemic steroids	

## 22.6 SKIN ULCERS AND CHRONIC WOUNDS

### 22.6.1 Leg Ulcers

ICD10 CODE: L97

Chronic ulcerative skin lesion caused by various aetiologies and often triggered by a minor trauma

#### Cause/risk factors

- Vascular, e.g. venous/arterial insufficiency
- Bacterial: leprosy, Buruli ulcer (by Parasites: guinea worm, leishmaniasis, jiggers)
- Parasites: guinea worm, leishmaniasis
- Diabetes, sickle cell disease, malnutrition

#### Clinical features

- Often in lower third of the leg
- Ulcerated lesion with necrotic tissue, slough, discharge, oedema around the lesion, scarring
- Features of cellulitis due to secondary infection may be present
- Features of underlying disease

#### Investigations

- Swab for C&S
- X-ray
- Blood glucose

## Management

TREATMENT	LOC
<ul style="list-style-type: none"><li><input type="checkbox"/> Clean the wound<ul style="list-style-type: none"><li>- If exudating/dirty lesions: use chlorhexidine solution 0.05% or hydrogen peroxide solution 6% or povidone iodine 2%</li><li>- If clean wound: use clean water or normal saline</li></ul></li><li><input type="checkbox"/> Remove necrotic tissue</li><li><input type="checkbox"/> Elevate and rest the leg</li><li><input type="checkbox"/> Perform daily dressing</li><li><input checked="" type="radio"/> Apply silver sulphadiazine or povidone iodine if the wound is dirty and exudative<ul style="list-style-type: none"><li>- Otherwise use gauze moistened with normal saline</li></ul></li><li><input type="checkbox"/> Analgesics for pain if needed</li></ul>	HC2
If sign of cellulitis <ul style="list-style-type: none"><li><input type="checkbox"/> Treat as per guidelines (see section 22.1.3)</li></ul>	HC3

## Prevention

- Ensure personal hygiene
- Ensure good nutrition
- Avoid trauma

## 22.7 DRUG-INDUCED SKIN REACTIONS

### 22.7.1 Steven-Johnson Syndrome (SJS) and Toxic Epidermal Necrolysis (TEN)

ICD10 CODE: L51

A life threatening hypersensitivity reaction that affects the skin and the mucous membranes: SJS affects up to 10% of the body surface area, while TEN affects >30%. If it is between 10 and 30%, it is SJS/TEN overlap.

## Causes

Most well-known causes are:

- Certain medications such as: HIV medication (nevirapine), Anti-TB medications, anticonvulsants, e.g., carbamazepine, lamotrigine, sulpha-containing drugs (e.g., co-trimoxazole, allopurinol)
- Infections, especially in immunocompromised persons

## Clinical features

- Dark macular skin rash, progressing to confluence with epidermal necrosis and large flaccid blisters which rupture, leaving large areas of denuded skin
- Usually sparing the scalp but involving mucosa (genitalia, mouth, anal area, eyes) with multiple erosions
- General lanning: fever, malaise
- Complications: dehydration, electrolyte imbalances, hypoalbuminemia, secondary infection and sepsis

## Investigations

- Diagnosis is usually clinical
- History of medicines taken
- Serology for HIV, if status unknown
- RFTs, pus swab, C&S if indicated

TREATMENT	LOC
<ul style="list-style-type: none"><li>□ Remove offending medicine or agent, possibly stop all medications</li><li>□ Refer all patients to hospital</li><li>□ Management is multi disciplinary and supportively (as in Burns, section 1.2.3)<ul style="list-style-type: none"><li>- Intravenous rehydration</li><li>- Care for the skin</li></ul></li></ul>	H

TREATMENT	LOC
<ul style="list-style-type: none"> <li>- Maintain good hygiene</li> <li>- Adequate nutrition</li> </ul> <p><input checked="" type="checkbox"/> If eyes are involved, consult eye specialist f Treat if there is secondary bacterial infection</p> <p><input checked="" type="checkbox"/> There is no strong evidence to support the use of corticosteroids, which also increase risk of infection and catabolism</p> <p>NB; Avoid unnecessary medication, this may worsen the condition</p>	H

### Prevention

- Ⓐ Take thorough medicine history
- Ⓐ Advise patients to avoid self-medication

## 22.8 CONGENITAL DISORDER

A disorder characterized by complete or partial absence of melanin pigment in the skin hair and eyes- (albinos)

### Cause

- Ⓐ due to absence of defect of tyrosinase enzyme involved in the production of melanin (skin pigment)

### Treatment

- Ⓐ Apply sun screen whenever moving under the sun. Stay as much as possible in the shed.
- Ⓐ Do annual skin assessment to screen skin for cancer or lesions than can lead to skin cancer

# 23 Oral and Dental Conditions

## 23.1 DENTAL DISORDERS

### 23.1.1. Halitosis/Bad Breath

ICD 10 CODE: R19.6

Unpleasant odour from the oral cavity

#### Causes

- Ⓐ Poor brushing techniques
- Ⓐ Gum disease due to infections in the mouth
- Ⓐ Tobacco smoking and chewing
- Ⓐ Systemic conditions or illnesses, such as liver disease, kidney disease, lung disease etc.
- Ⓐ Decayed teeth
- Ⓐ Diet

#### Management

TREATMENT	LOC
<ul style="list-style-type: none"><li><input type="checkbox"/> Treat underlying condition</li><li><input type="checkbox"/> Drink plenty of water every day to encourage saliva production</li><li><input type="checkbox"/> Use of sugar free gum</li><li><input type="checkbox"/> Dietary changes, like use of raw carrots, as recommended by your dentist or nutritionist</li><li><input type="checkbox"/> Advise on brushing teeth thoroughly at least twice daily</li><li><input type="checkbox"/> See also section 23.2.1 below</li></ul>	HC2



### **23.1.2. Dentin Hypersensitivity**

ICD10 CODE: K03.9

This condition is due to wearing off of the enamel, making it thinner leading to exposure of the dentin

#### **Causes**

- ⌚ Gum recession due to age or improper tooth brushing
- ⌚ Acidic beverages that cause enamel erosion and dentin exposure
- ⌚ Tooth grinding
- ⌚ Chipped or fractured tooth may also expose the dentine
- ⌚ Eating disorders, e.g. bulimia nervosa and anorexia nervosa (exposure to vomitus)

#### **Clinical features**

- ⌚ Sensitivity to hot, cold, sweet or very acidic foods and drinks, and breathing in cold air

#### **Management**

TREATMENT	LOC
<input type="checkbox"/> Topical application of fluoride in form of toothpaste	HC2
<input type="checkbox"/> In severe conditions, refer for root canal therapy	
<input type="checkbox"/> Professional cleaning of teeth	HC4

### **23.1.3. Malocclusion**

ICD10 CODE: M26.4

Malocclusion is any deviation from the normal relation of the teeth in the same arch to each other, and to the teeth in the opposite arch

#### **Causes**

- ⌚ Aetiology is usually multifactorial
- ⌚ Discrepancies in the craniofacial skeleton, dentition, or both

## Cases that require treatment

- Ⓐ The main indications for orthodontic treatment are aesthetics and function.
- Ⓐ Crossbites (as associated occlusal interferences may predispose to Temporomandibular Pain Dysfunction Syndrome)
- Ⓐ Deep traumatic overbite with palatal impingement of the mandibular incisors
- Ⓐ Large overjets (increased risk of trauma), severe crowding (as this reduces periodontal support for teeth)
- Ⓐ While severe malocclusion can have a psychologically debilitating effect, it is often influenced by social and cultural factors

## Management

TREATMENT	LOC
<b>Mild case</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Removable appliance orthodontic therapy in the mixed dentition, by a dentist</li> </ul>	RR
<b>Moderate to severe case</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Fixed appliance orthodontic therapy in adolescents and adults, by an orthodontist</li> <li><input type="checkbox"/> Cases with discrepancies in the craniofacial skeleton may require orthognathic surgery by an oral and maxillofacial surgeon</li> </ul>	RR

### 23.1.4. Fluorosis (Mottling)

ICD10 CODE: K003

Brown discolouration of teeth

#### Cause

- Ⓐ Occurs due to long-term excess of fluoride. Endemic in areas of high fluoride occurring naturally in the water.



## Clinical features

- Ⓐ Varies from white opacities to severe pitting and discolouration due to incorporation of the excess fluoride in the enamel structure

## Management

TREATMENT	LOC
Ⓐ Tooth coloured (composite) fillings, veneers	RR

## Prevention

- Ⓐ Monitoring of fluoride levels in drinking water
- Ⓐ Use of fluoride-free toothpastes in endemic areas

### 23.1.5. False Teeth (“Ebinnyo”)

Traditional beliefs in many Ugandan communities attribute diarrhoea, fever, and vomiting in children to the developing dentition with the belief that if the offending teeth or “ebinnyo” are not removed, the child will die.

#### Facts on ebinyo

- Ⓐ The practice of extraction of ebinnyo/false teeth is based on the belief that rubbing of herbs on the gum (in the region of the canine), or the removal of the primary and/ or permanent canine tooth buds will lead to the relief of childhood fevers and diarrhoea,

The procedure is done as early as 1 month and up to 3 years of age. Most studies report a peak age of 4-18 months

- Ⓐ Whereas infant illnesses may be attributed to the teething period, they are in fact a result of the poor health conditions in which these children are raised
- Ⓐ The term ebinyo encompasses both the child’s ailment, as well as the treatment offered by traditional healers

#### Consequences of traditional treatment of ebinyo

- ⑤ The procedure is aimed at removal of the primary canine, but damage to the surrounding tissues occurs
- ⑤ The incisions in the mouth and the herbs can lead to oral sepsis, bacteraemia, anaemia, and death
- ⑤ If initial cause of diarrhoea, fever, and vomiting is not addressed, dehydration and death can occur
- ⑤ Depending on the extent of damage, malocclusion can result because the permanent canine maybe missing, impacted, or malformed

## Management

TREATMENT	LOC
<input type="checkbox"/> Counsel the parent/caretaker	HC2
<input type="checkbox"/> Treat the condition causing the symptoms	

## Prevention

- ⑤ Oral health education
- ⑤ Sensitise community on dangers of “ebinnyo” beliefs
- ⑤ Appropriate treatment of childhood illnesses
- ⑤ Provision of proper nutrition to children

## 23.2 ORO-DENTAL INFECTIONS

### 23.2.1. Prevention of Dental Caries and Other Conditions Due to Poor Oral Hygiene

- ⑤ Advise patient to reduce sugary foods and soft drinks, and to have adequate fresh fruit and vegetables in their diet
- ⑤ Advise patient to brush their teeth at least twice a day (morning and evening) or preferably after every meal (wait at least 30 minutes if you have consumed acidic food like lemon, oranges, grapes)

- Ⓐ Dental flossing at least once a day
- Ⓐ Tooth strengthening and protection by rinsing with fluoride rinses and applying sealants to susceptible sites on teeth
- Ⓐ Prevention and early management of dental caries
- Ⓐ Advise patient to have a dental check-up every six months
- Ⓐ Good nutrition

### **23.2.2 Dental Caries**

ICD10 CODE: K02

Sugar-dependent disease resulting into cavities or holes in the teeth.

#### **Causes**

- Ⓐ Poor oral hygiene results in bacteria accumulation in a plaque on the tooth surface. Acid produced as a by-product of metabolism of dietary carbohydrate by the plaque bacteria causes demineralization and disintegration of the tooth surface forming a cavity

#### **Clinical features**

- Ⓐ Localized toothache
- Ⓐ Cavitations in the teeth
- Ⓐ Tooth sensitivity to hot and cold stimuli
- Ⓐ Susceptible sites include pits and fissures of the posterior teeth, interproximal surfaces, and teeth in malocclusion

#### **Differential diagnosis**

- Ⓐ Dental abscess
- Ⓐ Referred pain from ENT infections, commonly sinusitis

#### **Management**

TREATMENT	LOC
<input type="checkbox"/> Paracetamol 1 g every 8 hours - Child: 10-15 mg/kg every 8 hours	HC2

TREATMENT	LOC
<input type="checkbox"/> Or ibuprofen 400 mg every 8 hours <input type="checkbox"/> Child: 7-13 mg/kg every 8 hours <input type="checkbox"/> Refer to specialist for filling or extraction	HC4

### 23.2.2.1 Nursing Caries

These are anterior caries in the pre-school child, due to prolonged and improper feeding habits.

#### Causes

- Ⓐ Frequent and prolonged consumption of fluid containing fermentable carbohydrates from a bottle, feeder cup, or on-demand nightly breast feeding after 15 months of age

#### Clinical features

- Ⓐ Rapid progression of decay commencing labially and quickly encircling the teeth
- Ⓐ Teeth are affected in order of eruption
- Ⓐ Lower incisors are rarely affected as they are protected by the tongue during suckling and directly cleansed by secretions from sublingual and submandibular salivary glands

#### Management

TREATMENT	LOC
<input type="checkbox"/> Discontinue night feeding <input type="checkbox"/> Gently brush teeth with a toothpaste approved for children (avoid swallowing) <input type="checkbox"/> Build-up of the teeth should be done using composites to restore shape and function <input type="checkbox"/> Disc affected teeth interproximally to create self-cleansing areas <input type="checkbox"/> Regular fluoride applications	HC2
	HC4

## Prevention

- Educate care taker to avoid frequent on-demand liquids at night including breastfeeding, after 15 months

### 23.2.2.2 Rampant and Radiation Caries

Rapid carious attack involving several teeth including those surfaces that are usually caries-free (e.g. the smooth surface of a tooth)

#### Causes

- Frequent ingestion of sugary foods and drinks in individuals with reduced saliva flow
- Prolonged and frequent intake of sugar-based syrup medications
- Untreated nursing caries
- Radiation caries: Radiation for head and neck cancer may result in fibrosis of salivary glands and subsequent reduction in saliva flow. Patients often resort to sucking sweets to alleviate their dry mouth, which further exacerbates the problem

#### Management

TREATMENT	LOC
<input type="checkbox"/> Removal of causative factors as mentioned above	HC4
<input type="checkbox"/> Education, fluoride treatment, tooth restoration, endodontic therapy, extractions	

### 23.2.3 Pulpitis

ICD10 CODE: K04.0

Inflammation of the pulp of a tooth

#### Causes

- Commonly presents as a complication of dental caries
- Thermal, chemical, or traumatic insult to the pulp

#### Clinical features

- Pulsatile pain that lasts for several hours and worsens at night
- Thermal sensitivity
- Tooth is very tender to percussion

### Differential diagnosis

- Referred pain of ENT origin, e.g. sinusitis
- Pain due to temporomandibular joint pain dysfunction syndrome, or erupting mandibular wisdom teeth
- Dentine sensitivity due to thermal, tactile, or osmotic stimulus

### Management

TREATMENT	LOC
<input type="checkbox"/> Give an analgesic for pain relief <input type="checkbox"/> Paracetamol 1 g every 8 hours - Child: 10-15 mg/kg every 8 hours <input type="checkbox"/> Or ibuprofen 400 mg every 8 hours - Child: 7-13 mg/kg every 8 hours <input type="checkbox"/> Refer to dentist pulpotomy, endodontic (root canal) treatment, or extraction	HC2
	HC4

### 23.2.4 Acute Periapical Abscess or Dental Abscess ICD10 CODE: K04.6-7

Infection with pus formation at the root of a tooth as a sequel to pulpitis caused by dental caries or trauma

#### Causes

- Mixed bacterial flora but mainly *Staphylococcus* spp

#### Clinical features

- Severe pain that disturbs sleep
- Facial swelling may be localized in the gum or extend to adjacent tissues

- Ⓐ Abscesses of the mandibular incisors or molars may discharge extra orally
- Ⓐ Affected tooth is mobile and tender to percussion
- Ⓐ Fever and headache may be present if infection has spread

### Differential diagnosis

- Ⓐ Gingivitis
- Ⓐ Swelling due to trauma
- Ⓐ Pain due to sinusitis, temporomandibular joint pain dysfunction syndrome, or erupting wisdom teeth
- Ⓐ Dentine sensitivity due to thermal, tactile, or osmotic stimulus

### Management

TREATMENT	LOC
<p>Infections localized to a tooth and its surroundings (swelling limited to the gum and no signs of infection extending to anatomical structures, or general signs of infection)</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Pain relief (paracetamol and/or ibuprofen)</li> <li><input type="checkbox"/> Root canal therapy if possible or extraction of tooth</li> <li>- NO NEED of antibiotics since they cannot reach the site of infection</li> </ul> <p>If infection is spreading to local adjacent structures (painful gingival and buccal swelling) or systemic signs and symptoms (fever) are present:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Surgical treatment</li> <li><input type="checkbox"/> Then amoxicillin 500 mg every 8 hours           <ul style="list-style-type: none"> <li>- Child: amoxicillin dispersible tablets 25 mg/kg (max 250 mg) every 8 hours</li> </ul> </li> </ul>	HC4

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Plus metronidazole 400 mg every 8 hours           <ul style="list-style-type: none"> <li>- Child: 10-12.5 mg/kg (max 200 mg per dose)</li> </ul> </li> <li><input type="checkbox"/> Paracetamol 1 g every 8 hours           <ul style="list-style-type: none"> <li>- Child: 10-15 mg/kg every 8 hours</li> </ul> </li> <li><input type="checkbox"/> Or Ibuprofen 400 mg every 8 hours           <ul style="list-style-type: none"> <li>- Child: 7-13 mg/kg every 8 hours</li> </ul> </li> </ul>	

### 23.2.4.1 Post-Extraction Bleeding

Bleeding socket can be primary (occurring within first 24 hours post extraction) or secondary (occurring beyond 24 hours post- extraction)

#### Causes

- Ⓐ Disturbing the blood clot by the patient through rinsing or inadequate compression on the gauze
- Ⓐ Bony/tooth remnants
- Ⓐ Physical exercise following extraction
- Ⓐ Bleeding disorder of patient
- Ⓐ Medication (e.g. aspirin or anticoagulants)

#### Clinical features

- Ⓐ Active bleeding from the socket
- Ⓐ The socket may or may not have a blood clot
- Ⓐ If patient has lost significant amount of blood; decreased pulse rate, hypotension, dehydration may be present Traumatic area of surrounding bone of the socket
- Ⓐ Features of infection or trauma in secondary bleeding

## Management

TREATMENT	LOC
<p><b>General measures</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Restore airway, breathing and circulation if necessary</li> <li><input type="checkbox"/> Check blood pressure and pulse</li> <li><input type="checkbox"/> Clear any clot present and examine the socket to identify source of bleeding</li> <li><input type="checkbox"/> If the bleeding is from soft tissue (which is common) remove any foreign body like bone spicule if found, smoothen any sharp edges</li> <li><input type="checkbox"/> Suture the wound only if necessary</li> <li><input type="checkbox"/> Check and repack the socket with gauze           <ul style="list-style-type: none"> <li>- Tell patient to bite on gauze pack for 30 minutes, not to rinse or eat hot foods on that day; at least for 12 hours, and avoid touching the wound</li> </ul> </li> <li><input type="checkbox"/> Consider blood transfusion if Hb decreases to &lt;7 g/dL in an otherwise healthy patient before extraction</li> </ul> <p>If bleeding continues after 24 hours</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Consult a haematologist or physician for further management</li> </ul>	HC4

### 23.2.5. Gingivitis

ICD10 CODE: K05.0

Inflammation of the gum, usually as a result of plaque accumulation.

#### Clinical features

- Ⓐ Gingival redness and swelling
- Ⓐ Increased tendency of the gingiva to bleed on gentle probing, during tooth brushing or even on touch

## Management

TREATMENT	LOC
<input type="checkbox"/> Dental check up <input type="checkbox"/> Scaling and polishing <input type="checkbox"/> See following sections for specific types of gingivitis	HC4

## Prevention

- Proper oral hygiene

### 23.2.5.1 Chronic Gingivitis

ICD 10 CODE: K05.1

Inflammatory infiltrate in response to the accumulation of undisturbed dental plaque next to the gingival margin

#### Causes

- Mixed anaerobic and aerobic oral flora, e.g., Streptococcus viridans, facultative streptococci; fusiform bacteria, spirochaetes, viruses, fungi
- Chemicals
- Poor oral hygiene with increase in plaque accumulation

#### Clinical features

Swelling and erythema of the gingival margins which bleed on brushing  
Plaque and calculus (tartar) deposits adjacent to the gingival margins

## Management

TREATMENT	LOC
General measures Rinse mouth with mouthwash 3 times a day <input type="checkbox"/> Warm salt solution (5 ml spoonful of salt in 200 ml warm water)	HC4

TREATMENT	LOC
<input type="checkbox"/> Or hydrogen peroxide solution 6%, (add 15 ml to a 200 ml cup of warm water) <input type="checkbox"/> Or chlorhexidine solution 0.2%	
<b>Medicine</b> <input type="checkbox"/> Paracetamol 1 g every 8 hours - Child: 10-15 mg/kg every 8 hours <input type="checkbox"/> Or Ibuprofen 400 mg every 8 hours - Child: 7-13 mg/kg every 8 hours <b>If systemic signs and symptoms present, give a 5-day course of an antibiotic:</b> <input type="checkbox"/> Metronidazole 400 mg every 8 hours - Child: 10-12.5 mg/kg (max 200 mg per dose) every 8 hours <input type="checkbox"/> Or Amoxicillin 500 mg every 8 hours - Child: Amoxicillin Dispersible tablets 25 mg/kg every 8 hours <input type="checkbox"/> Refer to a dentist for scaling, root planing lanning and polishing, to remove plaque and calculus deposits	HC2
<b>Caution</b> Avoid metronidazole in 1st trimester of pregnancy	

### 23.2.6. Acute Necrotizing Ulcerative Gingivitis (ANUG)/Peri-odontitis/Stomatitis ICD10 CODE: A69.0-1

Also known as Vincent's gingivitis or Vincent's gingivostomatitis. They are infections characterized by oral ulcerations and necrosis.

Gingivitis only affects the gums, periodontitis involves the surrounding tissue and attaching the teeth.

In stomatitis, there is widespread involvement of mucosa and bone loss, until the most severe form known as noma or cancrum oris, leading to

extensive destruction of facial tissues and bones.

Inadequately treated ANUG will lapse into a less symptomatic form known as chronic ulcerative gingivitis.

## Causes

- Ⓐ Fusospirochaetal complex together with gram negative anaerobic organisms

## Predisposing factors

- Ⓐ Associated with poor oral hygiene, stress and smoking
- Ⓐ Uncontrolled diabetes mellitus, and debilitated patients with poor hygiene
- Ⓐ Malnutrition
- Ⓐ HIV infection

## Clinical features

- Ⓐ Swelling and erythema of the gingival margins, which bleed easily when touched, causing difficulty drinking and eating
- Ⓐ Painful papillary yellowish-white ulcers
- Ⓐ Necrosis and sloughing of gum margins
- Ⓐ Loss of gingiva and support bone around teeth
- Ⓐ Foul smelling breath
- Ⓐ Patient complains of metallic taste and the sensation of their teeth being wedged apart
- Ⓐ Fever, malaise, and regional lymphadenitis may be present
- Ⓐ Extensive destruction of the face and jaws in the severe form of Cancrum Oris or noma (in malnourished patients)

## Differential diagnosis

- Ⓐ Dental abscess
- Ⓐ Swelling due to trauma
- Ⓐ Acute stomatitis

- ② Oral thrush
- ② Chemical oral ulcers

## Management

TREATMENT	LOC
<p><b>General measures</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Rinse mouth with mouthwash 3 times a day</li> <li><input type="checkbox"/> Warm salt solution (5 ml spoonful of salt in 200 ml warm water)</li> <li><input type="checkbox"/> Or hydrogen peroxide solution 6%, (add 15 ml to a 200 ml cup of warm water)</li> <li><input type="checkbox"/> Or chlorhexidine solution 0.2% f Surgical debridement Manage underlying condition</li> <li><input type="checkbox"/> Metronidazole 400 mg every 8 hours</li> <li><input type="checkbox"/> Child: 10-12.5 mg/kg (max 200 mg per dose) every 8 hours</li> <li><input type="checkbox"/> Refer to dental specialist</li> </ul>	HC4

### 23.2.7. Periodontitis

ICD10 CODE: K05.2-3

Periodontitis occurs when inflammation or infection of the gums (gingivitis) occurs and is not treated. Infection and inflammation spreads from the gums (gingiva) to the ligaments and bone that support the teeth. Loss of support causes the teeth to become loose and eventually fall out.

#### Causes

- ② Mixed microbial flora commonly *B. gingivalis*, *B. forsythus*, *B. intermedius*, *Wolinella* sp, and *Fusobacter*

#### Clinical features

- ② Bleeding of gums on probing and brushing

- Ⓐ Foul smelling breath
- Ⓐ Presence of periodontal pockets due to apical migration of the junctional epithelium beyond the enamel-cemental junction of the tooth
- Ⓐ Tooth sensitivity to thermal changes
- Ⓐ Presence of sub-gingival calculus with increased tooth mobility

## Management

TREATMENT	LOC
<input type="checkbox"/> Give instructions on oral hygiene	HC2
<input type="checkbox"/> Oral rinses with mouthwash consisting of	
<input type="checkbox"/> chlorhexidine solution 0.2% 3 times a day	HC4
<input type="checkbox"/> Refer to a dentist for scaling, root lanning, and polishing, to remove plaque and calculus deposits	

### 23.2.7 Periodontitis

ICD10 CODE: K05.2-3

Periodontitis occurs when inflammation or infection of the gums (gingivitis) occurs and is not treated. Infection and inflammation spreads from the gums (gingiva) to the ligaments and bone that support the teeth. Loss of support causes the teeth to become loose and eventually fall out.

#### Causes

- Ⓐ Mixed microbial flora commonly *B. gingivalis*, *B. forsythus*, *B. intermedium*, *Wolinella* sp, and *Fusobacter*

#### Clinical features

- Ⓐ Bleeding of gums on probing and brushing
- Ⓐ Foul smelling breath
- Ⓐ Presence of periodontal pockets due to apical migration of the junctional epithelium beyond the enamel-cemental junction of the tooth



- Ⓐ Tooth sensitivity to thermal changes
- Ⓐ Presence of sub-gingival calculus with increased tooth mobility

## Management

TREATMENT	LOC
❑ Give instructions on oral hygiene	HC4
❑ Oral rinses with mouthwash consisting of chlorhexidine solution 0.2% 3 times a day	HC2
❑ Refer to a dentist for scaling, root lanning, and polishing to remove plaque and calculus deposits	

### 23.2.8. Periodontal Abscess

ICD10 CODE: K05.21

Localised collection of pus within a periodontal pocket

#### Causes

- Ⓐ Entry of virulent organisms into an existing pocket
- Ⓐ Impact of a foreign body, e.g., a fishbone into healthy periodontal membrane

#### Clinical features

- Ⓐ Localised, red and tender swelling of gum
- Ⓐ Need to differentiate it from a dental abscess

DENTAL ABSCESS-PERI-APICAL ABSCESS	PERIODONTAL ABSCESS
Associated tooth is non-vital	Ⓐ Associated tooth is vital
Tooth is tender to vertical percussion	Ⓐ Tooth is tender to lateral movements

## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Incision and drainage under a local anaesthetic</li> <li><input type="checkbox"/> Debridement of the pocket with a scaler</li> </ul> <p>Give an analgesic for 5-7 days</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Paracetamol 1 g every 8 hours             <ul style="list-style-type: none"> <li>- Child: 10-15 mg/kg every 8 hours</li> </ul> </li> <li><input type="checkbox"/> Or ibuprofen 400 mg every 8 hours             <ul style="list-style-type: none"> <li>- Child: 7-13 mg/kg every 8 hours</li> </ul> </li> <li><input type="checkbox"/> Or diclofenac 50 mg every 8 hours</li> </ul> <p>Give antibiotics for 5 days</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Amoxicillin 500 mg every 8 hours</li> <li><input type="checkbox"/> Plus Metronidazole 400 mg every 8 hours</li> </ul>	HC4

### 23.2.9. Stomatitis

ICD10 CODE: K12

Inflammation of the epithelial lining of the oral mucosa

#### Causes

- Ⓐ Nutritional deficiency, e.g. vitamin A
- Ⓐ Hormonal changes
- Ⓐ Infections: Spirochaetes, Bacilli, Candida, Measles virus, Herpes simplex virus

#### Clinical features

- Ⓐ Inflammation of the tongue and lining of mouth - tongue is red, raw, and painful
- Ⓐ Ulcers on the gum, palate, lips
- Ⓐ Thrush (in babies and HIV/debilitated patients)
- Ⓐ Swelling and bleeding of gums

## Differential diagnosis

- Ⓐ Allergic reactions, erythema multiforme, pemphigus
- Ⓐ Lead poisoning
- Ⓐ Lichen planus
- Ⓐ Investigations
- Ⓐ Swab mouth for microscopy, and culture and sensitivity of bacteria and fungi (though normal oral flora may give false positives)
- Ⓐ Blood: For Rapid Plasma Reagins (RPR) test, HIV serology

## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li>☐ Rinse mouth 3 times a day with Salt solution (dissolve 1 teaspoon of salt in a cup of warm water)</li> <li>☐ Or Hydrogen peroxide solution 6% (add 15 ml to a cup/200 ml of warm water)</li> <li>☐ Or chlorhexidine mouth wash 0.2%</li> <li>☐ Paracetamol 1 g every 8 hours           <ul style="list-style-type: none"> <li>- Child: 10-15 mg/kg every 8 hours</li> </ul> </li> <li>☐ Or a topical analgesic</li> <li>☐ Continue treatment until healing takes place</li> </ul>	HC2

### 23.2.9.1 Denture Stomatitis

Redness of the palate under a denture with petechial and whitish areas

#### Causes

- Ⓐ 90% of cases due to Candida albicans, 9% other Candida species, and 1% Klebsiella
- Ⓐ Poor denture hygiene
- Ⓐ Night-time wear of dentures

- Trauma
- Increased intake of sugary foods

### Clinical features

- Mild inflammation and redness under denture
- Petechial and whitish areas in severe cases
- Burning sensation but no pain or tenderness

### Differential diagnosis

- Acrylic allergy

### Investigations

- Exclude diabetes, i.e. blood glucose

### Management

TREATMENT	LOC
<ul style="list-style-type: none"><li><input type="checkbox"/> Remove dentures at night</li><li><input type="checkbox"/> Improve denture hygiene by soaking in hypochlorite cleanser (10 drops of household bleach in a denture cup or container filled with tap water) and brushing fitting surface with a soft brush</li><li><input type="checkbox"/> Replace ill-fitting dentures</li><li><input type="checkbox"/> Reduce sugar intake</li><li><input type="checkbox"/> Nystatin suspension 100,000 IU/ml 6 hourly</li></ul>	HC2

### **23.2.10. Aphthous Ulceration      ICD10 CODE: K12.0**

Aphthous ulcers or recurrent aphthous stomatitis (RAS) are painful recurrent mucous membrane ulcerations. Usually affect the non-keratinized oral mucous membrane

## Clinical features

There are 3 types of aphthous ulcers

TYPE	FEATURES
Minor aphthous ulcers	<ul style="list-style-type: none"> <li>○ Small round/oval ulcers (2-4 mm)</li> <li>○ Surrounded by erythematous ulcers</li> <li>○ Occur in groups of only a few ulcers (i.e., 1-6) at a time</li> <li>○ Mainly on the non-keratinized mobile mucosa of the lips, cheeks, floor of the mouth, sulci, or ventrum of the tongue</li> <li>○ Heal spontaneously in 7-10 days</li> <li>○ Leave little or no evidence of scarring</li> </ul>
Major aphthous ulcers	<ul style="list-style-type: none"> <li>○ Painful ulcers on non-keratinized oral mucous membrane</li> <li>○ Large (1-3 cm) edged ulcers</li> <li>○ Several may be present simultaneously</li> <li>○ Marked tissue destruction, sometimes constantly present</li> <li>○ Healing is prolonged often with scarring</li> </ul>
Herpetiform ulcers	<ul style="list-style-type: none"> <li>○ Occur in a group of small (1-5 mm) multiple ulcers and heal within 7-10 days</li> </ul>

## Management

Goal of treatment: to offer symptomatic treatment for pain and discomfort, especially when ulcers are causing problems with eating.

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Salt mouth wash for cleansing</li> <li><input type="checkbox"/> Prednisolone 20 mg every 8 hours for 3 days; then taper dose to 10 mg every 8 hours for 2 days; then 5 mg every 8 hours for 2 days</li> <li><input type="checkbox"/> Or topical triamcinolone paste applied twice a day</li> <li><input type="checkbox"/> Paracetamol 1 g every 8 hours for 3 days</li> <li><input type="checkbox"/> Refer to specialist if ulcers persist for more than 3 weeks apart from the treatment</li> </ul>	HC4

**Note**

Oral gel containing an anti-inflammatory agent combined with analgesic and antiseptic is ideal treatment

### 23.2.11 Pericoronitis

ICD10 CODE: K05.30

Inflammation of the operculum covering an erupting tooth occurs more commonly in association with the mandibular wisdom teeth.

#### Causes

- Ⓐ Usually associated with partially erupted and/or impacted third molars
- Ⓐ Associated trauma from a tooth in the opposing arch is usually present

#### Clinical features

- Ⓐ Pain, trismus, swelling
- Ⓐ Halitosis
- Ⓐ The operculum is swollen, red, and often ulcerated
- Ⓐ Fever and regional lymphadenitis may be present



## Management

TREATMENT	LOC
<p>Surgery</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Operculectomy done under local anaesthesia</li> <li><input type="checkbox"/> Extraction of the third molar associated with the condition</li> <li><input type="checkbox"/> Grinding or extraction of the opposing tooth</li> <li><input type="checkbox"/> Apply caustic agents (trichloracetic acid and glycerine)</li> </ul> <p>Treat with analgesic and antibiotic for 5-7 days</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Paracetamol 500 mg every 8 hours Child: 10-15 mg/kg every 8 hours             <ul style="list-style-type: none"> <li>- Or ibuprofen 400 mg every 8 hours Child: 7-13 mg/kg every 8 hours</li> <li>- Or diclofenac 50 mg every 8 hours</li> </ul> </li> <li><input type="checkbox"/> Amoxicillin 500 mg every 8 hours Child: 25 mg/kg every 8 hours</li> <li><input type="checkbox"/> Add metronidazole 400 mg every 8 hours if necessary Child: 10-12.5 mg/kg per dose</li> </ul>	HC4

### 23.2.12. Osteomyelitis of the Jaw

**ICD10 CODE: M27.2**

Inflammation of the medullary portion of the jaw bone which extends to involve the periosteum of the affected area. Infection in the bone ends up with pus formation in the medullary cavity or beneath the periosteum, and obstructs the blood supply. The infected bone becomes necrotic following ischaemia.

#### Clinical features

##### Initial stage

- Ⓐ Malaise and fever; there is no swelling
- Ⓐ Enlargement of regional lymphnodes
- Ⓐ Teeth in affected area become painful and loose, thus causing difficulty in chewing

## Later stage

- Bone undergoes necrosis and area becomes very painful and swollen
- Pus ruptures through the periosteum into the muscular and subcutaneous fascia. Eventually it is discharged on to the skin surface through a sinus

## Investigations

- X-ray- Orthopantomograph (OPG) will show characteristic features (e.g., widening of periodontal spaces, changes in bone trabeculation, areas of radiolucency and sequestra formation in chronic stage)
- Culture and sensitivity of pus

## Management

TREATMENT	LOC
<input type="checkbox"/> Incision and adequate drainage of confirmed pus accumulation which is accessible <input type="checkbox"/> Amoxicillin 500 mg every 8 hours for 7-10 days <input type="checkbox"/> Or cloxacillin 500 mg every 6 hours <input type="checkbox"/> Plus metronidazole 400 mg every 8 hours	H
<input type="checkbox"/> Removal of the sequestrum by surgical intervention	RR
<b>Surgery</b>	
<b>Note</b> Change medication according to the results of culture and sensitivity testing Refer to regional referral hospital in case of long-standing pus discharge and sinuses from the jaws	

## 23.3 HIV/AIDS ASSOCIATED CONDITIONS

### 23.3.1 Oral Candidiasis

ICD10 CODE: B37.0

#### Cause

- Ⓐ Caused primarily by *Candida albicans*

#### Clinical features

- Ⓐ Common in immunosuppressed, infants, and after prolonged antibiotic treatment
- Ⓐ In advanced HIV it can present as intractable oral and oesophageal candidiasis. Angular cheilitis is also common

#### Management

TREATMENT	LOC
<b>Oral candidiasis</b> <ul style="list-style-type: none"> <li>☐ Nystatin tablets 500,000-1,000,000 IU every 6 hours for 10 days (chewed then swallowed) Child &lt;5 years: Nystatin oral suspension 100,000 IU every 6 hours for 10 days           <ul style="list-style-type: none"> <li>- Child 5-12years: 200,000 IU per dose every 6 hours for 10 days</li> </ul> </li> </ul>	HC2
<b>Oropharyngeal candidiasis</b> <ul style="list-style-type: none"> <li>☐ Fluconazole loading dose 400 mg, then 150-200 mg daily for 14-21 days           <ul style="list-style-type: none"> <li>- Child: loading dose 6 mg/kg, then 3 mg/kg daily</li> </ul> </li> </ul>	HC3

### 23.3.2 Herpes Infections

ICD10 CODE: B00

Infections caused by virus herpes (simplex and zoster)

#### Causes

- Ⓐ Both simplex and zoster infections can affect the face and oral cavity

## Clinical features

- Ⓐ Herpes simplex: cluster of painful vesicles around the mouth (cold sores or fever blisters). Can be recurrent
- Ⓑ Herpes zoster: multiple small vesicles (2-3 mm) that ulcerate and coalesce to form larger ulcers on the oral mucosa
  - Commonly on the vermillion border, gingiva, dorsal tongue, and hard palate
  - Always present as a unilateral lesion and never cross the midline
  - Pre-eruption pain followed by the development of painful vesicles on the skin or oral mucosa that rupture to give rise to ulcers or encrusting skin wounds in the distribution outlined above.
  - Post herpetic neuralgia may continue for years

## Management

TREATMENT	LOC
<b>Herpes simplex</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Reassure, it will resolve in most cases</li> <li><input type="checkbox"/> For severe forms consider acyclovir 400 mg every 8 hours for 5-7 days</li> </ul>	HC2
<b>Herpes Zoster</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Acyclovir 800 mg 5 times daily for 5 days</li> <li><input type="checkbox"/> May require antibiotic therapy if the area becomes secondarily infected</li> <li><input type="checkbox"/> Analgesics, topical anaesthetic (e.g. lidocaine)</li> </ul>	HC4

### 23.3.3 Kaposi's Sarcoma

ICD10 CODE: C46

A malignancy of vascular endothelium that, until the advent of AIDS, was seen only occasionally in Jews and immune suppressed patients



## Clinical features

- Ⓐ Painless purplish swelling on the skin
- Ⓑ In the mouth, the palate is the most frequent site

## Investigation

- Ⓒ Biopsy to confirm histology

## Management

TREATMENT	LOC
▢ Refer for chemotherapy	RR

### 23.3.4 Hairy Leukoplakia

Benign lesion, usually asymptomatic, associated with HIV immunosuppression, and linked to Epstein Barr Virus infection

## Clinical features

- Ⓐ Adherent white, corrugated plaque, usually found bilaterally on the borders of the tongue

## Management

TREATMENT	LOC
▢ Podophyllin resin 25%: Apply to lesion once weekly if necessary	RR
▢ Manage HIV infection as per national guidelines	

## 23.4 ORAL TRAUMA

Injury to the oral or dental tissues as a result of trauma.

### 23.4.1 Traumatic lesions I

ICD10 CODE: S00.5

TYPE OF LESION	FEATURES
Fibroepithelial polyp  Over-vigorous response to low grade recurrent trauma resulting in fibrous hyperplasia	<ul style="list-style-type: none"> <li>⦿ Well-localized sessile or pedunculated lump, usually located on the palate or lateral surface of the tongue</li> </ul>
Mucocele  Saliva extravasation into the tissues from damage to minor salivary gland ducts. They are commonly seen in the lower labial and ventral lingual mucosa	<ul style="list-style-type: none"> <li>⦿ History of trauma and characteristic appearance</li> </ul>
Ranula  A mucocele that occurs from the sublingual gland	<ul style="list-style-type: none"> <li>⦿ Blue, transparent sublingual swelling</li> </ul>

## Management

TREATMENT	LOC
Fibroepithelial polyp  <input type="checkbox"/> Excision biopsy and histological confirmation	RR
Mucocele  <input type="checkbox"/> Surgical removal (recurrence may occur if there is regular trauma)	
Ranula  <input type="checkbox"/> Excision of the sublingual gland	

### 23.4.2 Traumatic lesions II

These simple lesions are often confused for more severe conditions like lichen planus, oral candidiasis, pemphigus, erythema multiforme.

TYPE OF LESION	FEATURES
Burns  Most Commonest after ingestion of hot foods, and particularly seen on the palate or tongue. Chemical burns are usually due to analgesics positioned next to a painful tooth or chemicals used in restorative dentistry	⦿ Burns in the palate located in characteristic sites related to eating, restored or painful tooth
Sharp teeth and restorations  Trauma from sharp teeth or restorations is often worsened in patients with physical or intellectual disability [What's this?]	⦿ Lesion is site specific and is related to a sharp edge
Ulceration due to local anaesthetic  lceration due to biting the area of anaesthetised mucosa	⦿ Ulcer confined to the area of anaesthetised mucosa

TREATMENT	LOC
Burns  <input type="checkbox"/> Reassurance that healing will occur without scarring <input type="checkbox"/> Topical anaesthetic lidocaine 2% may help	RR
Sharp teeth and restorations  <input type="checkbox"/> Smooth the edge and/or apply a restorative material to the tooth	
Sharp teeth and restorations  <input type="checkbox"/> Smooth the edge and/or apply a restorative material to the tooth	

TREATMENT	LOC
<p>Ulceration due to local anaesthetic</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Reassurance</li> <li><input type="checkbox"/> May require antibiotic therapy if the area becomes secondarily infected           <ul style="list-style-type: none"> <li>- Amoxicillin 500 mg every 8 hours for 5-7 days if necessary</li> </ul> </li> </ul>	RR

### 23.4.3 Traumatic lesions III

Trauma due to physical injury, e.g., a fall, sports, road traffic accident

#### Management

TREATMENT	LOC
<p>General measures</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Give tetanus booster if needed (see section 18.1.4)</li> <li><input type="checkbox"/> Check for facial fractures and/or lacerations</li> <li><input type="checkbox"/> If evidence of head injury (amnesia, loss of consciousness, neurological signs), transfer patient to hospital immediately (see Trauma and Head injuries, section 1.2.5)</li> <li><input type="checkbox"/> Intra-oral check: for soft-tissue lacerations, dento-alveolar fractures, and damage to teeth</li> <li><input type="checkbox"/> Check for the whereabouts of tooth fragments, which are commonly embedded in the lip</li> <li><input type="checkbox"/> Examine traumatized teeth for mobility</li> <li><input type="checkbox"/> Check occlusion, especially if any teeth have been displaced</li> </ul>	RR
<ul style="list-style-type: none"> <li><input type="checkbox"/> Refer for radiographs of affected teeth to check for root fracture</li> <li><input type="checkbox"/> Avulsed permanent teeth should be re-planted immediately. Prognosis is good with immediate treatment, therefore refer the patient to a dentist as soon as possible</li> </ul>	HC4

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Suture soft tissue lacerations in 3/0 resorbable suture</li> <li><input type="checkbox"/> Refer to an oral surgeon for reduction and immobilization of mobile teeth and alveolar fragments</li> </ul>	HC4
<b>Medicines</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Wash mouth with warm salt solution (dissolve a 5 ml spoonful of salt in 200 ml of warm water) f Or hydrogen peroxide solution 6% (add 15 ml to a cup 200 ml of warm water) f Repeat mouth wash 3 times daily f Paracetamol 1 g every 8 hours f Or ibuprofen 400 mg every 8 hours</li> </ul>	HC2
<b>Give prophylactic antibiotics if indicated</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Amoxicillin 500 mg every 8 hours for 5-7 days f Refer to a dentist for orthodontics, endodontic (root canal) treatment, or protection of pulp</li> </ul>	

## Prevention

- Ⓐ Early orthodontic treatment in children with large overjets that are susceptible to trauma
- Ⓐ Provision of a mouth guard (made of vacuum formed thermoplastic vinyl) for sports
- Ⓐ Be alert for evidence of child abuse and notify relevant authorities if any.

## 23.5 ORAL TUMOURS

### 23.5.1 Burkitt's Lymphoma

ICD10 CODE: C83.7

Burkitt's lymphoma (or "Burkitt's tumour" or "Malignant lymphoma, Burkitt's type") is a cancer of the lymphatic system (in particular, B lymphocytes). It is a non-Hodgkin's lymphoma and recognised as the fastest growing human tumour. Of all cancers involving the same class of blood cell, 2% of cases are Burkitt's lymphoma.

## Causes

- Ⓐ Associated with Epstein-Barr virus (EBV)

## Risk factors

- Ⓐ HIV/AIDS
- Ⓐ Chronic malaria
- Ⓐ Low socio-economic status

## Clinical features

Often presents as a tooth ache in the maxilla

Teeth are mobile

Extractions do not relieve the swelling

Peak incidence at 4-7 years of age and more common among boys

## Classification

Burkitt's lymphoma is divided into 3 main clinical variants:

- Ⓐ Endemic variant: occurs in malaria endemic areas. Chronic malaria is believed to reduce resistance to Epstein-Barr virus (EBV), which is usually linked with the disease. The disease characteristically involves the jaw or other facial bone, distal ileum, caecum, ovaries, kidney, or the breast.
- Ⓐ Sporadic type: (also known as “non-African”) is usually found outside of Africa
- Ⓐ Immunodeficiency-associated Burkitt's lymphoma: usually associated with HIV infection or in post-transplant patients taking immunosuppressive drugs. Burkitt's lymphoma can be the initial manifestation of AIDS.

## Differential diagnosis

- Ⓐ Other cancer diseases

## Investigations

- Ⓐ Biopsy of the mass

## Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li>Ⓐ Refer to cancer treatment specialist centres for appropriate management</li> </ul>	

TREATMENT	LOC
<p>⦿ Treatment options include: chemotherapy, immunotherapy, bone marrow transplants, surgery, radiotherapy.</p>	RR

# 24 Surgery, Radiology and Anaesthesia

## 24.1 SURGERY

### 24.1.1 Intestinal Obstruction

ICD10 CODE: K56

Interruption of the normal flow of intestinal content, due to mechanical obstruction (at small or large bowel level), or due to functional paralysis.

#### Causes

- Ⓐ Small bowel mechanical obstruction: tumours, adhesions from previous surgeries or infections
- Ⓐ Large bowel obstructions: tumours, volvulus, adhesions, inflammatory strictures (e.g. diverticulosis, etc.)

#### Clinical features

- Ⓐ Small bowel obstruction: cramping abdominal pain, nausea, vomiting, abdominal distension. Due to the accumulation of fluids into the dilated intestinal loops, there is usually a varying degree of dehydration
- Ⓐ Large bowel obstruction: bloating, abdominal pain, constipation, vomiting and nausea less frequent and mainly in proximal colon obstruction; signs of dehydration and shock come later.

#### Investigations

- Abdominal X-ray (erect or left lateral decubitus, for air- fluid level), see section 24.2.1 for details

#### Differential diagnosis

- Ⓐ Paralytic ileus (diffuse functional paralysis of small and large bowel due to drugs, biochemical abnormalities, abdominal infections etc)



## Management

TREATMENT	LOC
<p><b>Pre-operative management</b></p> <ul style="list-style-type: none"> <li><input checked="" type="radio"/> IV fluids (normal saline, Ringer's Lactate)           <ul style="list-style-type: none"> <li>- To correct fluids deficit and replace ongoing losses plus maintenance fluids</li> <li>- Monitor haemodynamic status (pulse, blood pressure, skin turgor, level of consciousness, hydration of mucosae, urine output at least 0.5–1.0 ml/kg/hour)</li> <li>- It may take up to 6 hours to re-hydrate</li> <li>- If not responding to IV fluids, suspect septic shock</li> <li>- Insert urinary catheter to monitor urinary output</li> </ul> </li> <li><input type="checkbox"/> Nasogastric tube decompression           <ul style="list-style-type: none"> <li>- Pass NGT and connect with a drainage bag to empty the stomach in small bowel obstruction or when clinically indicated</li> <li>- Nil by mouth</li> </ul> </li> <li><input checked="" type="radio"/> Give appropriate antibiotics           <ul style="list-style-type: none"> <li>- Ceftriaxone 2 g IV once a day</li> <li>- Plus metronidazole 500 mg IV every 8 hours</li> </ul> </li> <li><input type="checkbox"/> If the patient is in severe colicky pain, administer pethidine 50-100 mg IV or IM</li> <li><input type="checkbox"/> If surgery is indicated and the patient's parameters are near normal after resuscitation, take the patient to the operating theatre for an appropriate surgical relief of the obstruction</li> </ul>	H
<b>Intra-operative fluid therapy</b>	
<ul style="list-style-type: none"> <li>- Blood loss, fluid aspirated from the gut and other fluid losses must be replaced</li> <li>- Maintenance fluid should be given: 5 ml/kg/hour</li> </ul>	

TREATMENT	LOC
<b>Post-operative fluid therapy</b> <ul style="list-style-type: none"> <li>- Replace all fluid losses</li> <li>- Maintenance fluid</li> <li>- Use normal saline or Ringer's lactate solution and 5% dextrose in the ratio 1:2 for the first 24-48 hours post-operatively</li> <li>- Monitor for adequate rehydration</li> </ul>	
<b>Post-operative antibiotics and analgesics</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Continue with analgesics in the postoperative period. (Tramadol, pethidine, diclofenac, paracetamol; morphine may be used)</li> <li><input type="checkbox"/> Continue with antibiotic treatment where           <ul style="list-style-type: none"> <li>- clinically indicated (metronidazole + ceftriaxone +/- gentamycin)</li> </ul> </li> </ul>	
In selective cases, non-operative treatment of intestinal obstruction (in particular small bowel obstructions) can be tried <ul style="list-style-type: none"> <li><input type="checkbox"/> Indicated in appendicular mass, acute pyosalpingitis (PID), some patients with adhesions, pseudo obstruction, plastic peritonitis of TB, acute pancreatitis</li> <li><input type="checkbox"/> Involves NGT decompression, intravenous fluid therapy and antibiotic therapy if indicated</li> <li><input type="checkbox"/> Monitor clinical progression of obstruction using parameters of: abdominal pain, abdominal girth, amount and colour of NG aspirate, temperature, pulse</li> <li><input type="checkbox"/> If no improvement after 72 hours or the NG content becomes feculent, operate the patient</li> </ul>	RR

### 24.1.2 Internal Haemorrhage

Internal bleeding (also called internal haemorrhage) is a loss of blood that occurs from the vascular system into a body cavity or space. It is

a serious medical emergency and the extent of severity depends on:

- Bleeding rate (hypovolaemic shock)
- Location of the bleeding (damage to organs, even with relatively limited amounts: see specific chapters)

Severe bleeding in a body cavity/space is an emergency condition with unstable vital signs (e.g., ruptured spleen, ruptured tubal pregnancy)

## Management

TREATMENT	LOC
<p>Invasive surgical intervention to control bleeding is life saving</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Do not delay operation in attempt to stabilise the patient as this may not be achieved</li> <li><input type="checkbox"/> Prompt resuscitation</li> <li><input type="checkbox"/> Establish IV line and give fluids rapidly</li> <li><input type="checkbox"/> Draw blood for grouping and cross matching for volume replacement after surgical haemostasis</li> <li><input type="checkbox"/> Surgical intervention           <ul style="list-style-type: none"> <li>- Rapid sequence induction of general anaesthesia</li> <li>- Use drugs with minimal or no cardiac depression</li> <li>- Laparotomy to achieve surgical haemostasis</li> </ul> </li> </ul>	RR

### 24.1.3 Management of Medical Conditions in Surgical Patient

#### Principle

The medical condition must be stabilised as much as possible before surgery.

#### Pre-operative management

- Establish whether condition is stable or unstable
- If unstable, control or correct the condition

## Operative and post-operative management

- Anaesthesia technique based on condition and nature of surgery
- Maintain the stable condition

TREATMENT	LOC
<p><b>Hypertension</b></p> <ul style="list-style-type: none"> <li>- Diastolic of 90 mmHg and systolic of 140 mmHg are acceptable</li> <li>- If hypertension not adequately controlled, there is risk of vasoconstriction, hypovolaemia, exaggerated vasoactive response to stress leading to hypo or hypertension, hypertensive complications during anaesthesia</li> </ul> <p><input type="checkbox"/> Control hypertension pre-operatively</p> <p><input type="checkbox"/> Patient should take antihypertensive medicines on schedule even on the day of operation</p> <p><input type="checkbox"/> General anaesthesia technique is preferred</p> <p><input type="checkbox"/> Ensure adequate depth of anaesthesia and analgesia</p>	HC4
<p><b>Anaemia</b></p> <p>Condition of reduced oxygen carrying capacity; patient prone to hypoxia</p> <ul style="list-style-type: none"> <li>- Heart failure may occur</li> <li>- Hypotension or hypoxia can cause cardiac arrest</li> </ul> <p><input type="checkbox"/> Correct anaemia to acceptable level depending on urgency of surgery (see section of anaemia 11.2.2)</p> <p><input type="checkbox"/> Regional anaesthesia is the preferred method</p> <p><input type="checkbox"/> If general anaesthesia is used, avoid myocardial depressant, e.g. thiopental</p> <p><input type="checkbox"/> Use small doses of anaesthetics</p> <p><input type="checkbox"/> Use high oxygen concentration</p> <ul style="list-style-type: none"> <li>- Intubate and ventilate except for very short procedures</li> </ul>	



TREATMENT	LOC
<ul style="list-style-type: none"> <li>- Replace blood very carefully</li> <li>- Extubate patient when fully awake</li> <li>- Give oxygen in the post-operative period</li> </ul> <p>For sickle cell anaemia, the above also applies, as well as avoiding use of tourniquet</p>	HC4
<b>Asthma</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Avoid drugs and other factors likely to trigger bronchospasms, e.g., thiopental</li> <li><input type="checkbox"/> Regional anaesthesia is the preferred method</li> </ul>	HC4
<b>Diabetes</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Achieve blood glucose control using standard treatment pre-operatively</li> <li><input type="checkbox"/> If diabetic ketoacidosis:           <ul style="list-style-type: none"> <li>- Delay surgery even in emergency for 8-12 hours</li> <li>- Correct and control all associated disturbances</li> </ul> </li> <li><input type="checkbox"/> Hyperglycaemia under general anaesthesia is safer than hypoglycaemia</li> <li><input type="checkbox"/> Patient should be operated on early in the morning and MUST be first on theatre list</li> <li><input type="checkbox"/> Regional anaesthesia is the method of choice where applicable</li> </ul>	
<b>Minor surgery</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Stop usual antidiabetic dose on the morning of surgery</li> <li><input type="checkbox"/> Start infusion of 5% glucose infusion rate of 2 ml/minute in theatre</li> <li><input type="checkbox"/> Monitor blood sugar</li> <li><input type="checkbox"/> Usual medication is resumed as soon as the patient is able to take it orally</li> </ul>	

TREATMENT	LOC
<p><b>Major surgery</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Control on sliding scale of insulin</li> <li><input type="checkbox"/> Infusion of 5% glucose started on the morning of surgery, or glucose insulin potassium infusion</li> <li><input type="checkbox"/> Monitor blood sugar 200 mg/dl</li> </ul>	HC4

#### 24.1.4 Newborn with Surgical Emergencies

Babies may be born at lower health facilities with congenital defects that require emergency surgical intervention at tertiary levels:

- The common surgical emergencies in neonates include: gastroschisis (defect of abdominal wall with intestine sticking outside the body), tracheoesophageal fistula, imperforate anus, and spina bifida
  - If diagnosed in lower level health facilities (HCII, HCIII, HCIV, District Hospital), apply general principles of supportive management of the newborn
- The aim should be to avoid hypothermia, minimize risk of infection, ensure adequate hydration, and minimize risk of aspiration and hypoglycaemia

#### Management

TREATMENT	LOC
<ul style="list-style-type: none"> <li><input type="checkbox"/> Use sterile or clean gauze if available to properly cover the defects which are externally visible.</li> <li><input type="checkbox"/> For gastroschisis, moisten the gauze using warm saline and use it to properly wrap the exposed intestines</li> <li><input type="checkbox"/> Properly cover the newborn using a clean thick linen to avoid hypothermia</li> <li><input type="checkbox"/> Insert IV cannula gauge 24 and administer prophylactic antibiotics preferably IV antibiotics (ampicillin + gentamicin)</li> </ul>	HC2

TREATMENT	LOC
<input type="checkbox"/> Keep the baby well hydrated (see IV fluids in neonates section 1.1.4)	HC3
<input type="checkbox"/> If vomiting or signs of intestinal obstruction, pass a neonatal feeding tube Fr. G 6 or Fr. G. 8 (if available) and aspirate all the stomach contents <input type="checkbox"/> If tracheoesophageal fistula is suspected, insert the tube as above and ensure that the baby is kept in a propped-up position <input type="checkbox"/> Urgently refer the neonate to the nearest regional or national referral hospital for further advanced treatment and care	RR

### 24.1.5 Surgical Antibiotic Prophylaxis

This is the pre-operative administration of antibiotics to reduce the risk of surgical site infection.

#### General principles

- The need of prophylaxis depends on the nature of the expected wound
  - Wounds that are expected to be clean (no inflammation, And respiratory, genital, urinary and alimentary tract not entered) generally DO NOT require prophylaxis except where the consequences of surgical site infection could be severe (e.g., joint replacements)
  - Prophylaxis is indicated in cases of clean-contaminated wounds (entering respiratory, genital, urinary and alimentary tracts but no unusual contamination)
  - Treatment with a course of antibiotics is indicated in procedures with contaminated wounds (fresh open accidental wounds, operations with major breaks in sterile techniques), dirty or infected wounds (old traumatic wounds with retained necrotic tissue, clinical infection, perforated viscera)
- Prophylaxis is given <60 minutes before the first incision
- Refer to institution-specific protocols for details

Prophylaxis is not recommended for most uncomplicated clean procedures  
One single dose prior to the procedure is usually sufficient  
Routine post-operative antimicrobial administration is NOT recommended for most surgeries as it causes wastage of limited resources, causes unnecessary side effects to the patient and can lead to anti-microbial resistance.

## 24.2 DIAGNOSTIC IMAGING

### 24.2.1 Diagnostic Imaging: A Clinical Perspective

Medical imaging is an essential part of the diagnosis of many diseases.

A diagnostic imaging procedure is indicated when the management of a patient depends on the findings of the procedure. Therefore, before any diagnostic imaging procedure is requested, the question of how the results will influence patient management and care should always be asked.

- Ⓐ Prior to requesting a procedure, it is useful to determine if the required information is already available from recent procedures, and if the relevant clinical, laboratory, diagnostic imaging, and treatment information is provided.
- Ⓐ When indicated and available, alternative diagnostic imaging procedures which do not use ionising radiation, e.g. ultrasound, should be chosen first, especially in children.

**Questions to be answered to prevent unnecessary use of procedure and radiation**

- Ⓐ Has this procedure been done already?
- Ⓐ Does the patient need it?
- Ⓐ Does the patient need it NOW?
- Ⓐ Is this the best procedure?
- Ⓐ Are all the investigations I am requesting necessary?
- Ⓐ Have you provided appropriate clinical information and questions that the procedure should answer?

No procedure should ever be requested in lieu of a thorough clinical assessment or as a means of satisfying a difficult patient.

## Basic Diagnostic Imaging Modalities

- Plain Radiography (Hospital)
- Ultrasound scan (HC4 and Hospital)
  - Ultrasound is non-invasive and does not use ionising radiation. Therefore, when indicated, it is the most appropriate imaging modality for children and pregnant women.

## Other imaging modalities (at RR and NR)

- Computed tomography
- Fluoroscopy
- Magnetic Resonance Imaging
- Nuclear Medicine
- Mammography

In the following table, a summary of the clinical indication, the suggested investigation modality and the possible findings are presented, as a guide to request the correct investigation based on the clinical suspicion.

### Note

CT scan is the investigation of choice for intracranial pathological processes (severe head trauma, stroke, etc.) but it is only available at referral facilities.

SYSTEM/ BODY AREA	INDICATIONS	MODALITY	INFORMATION PROVIDED
Musculo- skeletal	<ul style="list-style-type: none"> <li>○ Suspected lesion of bony skull, spine and extremities</li> <li>○ Monitoring progress of pathologic conditions (osteomyelitis etc.)</li> </ul>	<ul style="list-style-type: none"> <li>Plain X-rays</li> <li>2 views taken at right angles, include the joint above and below in case of a fracture</li> </ul>	<ul style="list-style-type: none"> <li>○ Fractures</li> <li>○ Dislocations</li> <li>○ Foreign bodies (metallic)</li> <li>○ Bone lesions/destruction</li> <li>○ Osteomyelitis</li> </ul>
Chest/ pulmonary	<ul style="list-style-type: none"> <li>○ Cough for &gt;2 weeks not responding to treatment</li> <li>○ Haemoptysis</li> <li>○ Blunt chest trauma</li> <li>○ Acute respiratory insufficiency/ problems, asthma</li> <li>○ Foreign bodies (metallic, coins)</li> </ul>	<ul style="list-style-type: none"> <li>Chest X-ray</li> </ul>	<ul style="list-style-type: none"> <li>○ Chest infections e.g. bronchopneumonia, lobar pneumonia, interstitial pneumonia</li> <li>○ Pleurisy (pleural effusion)</li> <li>○ TB (Lung infiltrates especially in upper lobe, pleural effusion, cavities, mediastinal /hilar lymph nodes)</li> <li>○ Trauma complications (pneumothorax, fractured ribs, lung contusion, haemothorax)</li> <li>○ Lung masses</li> <li>○ Other lung/bronchial disorders (COPD)</li> </ul>

SYSTEM/ BODY AREA	INDICATIONS	MODALITY	INFORMATION PROVIDED
Cardio- vascular	Palpitation	Chest X-ray	<ul style="list-style-type: none"> <li>○ Heart enlargement (cardiomegaly or pericardial effusion), poorly defined cardiac borders</li> </ul>
	Exertion dyspnoea		<ul style="list-style-type: none"> <li>○ Pulmonary oedema (Kerley B lines)</li> </ul>
	Difficulty in breathing		<ul style="list-style-type: none"> <li>○ Pleural effusion</li> </ul>
	Peripheral oedema		
Paranasal sinuses	Acute uncomplicated sinusitis	X-rays of the Paranasal sinuses	<ul style="list-style-type: none"> <li>○ Air-fluid levels, opacification, polyps, mucosal thickening indicating sinusitis</li> </ul>
	Chronic headache		
	Nasal congestion		
	Nasal discharge		
Postnasal space	Snoring and difficulty in breathing in small children	X-ray of the postnasal space	<ul style="list-style-type: none"> <li>○ Hypertrophied adenoids</li> <li>○ Compromised airways</li> </ul>

SYSTEM/ BODY AREA	INDICATIONS	MODALITY	INFORMATION PROVIDED
Obstetric 1st trimester	<input type="radio"/> First-Trimester <input type="radio"/> PV bleeding <input type="radio"/> Low abdominal pain <input type="radio"/> Not sure of date <input type="radio"/> Embryo viability <input type="radio"/> Suspected ectopic pregnancy	Obstetric ultrasound scan	<input type="radio"/> Intrauterine or extra-uterine pregnancy, ectopic pregnancy, cardiac activity, number of embryo/foetus, gestation age
Obstetric 2nd and 3rd trimesters	<input type="radio"/> 2nd and 3rd trimester <input type="radio"/> Fundo-height greater or less than WOA <input type="radio"/> PV bleeding <input type="radio"/> Loss of foetal movements <input type="radio"/> Foetal anomalies	Obstetric ultrasound scan	<input type="radio"/> Foetal presentation, amniotic fluid volume, cardiac activity, placental position, foetal biometry, and foetal number, plus an anatomic survey. <input type="radio"/> Umbilical cord around the neck

SYSTEM/ BODY AREA	INDICATIONS	MODALITY	INFORMATION PROVIDED
Gynaecology	<ul style="list-style-type: none"> <li>○ Low abdominal pain</li> <li>○ Abnormal PV bleeding or discharges</li> <li>○ Amenorrhoea and irregular periods</li> <li>○ Pelvic mass(es)</li> <li>○ Infertility</li> </ul>	<ul style="list-style-type: none"> <li>Pelvic ultrasound</li> <li>Transvaginal ultrasound</li> <li></li> <li></li> <li></li> </ul>	<ul style="list-style-type: none"> <li>○ Uterine Masses (fibroids, polyps)</li> <li>○ Ovarian masses/cysts</li> <li>○ Pelvic inflammatory disease (fluid in the pouch of Douglas)</li> <li>○ Polycystic ovaries</li> <li></li> </ul>
Abdomen	<ul style="list-style-type: none"> <li>○ Suspected bowel obstruction (SBO)</li> </ul>	<ul style="list-style-type: none"> <li>Plain abdominal X-ray (supine and non-dependent (either upright or left lateral decubitus))</li> <li>Ultrasound X-Ray</li> </ul>	<ul style="list-style-type: none"> <li>○ Dilated small bowel, presence of &gt; two air-fluid levels, air-fluid levels wider than 2.5 cm, and air-fluid levels differing &gt;2 cm in height from one another within the same small bowel loop</li> <li>○ Lumen of the fluid-filled small bowel loops dilated to &gt;3 cm, length of the segment is &gt;10 cm, peristalsis of the dilated segment is increased, as shown by the to-and-fro or whirling motion of the bowel contents</li> </ul>

SYSTEM/ BODY AREA	INDICATIONS	MODALITY	INFORMATION PROVIDED
			<ul style="list-style-type: none"> <li>⦿ Examining the area of transition from the dilated to normal bowel may identify causes of conditions e.g. bezoars, intussusception, Crohn's disease, hernias and tumours</li> </ul>
	<ul style="list-style-type: none"> <li>⦿ Or suspected large bowel obstruction</li> </ul>	Ultrasound	<ul style="list-style-type: none"> <li>⦿ Colon dilated <math>&gt;6</math> cm and the cecum is not <math>&gt;9</math> cm in diameter. (Normal colonic caliber 3-8 cm, with the largest diameter in the cecum).           <ul style="list-style-type: none"> <li>- The colon is dilated proximal to the site of obstruction with a paucity or absence of gas distal to the obstruction.</li> <li>- Air-fluid levels are often seen in the dilated colon on the upright or decubitus radiographs.</li> <li>- This suggests that the cause of obstruction is more acute since the colonic fluid has not been present long enough to be absorbed</li> </ul> </li> </ul>

SYSTEM/ BODY AREA	INDICATIONS	MODALITY	INFORMATION PROVIDED
Abdomen	<ul style="list-style-type: none"> <li>○ Suspected perforation</li> </ul>	Abdominal X-Ray (erect or left lateral decubitus)	<ul style="list-style-type: none"> <li>○ Gut perforation: Free air below the hemidiaphragm on the CXR indicate pneumoperitoneum</li> </ul>
	<ul style="list-style-type: none"> <li>○ Liver or gall bladder disease</li> </ul>	Ultrasound	<ul style="list-style-type: none"> <li>○ Gallstones, cholecystitis</li> <li>○ Hepatomegaly or cirrhosis (fibrotic liver)</li> <li>○ Liver masses (tumours)</li> </ul>
	<ul style="list-style-type: none"> <li>○ Intra-abdominal bleeding</li> <li>○ Abdominal trauma</li> </ul>	Ultrasound	<ul style="list-style-type: none"> <li>○ Fluids (blood) in peritoneum</li> <li>○ Liver/spleen rupture/ haematoma</li> <li>○ Aortic aneurysm</li> <li>○ Renal trauma/haematoma</li> </ul>
	<ul style="list-style-type: none"> <li>○ Urological diseases</li> </ul>	Ultrasound	<ul style="list-style-type: none"> <li>○ Kidney stones</li> <li>○ Kidney diseases (cancer, chronic pyelonephritis, hydronephrosis)</li> <li>○ Prostate enlargement</li> </ul>

## 24.3 ANAESTHESIA

Main objectives of anaesthesia during surgery are to:

- Relieve pain
- Support physiological functions
- Provide favourable conditions for the operation

### 24.3.1 General Considerations

Body Part Affected	Features
Equipment	<ul style="list-style-type: none"><li><input checked="" type="radio"/> Available and in a state of readiness at all times</li><li><input checked="" type="radio"/> Appropriate in quality and quantity</li><li><input checked="" type="radio"/> Compatible with safety</li></ul>
Staff	<ul style="list-style-type: none"><li><input checked="" type="radio"/> Qualified anaesthesia provider</li><li><input checked="" type="radio"/> An assistant for the anaesthesia provider</li><li><input checked="" type="radio"/> Adequate assistance in positioning the patient</li><li><input checked="" type="radio"/> Adequate technical assistance to ensure proper functioning and servicing of all equipment</li></ul>
Before anaesthesia	<ul style="list-style-type: none"><li><input checked="" type="radio"/> Read the notes/medical records of the patient</li><li><input checked="" type="radio"/> Assess the patient very carefully</li><li><input checked="" type="radio"/> The drugs, equipment, instruments and materials to be used must be known</li><li><input checked="" type="radio"/> Properly prepare workplace and patient</li></ul>

Body Part Affected	Features
Before anaesthesia	<ul style="list-style-type: none"> <li>⦿ Anaesthesia is administered (induction and maintenance)</li> <li>⦿ The patient must be monitored meticulously to:</li> <li>⦿ Ensure his/her well-being</li> <li>⦿ Detect dangerous signs as soon as they arise and appropriately treat them</li> <li>⦿ Expertise in resuscitation is obligatory. If in trouble, ask for help</li> <li>⦿ Keep an accurate and legible record of the anaesthetic and all measured vital signs on the anaesthetic chart/form</li> </ul>
After anaesthesia	<ul style="list-style-type: none"> <li>⦿ The patient: <ul style="list-style-type: none"> <li>- Recovers from effects of anaesthesia</li> <li>- Has stable vital signs</li> <li>- Is returned to the ward in the fully conscious state</li> </ul> </li> <li>⦿ Follow-up patient for next 24 hours</li> </ul>

## Types of Anaesthesia

Anaesthesia may be produced in a number of ways

### General anaesthesia

- ⦿ Basic elements: Loss of consciousness, analgesia, prevention of undesirable reflexes, and muscle relaxation

### Regional or local anaesthesia

- ⦿ Sensation of pain is blocked without loss of consciousness. The conduction of stimulus from a painful site to the brain can be interrupted at one of the many points:

- Surface anaesthesia
- Infiltration anaesthesia
- Intravenous regional anaesthesia
- Nerve block/plexus block
  - Epidural anaesthesia
  - Spinal anaesthesia

### 24.3.1.1 General Anaesthesia

#### PREPARATION IN THE OPERATING THEATRE

Should be in a constant state of preparedness for anaesthesia

The following should be available, checked, and ready

- Oxygen source
- Operating table that is adjustable and with its accessories
- Anaesthesia machine with accessories
- Self inflating bag for inflating the lungs with oxygen
- Appropriate range of face masks
- Suction machine with range of suction catheters
- Appropriate range of oropharyngeal airways, endotracheal tubes, and other airways, e.g., laryngeal mask airway
- Laryngoscope with suitable range of blades
- Magill's forceps
- Intravenous infusion equipment, appropriate range of cannulae and fluids (solutions)
- Equipment for regional anaesthesia
- Adequate lighting
- Safe disposal of items contaminated with body fluids, sharps, and waste glass
- Refrigeration for storage of fluids, drugs, and blood
- Anaesthetic drugs: General and local anaesthetic agents
- Muscle relaxants
- Appropriate range of sizes of syringes
- Monitors: stethoscope, sphygmomanometer, pulse oximeter
- Appropriate protection of staff against biological contaminants. This includes: caps, gowns, gloves, masks, footwear and eye shields (personal protective equipment)
- Drugs necessary for management of conditions, which may complicate or co-exist with anaesthesia

## PREPARATION IN THE OPERATING THEATRE

### PRE-OPERATIVE MANAGEMENT

The aim is to make the patient as fit as possible before surgical operation

#### Assessment of the patient

- Identify the patient and establish rapport
- A standard history is obtained and an examination done
- Emphasis is on the cardio-respiratory systems
- Investigations appropriately interpreted e.g., Hb
- Health status/condition of the patient
- Classify physical status of the patient according to A.S.A. (ASA classification 1-5 with or without E)
- Make a plan for anaesthesia based on the information obtained

#### Preparation of the patient

- Explain the procedure to the patient and ensure that he/she has understood
- Ensure informed consent form is signed
- Weight of patient should be taken
- Check site and side of the operation
- Check period of fasting
- Remove: Ornaments/prostheses/dentures that may injure the patient and make-up that may interfere with monitoring
- Any other necessary preparation based on patient's condition and nature of the operation (condition of deficits/ imbalances should be corrected, control chronic conditions)
- Ability of the patient to withstand the stresses and adverse effects of anaesthesia and the surgical procedure will depend on how well prepared he/she is

### 24.3.1.2 General Anaesthetic Agents

#### Intravenous agents

Most anaesthetic agents are included in the specialist essential medicines list meaning that use is restricted to specialised health workers

TYPE OF LESION	FEATURES
Ketamine <ul style="list-style-type: none"> <li>Ⓐ Solution: 50mg/ml, 10 mg/ml</li> <li>Ⓐ Route: IV or IM</li> <li>Ⓐ Dose: <ul style="list-style-type: none"> <li>- IV 1-2 mg/kg</li> <li>- IM. 5-7 mg/kg</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Ⓐ Indication: Induction of anaesthesia, maintenance of anaesthesia (infusion), analgesia</li> <li>Ⓐ Contraindication: Hypertension, epilepsy, raised intracranial pressure, e.g., head injury</li> <li>Ⓐ Side effects: Emergency delirium, hallucinations, increased salivation, increased muscle tone</li> <li>Ⓐ Prevent salivation by atropine premedication, treat emergency delirium by giving diazepam</li> </ul>
Propofol <ul style="list-style-type: none"> <li>Ⓐ Solution/emulsion: 1% or</li> <li>Ⓐ mg/ml</li> <li>Ⓐ Route: IV</li> <li>Ⓐ Dose: 1-2.5 mg/ kg titrated at a rate of 4 ml per second</li> </ul>	<ul style="list-style-type: none"> <li>Ⓐ Indications: Induction of anaesthesia, maintenance of anaesthesia</li> <li>Ⓐ Contraindication:</li> <li>Ⓐ Hypersensitivity, hypotension</li> <li>Ⓐ Side effects: Pain at site of injection</li> </ul>

### Inhalational anaesthetic agents

Halothane is included in the general essential medicines list but should only be used by health workers confident with the use of this anaesthetic

MEDICINE	CHARACTERISTICS AND USE
Halothane	<ul style="list-style-type: none"> <li>Ⓐ A volatile liquid at room temperature</li> <li>Ⓐ Indications <ul style="list-style-type: none"> <li>- Induction of anaesthesia (in children, patients with airway obstruction)</li> <li>- Maintenance of anaesthesia</li> </ul> </li> </ul>

MEDICINE	CHARACTERISTICS AND USE
Halothane	<ul style="list-style-type: none"> <li>⦿ Precaution: Always use at least 30% oxygen with halothane</li> <li>⦿ It is safe to avoid use of adrenaline to prevent high incidence of arrhythmias</li> <li>⦿ Adverse effects which may occur include: <ul style="list-style-type: none"> <li>- Atony of the gravid uterus</li> <li>- Post-operative shivering</li> <li>- Severe cardiopulmonary depression</li> </ul> </li> </ul>

### 24.3.1.3 Muscle Relaxants

They are used to provide muscle relaxation to facilitate a procedure, and used in a patient who is unconscious, e.g. general anaesthesia, or sedated.

- ⦿ Precaution before using a muscle relaxant: always have means of supporting the airway and respiration

### 24.3.3 Selection of Type of Anaesthesia for the Patient

Consider the following factors:

- ⦿ Patient factors: medical state, time of last meal, mental state, wish of patient if applicable
- ⦿ Surgical factors: nature of surgery, site of operation, estimated duration of surgery, position in which the surgery is to be performed
- ⦿ Anaesthetic factors: availability of drugs, experience and competence of the anaesthetic provider

### 24.3.3.1 Techniques of General Anaesthesia

Requirements for all

- Take and record baseline vital signs
- Establish intravenous line and commence infusion

## RAPID SEQUENCE INDUCTION OF GENERAL ANAESTHESIA

### Induce anaesthesia by:

- Intravenous route (adults) or
- Inhalation route (children, patient with difficult airway)

### Maintenance

- Secure a clear airway using an oropharyngeal airway
- The mask is placed on the face
- Titrate concentration of inhalation against response of the patient
- Monitor, record every 5 minutes or more frequently, BP, pulse, respiration, colour, oximetry

### Indication

- This technique may be used for operations on limbs, perineum, superficial wall of chest, and abdomen
- Suitable for operations lasting less than 30 minutes

### Induce anaesthesia:

- Intravenous/inhalation (see above)
- Tracheal intubation
  - When spontaneously breathing for anticipated difficult airway (for children) or
  - Under relaxation by suxamethonium and laryngoscopy
  - Confirm correct tube placement by presence of breath sounds on both chest sides
  - Connect the breathing/delivery system to the endotracheal tube

### Maintenance

- Titrate concentration of inhalation agent against response of the patient
  - A selected, long acting muscle relaxant is given
  - Intermittent positive pressure ventilation is done

## RAPID SEQUENCE INDUCTION OF GENERAL ANAESTHESIA

- Monitor vital signs (as above)
- ⦿ At the end of the operation when the patient shows signs of respiratory effort, give
  - IV. Neostigmine 0.03 to 0.07 mg/kg to reverse the effects of the long acting muscle relaxant

### Indication

- ⦿ All operations that require a protected airway and controlled ventilation, e.g, intraabdominal, intrathoracic, and intracranial operations

(Also called crash induction) For patients with “full stomach” and at risk of regurgitation, e.g., emergency surgery, distended abdomen

### Crash induction steps

- ⦿ Establish an intravenous line and commence infusions
- ⦿ Preoxygenation for >3 minutes
- ⦿ Induce with selected intravenous anaesthetic agent
- ⦿ Assistant applies cricoid pressure
- ⦿ IV suxamethonium is given
- ⦿ Laryngoscopy is done
- ⦿ Trachea is intubated and correct tube placement confirmed
- ⦿ The cuff of the endotracheal tube is inflated, then cricoid pressure released
- ⦿ The position of the tube is fixed by strapping and an airway is inserted
- ⦿ Then connect to breathing circuit/system to maintain anaesthesia

### 24.1.1.1 Techniques for Regional Anaesthesia

- ⦿ Detailed knowledge of anatomy, technique, and possible complications is important for correct injection placement

- Preoperative assessment and preparation of the patient should be done
- Patient refusal and local sepsis are the only absolute contraindications
- Select the appropriate technique for operation

## PROCEDURE

- Discuss the procedure with the patient
- Identify the injection site using appropriate landmarks
- Observe aseptic conditions
- Use small bore needle, which causes less pain during injection
- Select concentration and volume of drug according to the technique
- Aspirate before injection to avoid accidental intravascular injection
- Inject slowly and allow 5-10 minutes for onset of drug action
- Confirm desired block effect before surgery commences
- The patient must be monitored throughout the procedure

## Note

Supplemental agents should be available for analgesia or anaesthesia if technique is inadequate

Resuscitative equipment, drugs, and oxygen must be at hand before administration of any anaesthetic



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## SUSPECTED ADVERSE DRUG REACTION REPORTING FORM

**A. PATIENT DETAILS**

Patient name	Patient Number	Sex: M/F*
Age at time of onset(yrs)*	Health Facility	Last Menstrual Period
Weight (kg)	District	Trimester (if pregnant)

**B. SUSPECTED DRUG (S) DETAILS**

Generic Name*	Brand Name	Dose /Route Frequency	Date* started	Date stopped	Prescribed for	Expiry date	Batch No

**C. SUSPECTED REACTIONS**

Please describe the reaction as observed and any treatment given to manage the reaction

## Outcome

Recovered  Recovering  Continuing  Death due to reaction 

Date reaction started*	Date reaction stopped	Date of notification
------------------------	-----------------------	----------------------

**SERIOUSNESS OF THE REACTION**Patient died  Prolonged inpatient Hospitalization  Involved disability  Life Threatening   
Congenital abnormality **D. CONCOMITANT DRUGS**

Please give information on the drug(s) the patient has been taking together with the suspected drug including those taken for chronic diseases (include self medication and herbal preparations)

Generic Name	Brand Name	Dosage	Date started	Date stopped	Indication(prescribed or OTC)

Relevant laboratory tests including dates	Additional relevant information (medical history, allergies, failure of efficacy)

**E. REPORTER'S DETAILS**

Name/Designation*	Telephone and Email Address	Date of reporting	Health facility

\* Mandatory field

# Appendix 1

## Standard Infection Control Precautions

Transmission of infections in health care facilities can be prevented and controlled through the application of basic infection control precautions which can be grouped into:

- ① Standard precautions: basic infection control measures which must be applied to all patients at all times, regardless of diagnosis or infectious status. They are designed to reduce the risk of transmission of micro-organisms from both recognized and non-recognized sources.
- ② Additional (transmission-based) precautions: measures that are used for patients known or suspected to be infected or colonized with highly transmissible or epidemiological important pathogens for which additional precautions are needed to interrupt transmission in health care facilities.

For more details please refer to Uganda National Infection Prevention and Control Guidelines December 2013.

## Standard Precautions

### Hygiene

#### Personal hygiene

Personal Hygiene involves the general cleanliness and care of the whole body: short and clean nails, short or pinned up hair, appropriate clean clothing (uniforms), no jewels on the hands, closed shoes.

#### Hand washing

Hand washing is a major component of standard precautions and one of the most effective methods to prevent transmission of pathogens associated with health care.

## WASH YOUR HANDS THOROUGHLY WITH SOAP AND WATER OR USE A SUITABLE DISINFECTANT



- Before and after any direct patient contact and between patients
- When any skin area is contaminated with body fluids
- Before handling an invasive device or doing any procedures (even if gloves will be worn!)
- After removing gloves
- During patient care, when moving from contaminated to a clean body site of the patient
- After contact with inanimate objects in the immediate vicinity of the patient.
- Hand wash (40-60 sec) with water and soap, rub all surfaces, dry with a single use towel or
- Hand rub (with an alcohol based rub) for 20-30 sec, apply enough product to cover all areas of the hands and rub hands until dry

### Respiratory hygiene and cough etiquette

- Patients with respiratory symptoms should cover their mouth and nose with tissue or mask while coughing/ sneezing, dispose of used tissues and masks and perform hand hygiene after contact with respiratory secretions
- Patients with respiratory symptoms should be placed 1 metre away from others in waiting areas and hand hygiene, tissues and masks made available in common areas

### Instrument hygiene (decontamination)

Decontamination is the combination of processes, including cleaning,

disinfection and/or sterilisation used to render a re-useable medical device safe for further episodes of use. The level of decontamination depends on the situation involved and the type and use of equipment.

- Ⓐ Cleaning is the single most important step in making a medical device ready for re-use: by removing organic material and reducing the number of micro-organisms present, it is an essential prerequisite of equipment decontamination to ensure effective disinfection or sterilization can be subsequently carried out. It utilizes detergents.
- Ⓑ Disinfection 'is a process used to reduce the number of viable micro-organisms, which may not necessarily inactivate some viruses and bacterial spores. Disinfection will not achieve the same reduction in microbial contamination levels as sterilization. It can be carried out by heat (boiling) or by chemical disinfectants.
- Ⓒ Sterilization is a process used to render the object free from viable micro-organisms, including spores and viruses. Moist Heat via clean steam (autoclaving) is the method of choice. Chemical disinfection may only be used when autoclaving is not possible.

## Facility hygiene

A clean environment forms the basis of sound infection prevention and control practices. This is because there is an important link between cleaning of health care facilities and persistence of nosocomial pathogens.

- Ⓐ The purpose of cleaning the environment is to remove visible dirt, reduce the level of microorganisms and to minimize the dissemination of infectious agents in the facility, thereby providing an aesthetically pleasing, sanitary and relatively contamination-free environment for patients, staff and visitors

## Linen and laundry

- Ⓐ Ensure proper handling of linen/laundry
- Ⓑ Collect clothing/sheets stained with blood/body-fluids while wearing gloves or using a plastic bag and keep separate from other laundry – never touch them directly

- Disinfect with hypochlorite if contaminated with body fluids
- Wash with soap and boil for 20 minutes

## Personal Protective equipment (PPE)

Personal Protective Equipment is specialised clothing or equipment worn to protect someone against a hazard or infection. PPE is indicated when health worker-patient interaction indicates that exposure to blood or body fluids is anticipated. They provide a physical barrier between micro- organism and the person.

### Gloves

- Wear clean protective gloves when handling body fluids/secretions, mucous membranes, nonintact skin contaminated waste,- soiled bedding or linen instruments, and for when cleaning body fluid spills
- Change between tasks and procedures on the same patients after contact with potentially infectious material
- Remove after use, before touching any other surface, and wash hands immediately
- Wear sterile or high-level disinfected gloves when performing sterile procedures

### Other PPE

- Wear a surgical or procedure mask and eye protection (googles or glasses) or a face shield when performing activities which are likely to generate splashes or sprays of blood, body fluids, secretions or excretions
- Wear a gown to protect skin and prevent soiling of clothing in activities as above
- Use a waterproof bandage to cover wounds
- Wear protective boots and gloves and where possible, wear a water-proof apron when working in a heavily contaminated area, e.g., toilets

- Avoid mouth-to-mouth resuscitation and pipetting by mouth where possible
- In surgical procedures, use a needle holder and appropriate sized needle, wear double gloves and eye shield

### Safe handling of sharps

- Ensure safe sharps handling and disposal
- Avoid accidental pricks and cuts with contaminated sharp instruments (e.g., needles) by careful handling and proper disposal
- Use "hands-free" technique for passing sharp instruments
- Keep a puncture-resistant container nearby
- Use safe injection practices:
  - Use a sterile needle and syringe for every injection
  - Do not recap, bend, or break needles after use
- Drop all used disposable needles, plastic syringes, and blades directly into the sharps container without recapping or passing to another person
- Empty or send for incineration when container is full

### Safe waste disposal

- Separate hazardous (potentially dangerous) from non-hazardous (routine) waste
  - Hazardous waste includes: infectious waste (e.g. soiled bandages), anatomical waste (placenta), sharps, chemical and pharmaceutical waste
- Use adequate personal protective equipment when handling hazardous waste (boots, gown, water proof apron, gloves, face protection)
- Practice safe waste disposal as per guidelines (incineration, burying)

## Additional Precautions

These are necessary for patients who are known or suspected to be

infected or colonized with specific pathogens that are transmitted by airborne, droplet or contact route of transmission.

### Airborn precautions

Airborn precautions are designed to prevent transmission of particles < 5 micron in size (e.g. some viruses like measles or chickenpox, M. tuberculosis)

- Ⓐ Placement of a patient in a well ventilated room with door closed and discharge of air outdoors
- Ⓐ Use of appropriate respirators (masks with high filtration power) when entering the room
- Ⓐ Limitation of contacts (visitors)
- Ⓐ Use of surgical mask for the patient if leaving the room
- Ⓐ Adherence to cough etiquette by the patient
- Ⓐ In particular settings, negative air pressure can be created

### Droplet precautions

They are designed to prevent transmission of pathogens transmitted by droplets, released by talking, sneezing and coughing: H. Influenza, N.meningitis, some viruses, pertussis, influenza etc.

- Ⓐ Place patient in well ventilated room or at least 1 metre distance from other patients
- Ⓐ Wear a mask if within 1 metre from the patient
- Ⓐ Patient to wear a mask when moving.
- ▢ Closed door and negative air pressure are not necessary

### Contact precautions

These precautions are designed to reduce the transmission of organism from an infected or colonized patient through direct or indirect contact. It applies to microorganisms like HIV, hepatitis B, multi-drug resistant

bacteria like MRSA, herpes simplex, varicella and haemorrhagic fevers viruses, skin staphylococcal infections, scabies, lice, other wound infections.

- Appropriate barrier method must be used
- Isolate patient, use dedicated equipment if possible
- Wear gloves before entering the room, change gloves after contact with potentially infected material
- Remove gloves as soon as leaving the room and wash hands with an antimicrobial
- Wear a gown if necessary
- Minimize patient's movements outside the room

### **In case of blood borne pathogens (HIV, hepatitis B)**

- Use particular precautions in taking blood samples
- Decontaminate any body fluid/blood spillage with 0.5/1% hypochlorite solutions

Patients suspected of having hemorrhagic fevers require the strictest infection control procedures (see WHO, 2016. Clinical management of patients with viral hemorrhagic fever. <http://www.who.int/csr/resources/publications/clinical-management-patients/en/>)

### **Post-Exposure Prophylaxis**

Accidental exposure to blood during medical procedures (needle or other sharp injury, splashes of blood on mucosae) carries the risk of transmission of HIV and/or hepatitis B.

Immunization against hepatitis B is recommended in health workers as an effective protection measure.

Steps for post exposure prophylaxis are described in section 3.1.11.1

## Appendix 2

### Pharmacovigilance and Adverse Drug Reaction Reporting

#### Pharmacovigilance and Adverse Drug Reaction Reporting

Pharmacovigilance is defined as the science and activities relating to the detection, assessment, understanding and prevention of adverse effects or any other drug-related problem.

The aims of pharmacovigilance are to enhance patient care and patient safety in relation to the use of medicines; and to support public health programmes by providing reliable, balanced information for the effective assessment of the risk- benefit profile of medicines.

Any medicine may cause unwanted or unexpected adverse reactions, some of which may be life threatening, for example anaphylactic shock or liver failure.

#### Why Should You Report?

Rapid detection and recording of adverse drug reactions (ADR) is of vital importance so that unrecognised hazards are identified promptly and appropriate regulatory action is taken to ensure medicines are used safely and future events are prevented.

#### What Should Be Reported

Suspected adverse events to any medicine, vaccines and herbal products should be reported (including self- medication medicines).

Report all adverse drug reactions such as:

- ⦿ ADRs to to any medicine (whether new or old)
- ⦿ Serious reactions and interactions
- ⦿ ADRs which are not clearly stated in the package insert
- ⦿ Unusual or interesting adverse drug reactions

- All adverse reactions or poisonings to traditional or herbal remedies

### Report Product Quality Problems such as:

- Suspected contamination
- Questionable stability
- Defective components
- Poor packaging or labelling
- Therapeutic failures
- Non-adherence (may be due to product characteristic)

### Report medication errors such as:

- Prescribing errors
- Dispensing errors
- Medicine preparation error
- Administration errors
- Monitoring error

### Who should report?

- All health workers
- Patients
- Any member of the public
- Medical representatives
- Pharmaceutical Companies, Distributors, Wholesalers and Retailers

## Where and How to Report

Health workers are urged to immediately report suspected ADRs directly to the National Drug Authority Pharmacovigilance Centre using the ADR forms (see example at the end of this section). The forms can

also be obtained from the regional pharmacovigilance centres. Encourage your patients to report suspected ADRs to you.

ADRs can also be reported directly online using the following links:

- Ⓐ [www.nda.or.ug](http://www.nda.or.ug)
- Ⓐ <https://primaryreporting.who-umc.org/Reporting/> Report-er?OrganizationID=UG
- Ⓐ All regional referral hospitals have pharmacovigilance coordinators
- Ⓐ NDA regional offices

The following NDA offices can also be contacted for further information:

#### NDA Head Office

Plot 46/48 Lumumba Avenue Kampala  
Tel. 0414255665/0414347391/0414344052  
Email: [ndaug@nda.or.ug](mailto:ndaug@nda.or.ug)

#### National Drug Authority

South-Western Regional Office  
House No. 29, Mbaguta Estates Kamukuzi Tel. 0485-421088  
MBARARA – UGANDA

#### Eastern Regional Office

South Bukedi Cooperative Building Plot No. 6 Busia Road  
Tel/Fax 045-45185 TORORO – UGANDA

#### Northern Region Office

Erute Road  
Tel./Fax 0473-420652 LIRA – UGANDA

South-Eastern Regional Office Stanley Road, Jinja Municipality Tel.  
0465-440688

#### JINJA – UGANDA

Central Regional Office Premier Complex Building Tel. 0312-261548  
NAKAWA - KAMPALA

#### Western Regional Office

Main Road  
Tel. 0465-440688 HOIMA - UGANDA

## What Will Happen When I Report?

When NDA receives your report, they will assess the likelihood that the suspected adverse reaction is actually due to the medicine, using the WHO causality assessment criteria for deciding on the contribution of the medicine towards the adverse event.

Depending on the outcome of the causality assessment, NDA will give feedback in any of the following ways: medicine alerts, media statements, patient information leaflets, newsletters and personal feedback to reporters.

## Prevention of Adverse Drug Reactions (ADRs)

- ⦿ Never use any medicine without a clear indication
- ⦿ If a patient is pregnant, do not use a medicine unless it is absolutely necessary
- ⦿ Ask the patient if they have any allergies, hypersensitivity or previous reactions to the medicine or to similar medicines
- ⦿ Reduce doses when necessary, for example, in the young, the elderly, and if liver or renal disease is present
- ⦿ Always prescribe as few medicines as possible
- ⦿ Carefully explain dose regimes to patients, especially those on multiple medicines, the elderly, and anyone likely to misunderstand. Check for understanding before patient goes away.
- ⦿ Age and liver or kidney disease may affect the way medicines behave in the body so that smaller than usual amounts are needed
- ⦿ Ask if patient is taking other medicines including self medication medicines, health supplements, herbal products as interactions can occur
- ⦿ If possible, always use medicines with which you are familiar
- ⦿ Look out for ADRs when using new or unfamiliar drugs
- ⦿ Warn patients about likely adverse effects and advise them on what to do if they occur

- ⑤ Give patients on certain prolonged treatments, for example anti-coagulants, corticosteroids, and insulin, a small card which they can carry with them giving information about the treatment

Note: Please attach additional pages to the ADR reporting form if necessary. Even if you do not know some details in the form, do not be put off reporting the suspected adverse event

## Appendix 3

### National Laboratory Test Menu

The test menu was developed by Ministry of Health/Uganda National Health Laboratory Services (UNHLS). It is a list of tests that are available at the specified level of health care. The laboratory system of Uganda is designed to support the minimum health care package for each level of care, with complexity of tests increasing with the level of care.

The laboratory test menu has been included in UCG 2023, in order to guide clinicians about the laboratory services available at each level of health care, and where to refer a patient in need of a particular test.

The National Laboratory Test Menu	
HEALTH CENTER II	
Serology	Pregnancy Test
Hepatitis B Test	Syphilis Test
HIV testing	Biochemistry
Malaria Test	Rapid Blood Sugar

ADDITIONAL TESTS FOR HEALTH CENTER III	
Haematology	Urobilinogen
Haemoglobin estimation	Glucose
Blood film comments	Ketones (Acetoacetic acid)
Bleeding Time	Specific Gravity
Clotting Time	pH
Differential count	Blood
Sickle cell test	Protein (Albumin)
Sickle cell screening test	Nitrite
Plasmin Inhibitor	Leukocytes in urine
Erythrocyte sedimentation rate	Microbiology

**ADDITIONAL TESTS FOR HEALTH CENTER III**

Blood Transfusion	AFB test
ABO grouping	Stool analysis
Rh grouping	Urinalysis
Serology	Parasitology
Cryptoccocal Antigen test	Malaria test
Brucella agglutinin test	Filaria test
Rheumatoid factor	Leishmania test
TB LAM Rapid Test	Trypanosoma test
Typhoid test	Skin Snip Test
Helicobacter pylori IgG	Immunology /Molecular
Hepatitis B rapid test	CD4,CD3,CD8 Counts and Ratios
Hepatitis C rapid test	CD3/CD8 %
Biochemistry	Referral Tests
Rapid Blood Sugar	DNA PCR -EID (Emerging Infectious Diseases)
Urine Chemistry	RNA PCR -VL
Bilirubin	

**ADDITIONAL TESTS FOR HC IV**

Haematology	Indirect bilirubin
Full blood count	Total protein
Coagulation Tests	RFTs
Thrombin clotting time (TT)	Urea
Prothrombin time (PT)	Creatinine
Blood Transfusion	Electrolytes
Compatibility testing	Sodium
Serology	Potassium

ADDITIONAL TESTS FOR HC IV	
Infectious Disease	Chloride
HBcAg IgG	Microbiology
HBeAg IgG	Swab analysis
Biochemistry	High Vaginal Swab (HVS) analysis
LFTS	Pus Swab
SGOT (AST)	Wound swab analysis
SGPT (ALT)	CSF Analysis
ALP	Immunology /Molecular
Direct bilirubin	Gene Xpert
Total Bilirubin	

ADDITIONAL TESTS FOR GENERAL DISTRICT HOSPITALS	
Haematology	Free T4
Blood Film comment	Total T4
Coagulation Tests	Total T3
Thrombin time in the presence of Protamine Sulphate	TSH (Thyroid Stimulating Hormone)
Activated partial Thromboplastin Time (APTT)	Fertility Hormones
Fibrinogen test (Modified Clauss Assay)	Follicle Stimulating Hormone (FSH)
Plasmin Inhibitor	Luteinizing Hormone (LH)
Lupus erythematosous	Cortisol
Platelet function tests	Progesterone
Thin film test	Testosterone
Blood Transfusion	Oestrogen
Blood Transfusion Services	Tumour Markers
Direct Coombs test	Alpha fetoprotein

ADDITIONAL TESTS FOR GENERAL DISTRICT HOSPITALS	
Indirect Coombs test	Pancreatic function tests
Immediate Spin Cross Match (ISCM)	Amylase
Serology	Uric Acid
Anti Streptolysin O-Test (ASOT)	Lipase
Toxoplasma IgG and IgM	Metabolic Profile
TB Lam	Iron
Infectious Disease	Lactic acid/Lactate
Toxo IgG/IgM	CSF Chemistry
CMV IgG/IgM	Protein
Biochemistry	Glucose
LFTs	Globulins
Albumin	Microbiology
GGT	Bacteriology
RFTs	Semen analysis
Creatinine Clearance	Occult blood Test
Lipid profile	Swab analysis
Triglycerides	Throat analysis
Total Cholesterol	Eye Swab analysis
Low Density Lipoproteins (LDL) LDLc	Nasal swab analysis
High Density Lipoproteins (HDL) HDLc	Ear swab
Cardiac Profile	Histology/Cytology
Creatine Kinase (CK-MB) test	PAP Smear
CK- NAC (Total)	HPV Test
Lactate dehydrogenase (LDH)	Biopsy Tissue
Troponins (C,T,I)	Mycology
Thyroid Function Tests	KOH
Free T3	Lactophenol cotton blue

ADDITIONAL TESTS FOR HC IV	
Haematology	Iron
Reticulocyte test	Ferritin
Reticulocyte count	Transferrin
Reticulocyte count(count (RET#))	G6PD
Immature RBC haemoglobin (RBC – HE)	Tumour Markers
Plasmin Inhibitor	Prostate antigen (PSA)
Erythrocyte sedimentation rate	CA 19-9 Ag
D.DIMER	CA 15-3 Ag
CRP test	CA 72-4 Ag
Peripheral Film Comment	Fertility Hormones
Lupus erythematosus test	-Hcg
Blood Transfusion	Microbiology
Blood Transfusion Services	Bacteriology
Du test	Semen analysis
Weak D Typing	Swab analysis
Serology	Blood culture
Measles IgM test	Gastric Aspirate
Rubella IgG and IgM Test	Nasopharyngeal/ oropharyngeal swab
Biochemistry	Cervical/Endo-cervical swab
Extended Electrolytes	Urethral/Rectal Swab
Lithium	Catheter Tips
Calcium	Bacterial identification tests
Magnesium	Bacterial susceptibility testing
Cardiac Profile	Lymph Node Aspirate
hs-CRP	Corneal scraping

### ADDITIONAL TESTS FOR HC IV

ASO (RHD)	Mycology
NT Pro BNP	Mycology Culture and sensitivity
Myoglobin	Fungal Identification Tests
Bone profile	Parasitology
Calcium	Boleria test
Phosphates	Skin Snip test
Blood gases ABG	Immunology/Molecular
HCO3	Molecular
PO2	Gene Xpert
PCO2	Viral load for HIV Virus
Metabolic Tests	Viral load for HEPATITIS B Virus
Glycosylated Haemoglobin	TB DNA PCR
Lactic acid	LPA
Vitamin B12	

### ADDITIONAL TESTS FOR MULAGO/ BUTABIKA NATIONAL REFERRAL HOSPITAL (NRH)

Haematology	Extended Electrolytes
Reticulocyte test	Bicarbonate
Low Fluorescence Ratio (LFR)	Phosphate
Medium Fluorescence Ratio (MFR)	Cardiac Profile
High Fluorescence Ratio (HFR)	hs-CRP
Reticulocyte haemoglobin (RET-HE)	ASO (RHD)
Immature RBC haemoglobin (RBC - HE)	Troponins (C,T,I)
Body fluid analysis	NT Pro BNP
Mono Nuclear cell count(MN)	Myoglobin

ADDITIONAL TESTS FOR MULAGO/ BUTABIKA NATIONAL REFERRAL HOSPITAL (NRH)	
Polymorph nuclear cell count (PMN)	Arterial Blood gases (ABG)
MN%	Ca2+ (Free & Bound)
PMN%	PH
Total Cell count (TC-BF#)	Hb
PROGENITOR CELL# (HPC)	HCT
Sickle cell test	HCO3
HB electrophoresis test (Sickle cell)	Metabolic Tests
HB – F	Folate
HB – S	Thyroid Function Tests
HB-A2	TSH
HBA	Anti -TSH-IgG
Immunotyping (light and heavy chains)	PTHH
Platelet function tests	Fertility Hormones
Thin film report	-hCG
Clot retraction test	Oestrone (E1)
Thromboerythrogram	Oestradiol (E2)
Coagulation Tests	Oestriol (E3)
Fibrinogen Antigen Assay by RIA	DHEA
Repitlase Time	DHEA-S
Batroxobin	Prolactin
Factor Assays(II)	Tumour Markers
Factor Assays(V)	CEA (Carcino Embryonic Antigen)
Factor Assays(VII)	- h CG
Factor Assays(VIII)	-FP (alpha fetoprotein)
Factor Assays(IX)	NSE (Neuro Specific Enolase)

## ADDITIONAL TESTS FOR MULAGO/ BUTABIKA NATIONAL REFERRAL HOSPITAL (NRH)

Factor Assays(X)	S-100
One- stage Intrinsic Assay of prekallikren(PKK), and High Molecular Weight Kininogen (HMWK)	Cyfra 21-1
Plasmin Inhibitor	Enolase
D.DIMER	Microbiology
CRP test	Swab analysis
Peripheral Film Comment	Gastric Aspirate
Lupus erythematosus test	Nasopharyngeal/ oropharyngeal swab
ANT THROMBIN(AT)	Cervical /Endo-cervical swab
Anti-Thrombin Liquid (AT)	Urethral /Rectal Swab
ANTI Xa	Catheter Tips
Plasmin Inhibitor (PI)	Lymph Node Aspirate
Blood Transfusion	Corneal scraping
Blood Transfusion services	Skin/Nail/Hair Scrapping
Du test	Special staining identification tests
Anti-body typing	Mycology
Immediate Spin Cross Match (ISCM)	Toluidine Blue-O for pneumocystis jiroveci
Weak D Typing	Mycology Culture and sensitivity
Serology	Fungal Identification Tests
Infectious Disease	Fungal susceptibility tests
Rubella IgG/IgM	Lactophenol cotton blue
Measles IgG/IgM	Mycology Grocotts' silver stain
Mumps IgG/IgM	Toluidine Blue-O for pneumocystis jiroveci

ADDITIONAL TESTS FOR MULAGO/ BUTABIKA NATIONAL REFERRAL HOSPITAL (NRH)	
HSV 1 IgG/IgM	KOH
HSV 2 IgG/IgM	Histology / Cytology
HZV IgG/IgM	PAS
Biochemistry	Biopsy Tissue
RFTs	Cytological test
Inulin Clearance	Histological test
Cystatin C	

ADDITIONAL TESTS FOR SPECIALISED LABS (NTRL, UBTS, UCI and UHI)	
Haematology (UHI)	Barbiturates
Inhibitor Screening	Benzodiazepines
Clotting factor inhibitor screening based on APTT	Cannabinoids
Ristocetin cofactor Activity/von willebrand factor Activity (VWF:R-Co or VWF: Act)	Cocaine
Von willebrand factor Antigen(VWF:Ag)	Ethanol
Von willebrand factor Collagen binding assay (VWF:CB)	Methadone
Factor VIII binding Assay( VWD Normanday)	Methaqualone
VWF Multimer Analysis	Opiates
Bethesda assay	Phencyclidine
F VIII inhibitor test	Propoxyphene
F IX inhibitor test	Tricyclic antidepressants

ADDITIONAL TESTS FOR MULAGO/ BUTABIKA NATIONAL REFERRAL HOSPITAL (NRH)	
F XIII activity assay	Lysergic Acid Diethylamide
Lupus anti-coagulant(LAC) and Phospholipid anti- body(APA) tests	ImmunoHistoChemistry
Dilute Russell's Viper Venom Time (DRVVT)	A Foeto protein
ANTI THROMBIN III (AT3)	A1 anti chymotrypsin
PROTEIN S	A1 anti trypsin
PROTEIN C	ACE mono
Other Specialized Tests	ACE mono
Protein S(PS)	ACTH
Free Protein S (Free PS)	Actine muscle
Protein S Activity	Actine muscle lisse
Plasminogen (PLG)	Actine muscle spé
Activated Protein C Resistance –Factor test (APCR-V)	Adenovirus
Heparin-UHF (HepXa)	ALK Poumon
Fibrinogen Clauss (Fib-C)	ALK1
2-Antiplasmin (APL)	Androgen Receptor
PFDP (P-FDP)	Annexin
Hepatocomplex (HPX)	Arginase-1
Chromogenic VIII High (F-VIII Chr H)	B Catenin
Proclot SP (P-ClotSP)	B HCG
Pro-IL Complex (PCX)	BCA 225
Silica Clotting Time (SCT-S, SCT Screen)	BCL2

ADDITIONAL TESTS FOR MULAGO/ BUTABIKA NATIONAL REFERRAL HOSPITAL (NRH)	
Homocysteine (HCY, HCYh)	bcl-2
Bone marrow report	BCL6
Blood Transfusion services (NBTS)	BerEP4
Blood Transfusion services	BG8
Serological Testing (Ab, Ag, PCR)	BOB.1
IgG Phenotyping: Fya, Fyb, Jka, JKb, S, s, Cellano	BRAF V600E
IgM Rh-Kell C, c, E, e, K - Vertical	CDX2
High Titer	CD1a,2,3,4,5,7,8,10,13,14,15,16,20..68
Direct Anti globulin Test(DAT)	CA125
Antibody screen, commonly known as Antibody detection test (ADT)	CA19.9
Group and screen	Cadherin 17
Anti globulin cross match	Calcitonin
Platelet Compatibility Test	Calcitonin
Serological Testing (CMIA, Ab, Ag, PCR)	Caldesmon
Serology	Calponin
Infectious Disease	Calretinin
Helicobacter pylori IgG/IgM	Caveolin-1
HBsAg IgG ,16,20..68	CD1a, 2,3,4,5,7,8,10,13,14,15
HBcAg IgG	FITC Albumin
HBeAg IgG	FITC C1Q
Toxo IgG/IgM	FITC C3
CMV IgG/IgM	FITC C4

## ADDITIONAL TESTS FOR MULAGO/ BUTABIKA NATIONAL REFERRAL HOSPITAL (NRH)

HCV IgG/IgM	FITC Fibrinogen
Rubella IgG/IgM	FITC IgA
Measles IgG/IgM	FITC IgG
Mumps IgG/IgM	FITC IgM
HSV 1 IgG/IgM	FITC Kappa
HSV 2 IgG/IgM	FITC Lambda
HZV IgG/IgM	CK 34BE12
HIV combi	CK AE1
HIV confirmatory	SPECIFIC PROTEINS
Anti HBS	ASLO
Anti HAV	APOA1
Anti HAV-IgM	APO B
Other Hormones	C3c
G.H (Gonadotrophic Hormone)	C4
IGF-4	CRP
ACTH	hs CRP
Aldosterone	HbA1c
Cortisol	Cystatin
GnRH (Gonadotropin Releasing Hormone)	Ferritin
Vasopressin	Haptoglobin
Insulin	IgA
Biochemistry (UHI)	IgG
Lipid profile	IgM
vLDLc	Acid Glycoprotein



ADDITIONAL TESTS FOR MULAGO/ BUTABIKA NATIONAL REFERRAL HOSPITAL (NRH)	
Cardiac Profile	Antitrypsin
Digitoxin	Microglobulin a1
Digoxin	Microglobulin a2
Pro-BNP	Microglobulin B2
PCT	Albumin Urine
IL-6	Myoglobin
Anti-CCP	RF
IgE	Transferrin
Bone Profile	Soluble Transferrin
PTH (Parathyroid Hormone)	Kappa
Vitamin D3	Free Kappa
B-Crosslaps	Lambda
Total P1NP	Free Lambda
N-MID-Osteocalcin	Antithrombin
Thyroid Function Tests	D-Dimer
TG	Protein Electrophoresis
T-Uptake	Serum Protein
Anti-TG	Enzyme
Anti-TPO	Haemoglobin
Fertility Hormones	HbA1C
s-Fit-1	Rheumatology Studies
SHBG (Sex Hormone Binding Protein)	R.F
PIGF	C3
G.H	C4

ADDITIONAL TESTS FOR MULAGO/ BUTABIKA NATIONAL REFERRAL HOSPITAL (NRH)	
IGF-1	CRP
ACTH	DsDNA
C-Peptide	Anti – CCP
Cortisol	ANA (antinuclear antibodies)
GnRH	ANCA (anti neutrophil cytoplasmic antibodies)
Insulin	CDT(for Alcohol abuse)
Tumour Markers	NTRL
FPSA	Tuberculosis Culture
- h CG-free	Identification of Mycobacteria tuberculosis complex (MTC)
Cyfra-21-1	Drug susceptibility testing (DST) methods
Drug Abuse	Xpert MTB/RIF test
Amphetamines	

## Appendix 4

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