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Ministry of Health
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Eritrean Standard Treatment Guidelines

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The ESTG is a dynamic document and feedback from all stakeholders will help in its revision at regular basis. Comments and Suggestions are therefore welcome and should be directed to the following address:

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I FOREWORD

The Eritrean Standard Treatment Guidelines (ESTGs) aims at providing health practitioners with standardized guidance in making decisions about appropriate health care for specific conditions found in Eritrea. By using ESTGs, prescribing practices can be rationalized and patient outcomes can be improved while making optimum use of medicines.
The 2nd edition of ESTGs is consistent with the 6th edition of the Eritrean National List of Medicines (ENLM), which retains its purpose of identifying medicines that are considered essential for the treatment of common disease conditions in Eritrea. The ESTG is also consistent with current national guidelines for diagnosis and management of common diseases.
The ESTGs is meant to be a guide for quick reference and its recommendations are valid for most presentations of the conditions covered. Nevertheless, clinical judgment and experience will always prevail for adjustment of treatment in individual cases when necessary.

The preparation of the ESTGs has passed through several steps, including preparation and review of a succession of draft documents, wide consultations, expert reviews and consensus building. In this regard, I would like to express my appreciation to all those who actively participated in the long process leading to the completion of these guidelines.
The process of developing the ESTGs shall be a continual effort, not limited to the one-time production. Hence, the publishing of the ESTGs shall be followed by implementing introductory campaigns and training activities and undertaking regular reviews and updates.

I trust that all health workers in Eritrea will find the ESTGs a useful tool in management of patients' illnesses, as well as for quantification of medicines and medical supplies.

Accordingly, I would like to call upon all health workers in Eritrea to promote and adhere to these Standard Treatment Guidelines.

Amina Nurhussien
Minster of Health

II ACKNOWLEDGEMENTS

The Ministry of Health wishes to acknowledge and express its sincere appreciation to all those who dedicated their time and effort in producing this second edition of the Eritrean Standard Treatment Guidelines (ESTGs).

Oversight of the process of developing the ESTGs was provided by the Medicines Information Unit and the Pharmacy Services Division of the MOH; the Global Fund provided the funding, the PMU-MOH managed the contract administration and Mesterhot Consultancy Firm provided the consultancy services. The Expert Review Committee thoroughly reviewed the final draft prepared by the Draft Preparing Team and discussed it in a consensus building Workshop of the Expert Review Committee.

The contribution of the preparatory team members comprising:- the oversight and coordination team, draft preparing team, expert review committee and editorial team that ensured the successful completion of the ESTGs is gratefully acknowledged.

I would also like to congratulate the drafting and editorial teams and the expert review committee members on successful collaboration and revision, and I thank them for their continued commitment to healthcare provision in Eritrea.

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III HOW TO USE THE DOCUMENT

The 2nd edition of the Eritrean Standard Treatment Guidelines (ESTGs), which is consistent with the 6th edition of the Eritrean National List of Medicines (ENLM), covers chapters of common diseases in Eritrea. The chapters are arranged according to the organ systems of the body. Most chapters start with a title, a brief description of the topic, common clinical signs and symptoms of each disease, the diagnosis and differentials, investigations, treatments and supportive care. The guideline also makes provision for referral of patients to higher health facilities.

The recommended treatments provided in this document are evidence based and clinically approved and are in consistent with the already existing WHO and National Guidelines. A brief description and diagnostic criteria are included to assist the health provider to make a diagnosis. These guidelines also make provision for referral of patients with more complex and uncommon conditions to facilities with the resources for further investigation and management. The dosing regimens provide the recommended doses used in usual circumstances however the final dose should take into consideration capacity to eliminate the medicine, interactions and co-morbid states.

The recommended treatments provided in this book are guidelines only and are based on the assumption that prescribers are competent to handle patients' health conditions presented at their facilities.

It is important that you become familiar with the contents and layout of the guideline in order to effectively navigate around to effectively use the ESTGs.

Refferal

These guidelines also make provision for referral of patients to other health facilities. Patients should be referred when the prescriber is not able to manage the patient either through lack of personal experience or the availability of appropriate facilities. Patients should be referred, in accordance with *ministry guidelines*, to

facilities where the necessary competence, diagnosis and support facilities exist. the problem and what has been done so far, including laboratory tests and treatment. When indicated emergency treatment and resuscitation measures must be given before referring the patient.

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Conflict of Interest Statement

None of the Preparatory and/or Review Teams of this document or anyone who had influence on the process of developing the ESTGs has any competing financial or other interests.

V ABBREVIATIONS

µg	Microgram
ARB	Angiotensin Receptor Blocker
AHF	Acquired Acute Heart Failure
AIDS	Immuno-deficient Syndrome
ALU	Artemether Lumefantrine
AMI	Acute myocardial infarction
APH	Ante partum Haemorrhage
ARDS	Acute Respiratory Distress Syndrome
ARF	Acute Renal Failure
ARI	Acute Respiratory Infections
ARV	Anti-rabies vaccine
AS	Aortic stenosis
ATI	Anti-tetanus immunoglobulin
ATS	Anti Tetanus Serum
AVR	Acute valvular regugitation
AV	Atrio-ventricular
BCG	Bacillus Calmette – Guerin Vaccines
BG	Blood Glucose
BID	Two Times a Day
BL	Burkitt's Lymphoma
BP	Blood Pressure
BSA	Body surface area
CCB	Calcium Channel Blocker
CHF	Congestive heart failure
CNS	Central Nervous System
COCs	Combined Oral Contraceptives
CPT	Cotrimoxazole Preventive Therapy
CrCl	Creatinine Clearance
CS	Caesarian Section
CSF	Cerebral-Spinal Fluid
CT	Computer Tomography
CVD	Cardiovascular Disease

CVP	Central Venous Pressure
D&C	Dilation and Curettage
DAHF	Decompensate Acute Heart Failure
DBP	Diastolic Blood Pressure
DIC	Disseminated Intravascular Coagulation
DKA	Diabetes Ketoacidosis
DOT	Directly observed therapy
DPM	Drops Per Minute
DPT	Diphtheria, Pertussis, Tetanus vaccine
DRE	Digital Rectal Examination
DSM	Direct Smear Microscope
DT	Delirium Tremens
DVT	Deep Vein Thrombosis
EAU	Examination Under Anaesthesia
EBV	Epstein Barr Virus
ECG	Electro Cardiogram
ENL	Erythema Nodosum Leprosy
ENLM	Eritrean National List of Medicines
EPI	Expanded Programme of Immunization
ENT	Ear Nose and Throat
ESR	Erythrocyte Sedimentation Rate
ESTG	Eritrean Standard Treatment Guidelines
FBC	Full Blood Count
FBP	Full Blood Picture
FBS	Fasting blood sugar
FFP	Fresh Frozen Plasma
g.	gram
GAS	Group A beta haemolytic Streptococci
GDM	Gestational Diabetes Mellitus
GFR	Glomerular Filtration Rate
GI	Gastro Intestinal
GIT	Gastro Intestinal Tract
GS	Glomerular Diseases

HB	Haemoglobin
HB	Haemoglobin
HD	Hodgkin Disease
HDC	Human diploid cell (rabies vaccine)
HDCV	Human Diploid Cell Vaccines
HF	Heart Failure
HIV	Human Immunodeficiency Virus
HRIG	Human rabies immunoglobulin
HSV	Herpes Simplex Virus
I.M/i.m	Intramuscular
I.V/i.v	Intravenous
ICU	Intensive Care Unit
IDDM	Insulin Dependent Diabetes Mellitus
IE	Infective Endocarditis
IHD	Ischemic Heart Diseases
INH	Isoniazid
INR	International Normalized Ratio
ITP	Idiopathic Thrombocytopenic Purpura
IU	International unit
IUD	Intra-uterine devi ce
IUFD	Intrauterine fetal death
IUGR	Intra Uterine Growth Restriction
IU	international unit
IVU	Intravenous urography
Kg	kilogram
KS	Kaposi's Sarcoma
L/l	Litre
LDL	Low Density Lipoprotein
LVH	Left ventricular hypertrophy
MCV	Mean Corpuscular Volume
MDIY	Multiple Daily Insulin Therapy
MDR	Multiple Drug Resistance
mEq	miliequivalent

mg	miligram
MI	Myocardial Infarction
ml	mililitre
mmHg	Millimeters of Mercury
MOH	Ministry of Health
MR	Mitral regugitation
MRI	Magnetic Resonance Imaging
MS	Mitral stenosis
MTX	Methotrexate
MU	Mega (international) unit
NGT	Nasal Gastric Tube
NHL	Non Hodgkin's Lymphoma
NIDDM	Non Insulin Dependent Diabetes Mellitus
NSAID	Non Steroidal Anti- Inflammatory Drugs
NSTEMI	Non ST Elevation Myocardial Infraction
O/PO	per Oral
OPD	Out-patient department
OPV	Oral polio vaccine
ORS	Oral rehydration salts solution
PB	Paucibacillary Disease
PCR	Protein Creatinine Ratio
PE	Pulmonary Embolism
PEM	Protein Energy Malnutrition
PHC	Primary Health Care
PID	Pelvic Inflammatory
PID	Pelvic inflammatory disease
PIH	Pregnancy Induced Hypertension
POPs	Progesterone Only Pills
PPH	Post Partum Hemorrhage
PPROM	Preterm Premature of Rapture of Membrane
PROM	Prolonged Premature Rapture of Membrane
PSA	Prostate Specific Antigen

PT	Prothrombin
PTT	Partial Thrombin Time
RF	Rheumatic fever
RHD	Rheumatic heart disease
RT	Radiotherapy
RV	Right Ventricle
SBP	Systolic Blood Pressure
SC	Subcutaneous
SJS	Steven Johnson Syndrome
SLE	Systemic Lupus Erythematous
SP	Sulfadoxine Pyrimethamine
SSS	Salt Sugar Solution
STD	Sexually Transmitted Diseases
STEMI	ST Elevation Myocardial Infraction
STG	Standard Treatment Guidelines
SVTs	Supraventricular Tachyarrhythmia's
T1DM	Type I Diabetes Mellitus
T2DM	Type 2 Diabetes Mellitus
TB/TBC	Tuberculosis
TIA	Transient ischaemic attack
TIG	Tetanus Immunoglobulin
TSH	Thyroid Stimulating Hormone
TT	Tetanus Toxoid
TTV	Tetanus toxoid vaccination
UFH	Unfractionated Heparin
URTI	Upper respiratory tract infection
UTI	Urinary Track Infection
VF/VT	Ventricular Fibrillation/flutter/ Ventricular tachyarrhythmia's
WHO	World Health Organization

VI PRESENTATION OF INFORMATION

General arrangement of sections
In this edition of Eritrean Standard Treatment Guidelines (2017), treatments have been grouped in sections according to body systems, except for general conditions such as: Infections (parasitic diseases, HIV/AID and STIs), miscellaneous conditions, poisoning, burns, immunization and family planning,
Within each section, conditions are generally arranged in an order describing the natural occurrence.
Each condition is dealt with under the following sub-heading:

1. Title/description

Each condition is given a title and this is followed by a brief description of the condition, e.g. "**Cluster Headaches:** headaches that come in groups (clusters) lasting weeks or months, separated by pain-free periods of months or years

2. Cause

Listed here are the pathological organisms, circumstances, or reasons for transmission of the disease or occurrence of the condition. Any pre-disposing factors will also be given in this part of the monograph

3. Signs and Symptoms
Listed here are the main signs and symptoms that characterize the disease or condition with an indication of patient groups that may be more susceptible, e.g. children and the elderly.
Where relevant, complications which may result from having the condition (usually in a serious or chronic form) are also given.

4. Differential diagnosis

This part gives any other conditions that may produce similar signs and symptoms and thus should be considered and excluded when making an initial diagnosis.

5. Investigations

This section indicates the most important diagnostic tests and investigations needed for a definitive diagnosis. Available tests or other diagnostic facilities may be limitedor not available at lower levels of the health system. Nevertheless, when necessary the diagnostic procedures are included only for information. At this level, clinical diagnosis should be made whenever possible.

6. Management

The non-pharmacological management measures necessary to deal satisfactorily with the particular condition are given in a logical sequence of steps. Drug therapy I whenever necessary is given under the sub-title: pharmacological treatment.

6.1 Alternative drugs and multi-drug treatments

If more than one drug may be used to treat a given condition, the medicines are listed as "alternatives" or indicated by the word "**OR**". The first listed drug is the recommended 1st line drug, the second listed is the 2nd line and so on. Where multiple drugs are necessary to treat a given condition, these are indicated by the word "**PLUS**" or "**AND**"

6.2 Dose regimes

Note:

Unless otherwise indicated, **all** dose regimes are for **adults** and are by **oral** route

Where medication is necessary, the individual dose regimes are stated in a standard format as follows:
Generic name (in bold letters): This is the official recommended name as listed in the sixth edition of the ENLM **(**2015). This name should be used in all prescribing, dispensing, medicines administration, and medication record procedures.
In addition to the name, the **strength** of a particular medication may be stated, e.g. paracetamol tablets 500mg, glucose infusion 5%, or chloramphenicol eye drops 1%

Dose: This is the size of each individual dose of the medicine. It is usually expressed as a quantity of the particular medicine by weight (e.g. 100mg, 250mg, 500 micrograms), number of units (e.g. 20,000 international units (IU), 2 mega unit (MU)), or volume of liquid of particular strength (e.g. IV infusions).

Paediatric doses: (for patients of 12 years or less) where applicable, these are specifically indicated in units of body weight (e.g. 5mg/kg) so that a precise dose may be accurately determined to suit individual patients. In other cases, a fixed dose may be related to a particular age range (e.g. <5yrs: 125mg; 5-12 yrs: 250mg). Where weighing is not possible but the age is known, age/weight charts may be used to estimate the weight of the child.

Where weighing is not possible and specific pediatric doses are not indicated, suitable pediatric doses may be approximated in terms of the normal adult dose as follows:
<5yrs: ¼ of adult dose
5-8yrs: ½ of adult dose
9-12yrs: ¾ of adult dose
For additional information, refer to the Eritrean National Formulary (ENF)

Route of administration: The oral route is to be used unless otherwise indicated. Approved abbreviations (IV, IM, Sc) etc., are used for parenteral routes.

Dose frequency: In most cases, this is expressed in the number of hours (interval) between doses (e.g. 8-hourly, every 4-6 hours).

For many medicines, intervals are more appropriate than number of times per day (every eight hours). This is because the dose interval may vary, which may have adverse effects on blood levels of the medicine and consequent therapeutic effectiveness of the medicine.

Duration of treatment: Where applicable, the recommended period for which treatment should be continued is indicated as a number of days, weeks, etc. Where the duration is not stated, treatment should be continued for as long as necessary to obtain the desired therapeutic outcome, e.g. until the patient is cured or the condition is resolved.

Special instructions: These give further information on the correct administration of the medication and, where relevant, should be written on any related prescription. Special instructions include taking medicine after food, applied sparingly, given slowly over a four hour period, etc.

7. Prevention

Practical measures to prevent or avoid development of a particular condition are given.

These should be clearly communicated to the patient during counseling as a vital and routine part of patient management.For, example, life-style modification is indicated for the prevention of cardiovascular disorders, diabetes etc. The detailed information is given at the beginning of chapter 4, CVS disorders.

VII PRESCRIBING GUIDELINES

The official prescription form is ***a legal document*** and therefore should be used strictly in accordance with the MOH guidelines. The prescription form which is pre-numbered should be used for no other purpose except for writing prescriptions. All copies of prescriptions should remain in the pad and be kept in a safe place.

1. Ten-point prescribing checklist

Some general points to consider before writing a prescription:

1.1 Not all patients need a prescription for drugs. Non-drug treatments and/or simple advice may be more suitable in several situations.

1.2 Good therapeutics depends on:

- ✓ Accurate diagnosis of the condition
- ✓ Knowledge of the relevant available medicines
- ✓ Selection from these of the most appropriate medicine and dose-form
- ✓ Correctly and completely prescribing the selected medicines stating clearly for each:
- ✓ The dose size
- ✓ The dose frequency
- ✓ The duration of treatment
- ✓ Ensuring that the patient understands fully the purpose of each medicine and how to use it each prescribed medicine

1.2 Unless otherwise specified, the oral route is to be used. Where appropriate, single dose therapy is recommended in the interests of cost-effectiveness and compliance. Even when a parenteral route is specified, it is often possible to change to oral administration once the patient has improved and is able to

swallow oral medication. Try to resist patient demand to prescribe injections. Always try to explain to the patient that these may not be the best forms of treatment.

1.3 In critical situations, always prescribe the most effective medicine available irrespective of cost or limited availability

1.4 Always prescribe drugs by their generic name and not by a brand name, eg diazepam (not Valium), paracetamol (not Panadol).

1.5 For most conditions, only one drug treatment (the most appropriate) is recommended and no alternatives are defined. For some (less common) conditions, alternative medications have been presented, eg 2nd line drugs to be used when no satisfactory response has been obtained with the recommended 1st line medication.

1.6 When prescribing any medicine, always take into consideration important patient criteria such as:

- ✓ Age
- ✓ Sex
- ✓ Weight - especially of children
- ✓ Likelihood of side effects (including allergies)
- ✓ Presence of renal or hepatic disease: many medicines may have to be used in reduced doses or avoided completely
- ✓ The effect of other diseases present; these may significantly affect the action of particular medicines or the considered medicines may affect the other diseases negatively
- ✓ Pregnancy; only use medicines in pregnancy if the expected benefit to the mother is greater than any risk to the fetus and avoid all medicines if possible during the 1st trimester (the first three months of pregnancy).
- ✓ Breastfeeding; only use medicines which are essential for treatment of the mother. For many medicines, there is

insufficient information available to provide guidance on breastfeeding.

- ✓ The likely degree of compliance with treatment; simpler, shorter dosage regimes increase the chance of the patient correctly following prescribed therapy

1.7 Before prescribing a drug, it is always necessary to carefully inquire about any other medication being taken by the patient. Care should be taken to avoid problems of interactions with other drugs, whether:

- ✓ 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 the purposes of self-medication at home.
- ✓ Where a drug interacts with alcohol (eg metronidazole, diazepam, anti-diabetic drugs, tricyclic antidepressants, etc) remember to counsel the patient to avoid taking alcoholic drinks during the course of treatment.

1.8 As a general principle, the lowest drug doses that achieve best therapeutic response should be used.

1.9 Do not practice multiple prescribing (poly-pharmacy), especially when the diagnosis is uncertain. It is a tremendous waste of resources and puts the patient at increased risk without corresponding clear benefit.

1.10 Do not prescribe combination of medicines unless they have a proven significant therapeutic advantage over corresponding single ingredient preparations

2. Levels and Authorisation of prescribing

2.1 Not all drugs of the Eritrean National List of Medicines (ENLM) can be prescribed at all levels of the Eritrean health care system. Each drug has its own code for this purpose.

2.2 Some drugs (code 1) can be used in all health care settings. Drugs belonging to code 2can be used in health centers (community hospitals) and higher levels only; some can only be used in all hospitals (code 3);. Treatments presented in this manual mainly use code 1, 2 and some of code 3.

2.3 The list also includes category Sdrugs which can be used in special cases are kept only in the highest referral hospitals, are mentioned occasionally when it is useful for health workers to know how their referred patients will be managed at the specialist level and how they should be supported at the local level.

3. Prescription Writing

3.1All incomplete, inaccurate, illegible or unclear prescriptions should be returned to the prescriber for clarification, completion, or correction, before they can be dispensed. The standard prescription form should be used when available and the prescriber's full name and address must always be included.

3.2 All prescriptions must be written readably in ink. Poor writing may lead to errors in interpretation by the dispenser, and have harmful consequences for the patient.

3.3 Write the full name, sex and age of the patient, and sign and date the prescription form.

3.4 Write the title of the drug or preparation in its full generic name. Unofficial abbreviations, trade names, and obsolete names should not be used.

3.5 State the strength of the preparation required where relevant.

3.6 Always state the full dose regimen, ie

- drug dose
- route of administration
- dose frequency
- Duration of treatment. The quantity to be dispensed will be deduced from this.

3.7 For tablets, capsules and topical preparations:

- Quantities of one gram or more should be written as 1g, 2.5g, 10g, etc.

- quantities less than one gram but more than one milligram should be written as milligrams rather than fractions of a gram, eg 500mg and **NOT** 0.5g

- Quantities less that one milligram should be expressed as micrograms (in full) and **NOT** as fractions of a milligram, eg 100 micrograms rather than 0.1 mg or 100 mcg.

3.8 If decimal figures are used, always write a zero in front of the decimal point where there is no other figure, eg 0.5 ml and **NOT** .5 ml.

3.9 Avoid expressions as 'to be used/taken as required'. State instead a suitable dose frequency. For example, state paracetamol 500 mg orally, every four hours when necessary rather paracetamol prn. In the few cases where 'as required' is appropriate, the actual dose to be taken should be stated as well.

3.10 Where relevant, always remember to include on the prescription any special instructions necessary for the correct use of a drug or preparation, eg 'before food', 'apply thinly', etc.

3.11 Write directions without Latin abbreviations. Write the information ful. Twice a day, every eight hours, immediately etc.

4. **Controlled Medicine Prescriptions**

Narcotic and psychotropic medicines are legally controlled substances according to the Proclamation to Control Drugs, Medical Supplies, Cosmetics and Sanitary Items.These medicines which

include opioids (Morphine,Pethidine, codeine all dosage forms), benzodiazepines and barniturates.

- They may only be prescribed by authorised prescribers who must observe the following legal requirements:
- Prescriptions must be in the prescriber's ownhandwriting, signed, and dated and with the prescriber's address
- The name and address of the patient must be stated
- The total amount of the item to be supplied must be stated in words and figures
- It is an offence for a prescriber to issue and for a pharmacy to dispense prescriptions for controlled medicines unless the requirements of the law are fully complied with.

For further information, refer to related guidelines on their management.

5. Paediatric prescribing

In general, children need different drug doses from adults because of smaller body mass and different rates of drug metabolising.
In these guidelines, paediatric drug doses are usually given according to body weight and not age, and are therefore expressed as mg/kg, etc. 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 drugs according to body weight. Moreover, this should encourage the good practice of weighing children whenever possible.

6 Prescribing of placebos

6.1 Avoid using placebo. Instead, spend some time reassuring and educating the patient.

62 If it is absolutely necessary to prescribe a placebo, always choose a safe, cheap drug, which is not essential for the

treatment of other important conditions, eg vitamin C tablets or Vitamin B. Complex tablets. Never prescribe injections as placebos.

6.3 Never prescribe tranquillisers, such as diazepam, phenobarbitone or antibiotics as placebos.

7. **Metric unit equivalent**

1 kilogram (kg)	=	1,000 grams (g)
1 g	=	1,000 milligrams (mg)
1 mg	=	1,000 micrograms (µg)
1 litre (L)	=	1,000 millilitres (ml)
1 ml of water	=	1 g
1% (w/v)	=	10 mg/ml

1. SYMPTOMS AND SYNDROMES

1.1 Fever

Fever is defined as a rectal temperature higher than or equal to 38°C.In practice, axillary route is easier, more accepted and more hygienic.
An axillary temperaturehigher than or equal to 37.5°C is considered a fever. In a child under 3 years, if the axillarytemperature is ≥ 37.5°C, take the temperature rectally if possible.
Record the temperature as measured and if taken using the rectal or axillary route, donot add 0.5°C to the axillary temperature.
Fever is frequently due to infection. In a febrile patient, first look for signs of serious illnessthen, try to establish a diagnosis. There is an increased risk of severe bacterial infection (malnourished or immune-depressed children may have a bacterial infection without a fever) ifthe rectal temperature is ≥ 38°C in children 0 to 2 months; ≥ 38.5°C in children 2 months to3 years; ≥ 39°C in children older than 3 years and adults.

Signs of Severity

- Severe tachycardia, tachypnoea, respiratory distress, oxygen saturation ≤ 90%
- Shock, altered mental status, petechial or purpuric rash, meningeal signs, seizures, heartmurmur, severe abdominal pain, dehydration, critically ill appearance,a bulging fontanel inyoung children.
- In endemic area, always consider malaria.

- If the patient is ill-appearingand has a persistent fever, consider HIV infection and tuberculosis, according to clinical presentation.

Investigations

- Children less than 2 months with a rectal temperature ≥ 38°C without a focus:
  - Urinary dipstick;
  - Lumbar puncture (LP) if child less than 1 month or if any of the following: meningeal signs,coma, seizures, critically ill appearance, failure of prior antibiotic therapy, suspicion of
  - Staphylococcal infection;
  - Chest X-Ray (if available) in case of signs of respiratory disease.
- Children 2 months to 3 years with a rectal temperature ≥ 38.5°C without a focus:
  - Urine dipstick;
  - White blood cell count (WBC) if available;
  - LP if meningeal signs.
- Children over 3 years and adults with an axillary or rectal temperature ≥ 39°C: according to clinical presentation.

General measures

- Treat according to the cause of fever.
- If no source of infection is found, hospitalise and treat the following children with empiricantibiotics:

- Children less than 1 month;
- Children 1 month to 3 years with WBC ≥ 15000 or ≤ 5000 cells/mm

- All critically ill appearingpatients or those with signs of serious illness;
- For antibiotic doses according to age, see: Acute pneumonia,
- Undress the patient. Do not wrap children in wet towels or cloths (not effective, increasesdiscomfort, risk of hypothermia).
- Antipyretics may increase the patient's comfort but they do not prevent febrile convulsions.
- Do not treat for more than 3 days with antipyretics.

Drugs (for symptomatic treatment**)**
Paracetamoloral, dosage:

- Children less than 1 month: 10 mg/kg/dose, 3 to 4 times daily as needed
- Children 1 month and over: 15 mg/kg/dose, 3 to 4 times daily as needed (max. 60 mg/kg/day)
- Adults: 1 g/dose, 3 to 4 times daily as needed (max. 4 g/day)**OR**

Ibuprofen, dosage:

- Children over 3 months and < 40 kg: 10 mg/kg/dose, 3 times daily as needed (max. 1200 mg/day)
- Children ≥ 40 kg and adults: 400 mg/dose, 3 times daily as needededoracetylsalicylic acid(ASA)oral

- Children over 15 years and adults: 1 g/dose, 3 times daily as needed

Acetyl salicylicacid (ASA)
Chldren over 15 years and adults, 1g dose three times daily, as needed

Prevention of complications
- Encourage oral hydration.
- Continue frequent breastfeeding in infants.
- Watch for signs of dehydration.
- Monitor urine output.

Notes:
- In pregnant or breast-feeding women use paracetamol only.
- In case of haemorrhagic fever and dengue: acetylsalicylic acid and ibuprofen are contra-indicated; use **paracetamol** with caution in the presence of hepatic dysfunction.

1.2 Pain Relief

Pain is a common symptom of disease and in many different conditions.

It may alert the health worker to the possibility of an underlying medical problem. It is an unpleasant sensation localized to a part of the body.

Pain is expressed differently by each patientdepending on cultural background, age, etc. It is a highly subjective experience meaning thatonly the individual is able to

assess his/her level of pain. Regular assessment of the intensity ofpain is indispensable in establishing effective treatment.

It is often described in terms of a penetrating or tissue-destructive process (e.g., stabbing, burning, twisting, tearing, squeezing) and/or of a bodily or emotional reaction (e.g., terrifying, nauseating, sickening).

Any pain of moderate or higher intensity is accompanied by anxiety and the urge to escape or terminate the feeling.
Expression of pain may vary, depending on the patient's emotional state and personality.

Diagnosis
Self-report is the key to pain assessment.
In non- or pre-verbal children, facial expression is the most valid indicator of pain; therefore use faces pain scale to assess severity. Pain should be assessed by:

- Duration
- Site
- Severity
- Character
- Persistent or intermittent
- Relieving or aggravating factors •Accompanying symptoms Distribution of pain

In children pain can be assessed by child's crying voice, posture, movement and colour.

The treatment of pain

The treatment of pain is based on a few fundamental concepts:

- Pain can only be treated correctly if it is correctly evaluated. The only person who can evaluate the intensity of pain is the patient himself. The use of pain assessment scales is invaluable.
- The pain evaluation observations should be recorded in the patient chart in the same fashion as other vital signs.
- Treatment of pain should be as prompt as possible.
- It is recommended to administer analgesics in advance when appropriate (e.g. before painful care procedures).
- Analgesics should be prescribed and administered at fixed time intervals (not on demand).
- Oral forms should be used whenever possible.
- The combination of different analgesic drugs (multimodal analgesia) is advantageous.
- Start with an analgesic from the level presumed most effective: e.g., in the event of afractured femur, start with opioids analgesics (eg., morphine oral, and sustained release if available).
- The treatment and dose chosen are guided by the assessment of pain intensity, but also bythe patient's response which may vary significantly from one person to another.

1.2.1 Acute Pain

Treatment for Acute Mild and moderate pain
Aspirin, Paracetamol, Ibupruphen, diclophenac and other Non -Steroidal Anti-Inflammatory Agents (NSAIDs) are used in the treatment of mild and moderate pain.. These drugs are considered together because they are used for similar problems and may have a similar mechanism of action.
Acetylsalicylic acid: Adult: 500mg every 4 hours until pain subsides **OR**
Paracetamol 500- 1000mg every 6-8 hours until pain subsides.
Paracetamol Children 15 mg/kg/dose 4–6 hourly when required to a maximum of 4 doses per 24 hours;

For moderate pain
Tramadol and codeine can be added to the NSAIDs

Treatment for Severe Pain
Opioids are the most potent pain-relieving drugs currently available. They have the broadest range of efficacy, providing the most reliable and effective method for rapid pain relief.
Tramadoltablets or injection 50-100mg every 6 hours or until pain is controlled.**OR**
Morphine 10mg IV every 6 hours on a "when necessary" basis.Children: 0.2mg/kg body weight IV every 6 hours

For sugery and obstetric conditions

Pethidine 100mg IM/ IV every 6 hours when necessary

CAUTION!! Opioids may cause respiratory depression; therefore use opioids carefully. In case of toxicity, reverse with the narcotic antagonist **naloxone.**
Naloxone 0.1-0.2mg IV intermittently, max. dose 10mg

Do not administer morphine in:

- advanced liver disease
- severe head injury
- asthma, advanced chronic obstructive bronchitis, emphysema or otherrespiratory disease with imminent respiratory failure

Use morphine with extreme care if there is:

- Recent or concurrent alcohol intake or other CNS depressants
- Hypovolaemia or shock and inn the elderly

Referral
Refer to Regional and Tertiary care for:

- All children with moderate and acute severe pain
- No response to oral pain control and unable to initiate opioids therapy
- Uncertain diagnosis
- Management of serious underlying condition

1.2.2 Chronic (Non Cancer Pain)

Chronic pain is a pain that persist for more than 4 weeks chronic pain can arise from:

- Tissue damage (nociceptive pain), e.g. arthritis, fibromyalgias, lower back pain, pleurisy etc
- Injuryto nerves (neuropathic pain) e.g. post herpetic neuralgia (pain following shingles),
- trigeminal neuralgia,
- diabetic neuropathy,
- HIV related peripheral neuropathy;
- Drug induced peripheral neuropathy or phantom limb.
- Abnormal nerve activity following disease

Psychological evaluation and behaviorally based treatmentparadigms are frequently helpful, particularly in the setting of a multidisciplinary pain-management center.

Pharmacological Treatment
Mild Pain
Adult: **Paracetamol** 1000 mg, 6 hourly until pain subsides
Moderate pain (Including neuropathy)
Adults: If still no relief to simple analgesics as above, add
Tramadol oral, 50 mg 4–6 hourly as a starting dose, may be increased to a maximum of 400 mg daily
Adjuvant therapy to be given at higher level facilities

Adults: in addition to analgesia as above, add antidepressants;
Amitriptyline 25 mg at night; Maximum dose: 75mg.
Anticonvulsants and Antiarrhythmic may also be helpful in neuropathic pain. Give **Phenytoin or carbamazepine**.

Referral
•Pain requiring strong opioids
•Pain requiring definitive treatment for the underlying disease
•All children

1.2.3 Chronic Cancer Pain

The long-term use of opioids is accepted for patients with pain due to malignant disease.
Some degree of tolerance and physical dependence are likely with long-term use. Therefore, before embarking on opioid therapy, other options should be explored, and the limitations and risks of opioids should be explained to the patient.

Note
Opioid analgesics are useful in managing severe and acute or chronic pain. They are often underused, resulting in needless pain and suffering, because clinicians often underestimate the required dosage, overestimate the duration of action and risks of adverse effects and have unreasonable concerns about addiction.

1.3 Cough

Clinical features: Cough is a symptom produced by inflammatory viscid secretions or obstruction of the tracheobronchial system.
It may be dry or productive withsputum. Cough may be paroxysmal, hacking, explosive, and harsh (brassy).

Pharmacological Treatment
Causative/precipitating factors e.g. asthma; allergies must be established and treated accordingly.Where causative/precipitating factors cannot be detected, the following treatments may be offered:

For Non-productive irritating cough
Cough syrup 5-10 ml every 6 hours
Expectorants may be used to liquefy viscid secretions.
Cough expectorants 5-10 ml every 6 hours

Note: Antibiotics should never be used routinely in the treatment of cough

1.4 Convulsion

A convulsion is an episode of neurologic dysfunction caused by abnormal neuronal activity that results in sudden change in behavior, sensory perception, or motor activity. For a patient with new onset convulsion, the list of possible causes is longer and consists of the following:

- CNS pathologies (stroke, neoplasm, trauma, hypoxia, vascular abnormality)
- Metabolic abnormalities (hypoglycemia /hyperglycemia, hyponatremia/hypernatremia, hyercalcemia, hepatic encephalopathy
- Toxicological etiologies (alcohol withdrawal, cocaine, isoniazid, theophylline)
- Infectious etiologies (meningitis,encephalitis,brain abcess,neurocycticercosis and malaria)

Approach to a patient:

- Ask for history of epilepsy, if yes; compliance to anticonvulsant.
- History of CNS pathology (stroke, neoplasm, recent surgery).
- History of systemic neoplasms, infections, metabollic disorders, or toxic ingestions
- Recent trauma or fall
- Alcohol abuse

Special concerns:

- Eclampsia
- Trauma
- Intracranial hemorrhage
- Alcohol or medication withdrawal (barbiturate, diazepam)
- Drug induced seizures (trycyclic antidepressant and isoniazid overdose)

Investigations

- Clinical information should guide the specific workup of a patient. Some investigations must be ordered:
- Serum glucose level
- Serum electrolyte
- Pregnancy test for women of child bearing age.
- CT scan is indicated as outpatient/inpatient depending on progress of patient after episode of seizure.

For a patient who had previously history of seizure do CT scan of brain if;

- New focal deficits
- Trauma
- Persistent fever
- New character or pattern to the seizure

ECG should be considered in some patients.
Seizure event can be precipitated by cerebral hypo perfusion due to arrhythmia, ECG may identify the following:

- Prolonged QTc
- Widened QRS,
- Prominent R in aVR
- Heart block

Consider Lumbar Puncture in:

- Immuno-compromised
- Persistent fever
- Severe headache
- persistently altered mental status

General Management and Pharmacological Treatment

Neurological dysfunction is theorized to occur after 20minutes of continuous seizure, so aggressive treatment of any seizure should be done in 5 minutes. Always consider the underlying cause until proved otherwise.

- A, B, C (airway, breathing, circulation)
- **Diazepam** 10-20mg IV at a rate of 0.5ml (2.5mg) per 30 sec. Repeat if necessary after 30-60min. May be followed by intravenous infusion to max. 3mg/kg over 24 hours, per rectum 500mcgrms/kg up to max of 30g) **OR**
- **Phenobarbitone** 20mg/kg 8 hourly. Max. Dose 1.5g **OR Phenytoin** 18mg/kg IV stat then 100mg 8 hourly O/IV

1.5 Shock

Shock is a life threatening condition characterized by hypotension. If not treated immediately it leads to death.

Diagnosis

- Low blood pressure (systolic BP below 80 mmHg) is the key sign of shock
- Low urine output

- Weak and rapid pulse
- Rapid and shallow breathe
- Restlessness and altered mental state
- Weakness

Note
Signs and symptoms of shock in children must be recognized while still in the compensated state to avoid irreversible deterioration. Therefore, the following are primarily assessed in children:

- Prolonged capillary filling (more than 3 seconds)
- Decreased pulse volume (weak thread pulse)
- Increased heart rate (>160/minute in infants, > 120 in children)
- Decreased level of consciousness (poor eye contact)
- Rapid breathing
- Decreased blood pressure and decreased urine output are late signs and while they can be monitored the above signs are more sensitive in detecting shock before it becomes irreversible.

Types of Shock

Type of Shock	Explanation	Additional symptoms
Hypovolemic	Most common type of shock Primary cause is loss of fluid from circulation due to haemorrhage, burns, diarrhoea etc.	Weak thread pulse, cold and clammy skin.
Cardiogenic shock	Caused by the failure of heart to pump effectively e.g. in myocardial infraction, cardiac failure etc.	Distended Neck veins, weak or absent pulses
Septic shock	Caused by an overwhelming infection, leading to vasodilatation.	Elevated body temperature
Neurogenic shock	Caused by trauma to the spinal cord, resulting in sudden decrease in peripheral vascular resistance and hypotension.	Warm and dry skin
Anaphylactic shock	Caused by severe allergic reaction to an allergen, or drug.	Bronchospasm , angioedema and/or urticaria

I. Emergency Treatment

Treatment depends on the type of shock. Intravenous fluid therapy is important in the treatment of all types of shock except for cardiogenic shock. Prompt diagnosis of underlying cause is essential to ensure optimal treatment.

- Maintain open airway
- Administer oxygen with face mask and if needed after intubation with assisted ventilation
- Check for and manage hypoglycemia

II. Fluid replacement (Not for Cardiogenic shock)

Adults:

- **0.9% Sodium chloride** given as the 1L bolus infusion. Repeat bolus until blood pressure is improved.
- Transfuse blood and plasma expanders (-) in hemorrhagic shock.

Children:

0.9% Sodium chloride 20 mol/kg as a slow infusion.

Note:

- Do not administer IV fluids in case of Cardiogenic shock but maintain IV access
- If patient develops respiratory distress, discontinue fluids
- Septicemia in children:
  All children with shock which is not obviously due to trauma or simple watery diarrhea should receive antibiotic cover for probable septicemia.

Ampicillin 20mg/kg/dose 6 hourly for 7-10 days **OR Ceftriaxone,** IM, 50–80 mg/kg/dose immediately as a single dose.

! CAUTION!
•Do not administer fluids containing calcium, e.g. Ringer-lactate, within 48 hours of administering ceftriaxone
•Contra-indicated in neonatal jaundice
•Annotate dose and route of administration on referral letter.

1.6 Dehydration

Dehydration is defined as the excessive loss of body fluid. There are three types of dehydration:

- Hypotonic or hyponatremic (primarily a loss of electrolytes, sodium in particular),
- Hypertonicor hypernatremic (primarily a loss of water), and,
- Isotonic or isonatremic (equal loss of water and electrolytes).

a). Hypovolemic
Hypovolemic is specifically a decrease in volume of blood plasma. It defines water deficiency only in terms of volume rather than specifically water.
Signs and symptoms - Symptoms may include headaches similar to what is experienced during a hangover, a sudden episode of visual snow, and dizziness or fainting when standing up due to orthostatic hypotension.

Untreated dehydration generally results in delirium, unconsciousness, swelling of the tongue and, in extreme cases, death.
Thirst, dryness of mucous membrane, loss of skin turgor, orthostatic hypotension or tachycardia, reduced jugular venous pressure (JVP) or central venous pressure (CVP) and decreased urine output. In the presence of normal renal function dehydration is associated usually with a urine output of less than 0.5ml kg/hr.

Differential diagnosis
In humans, dehydration can be caused by a wide range of diseases and states that impair water homeostasis in the body. These include:

a) **External or stress-related causes**

- Prolonged physical activity with sweating without consuming adequate water, especially in a hot and/or dry environment
- Prolonged exposure to dry air, e.g., in high-flying airplanes (5%–12% relative humidity)
- Blood loss or hypotension due to physical trauma
- Diarrhea •Hyperthermia • Vomiting
- Shock (hypovolemic)•Burns •Lacrimation
- Use of methamphetamine, amphetamine, caffeine and other stimulants
- Excessive consumption of alcoholic beverage

b) Infectious diseases

Cholera, Gastroenteritis, Shigellosis, Yellow fever

c) Malnutrition

- Electrolyte disturbance
- Hypernatremia (also caused by dehydration)
- Hyponatremia, especially from restricted salt diets
- Fasting
- Recent rapid weight loss may reflect progressive depletion of fluid volume (the loss of 1L of fluid results in a weight loss of 1 kg (2.2lb)).
- Patient refusal of nutrition and hydration
- Inability to swallow (obstruction of the esophagus)

d) Other causes of obligate water loss

Severe hyperglycemia, especially in diabetes mellitus Glycosuria, Uremia, Diabetes insipidus, acute emergency dehydration event, food borne illness

Investigations include:

- Blood chemistries (to check electrolytes, especially sodium, potassium, and bicarbonate levels);
- blood urea nitrogen (BUN);
- Creatinine; complete blood count (CBC;
- Urine specific gravity.
- Other tests may be done to determine the cause of the dehydration (for example, blood sugar level to check for diabetes).

Pharmacological Treatment

- For some dehydration oral fluid is the most effective to replenish fluid deficit.
- In more severe cases, correction of fluid deficit is best by intravenous therapy. Solutions used for intravenous rehydration must be isotonic or hypotonic.
- For severe cases of dehydration where fainting, unconsciousness, or other severely inhibiting symptom is present (the patient is incapable of standing or thinking clearly), emergency attention is required. Fluids containing a proper balance of replacement electrolytes are given intravenously with continuing assessment of electrolyte status.

1.7 Hypoglycemia

Hypoglycemia is a condition of lower than normal level of blood glucose.
Criteria referred to as **Whipple's triad** are used to determine a diagnosis of hypoglycemia:

1. Symptoms known to be caused by hypoglycemia
2. Low glucose at the time the symptoms occur
3. Reversal or improvement of symptoms or problems when the glucose is restored to normal

Symptoms of hypoglycemia usually do not occur until the blood ugar is in the level of 2.8 to 3.0 mmol/L (50 to 54 mg/dl). The precise level of glucose considered low enough to define hypoglycemia is dependent on

- The measurement method,
- The age of the person,
- Presence or absence of effects, and,
- The purpose of the definition.

Signs and symptoms

Hypoglycemic symptoms and manifestations can be divided into those produced by the counter regulatory hormones (epinephrine/adrenaline and glucagon) triggered by thefalling glucose, and the neuroglycopenic effects produced by the reduced brain sugar.

Adrenergic manifestations

- Shakiness, anxiety, nervousness
- Palpitations, tachycardia
- Sweating,
- Pallor, coldness, clamminess
- Dilated pupils (mydriasis)
- Feeling of numbness "pins and needles" (paresthesia)

Glucagon manifestations

- Hunger, borborygmus
- Headache
- Nausea, vomiting, abdominal discomfort

Neuroglycopenic manifestations

- Abnormal mentation, impaired judgment
- Personality change, emotional liability
- Fatigue, weakness, apathy, lethargy, daydreaming, sleep
- Confusion, amnesia, dizziness, delirium
- Stupor, coma, abnormal breathing
- Generalized or focal seizures

Causes

The circumstances of hypoglycemia provide most of the clues to diagnosis.
Circumstances include the age of the patient, time of day, time since last meal, previous episodes, nutritional status, physical and mental development, drugs or toxins (especially insulin or other diabetes drugs), diseases of other organ systems, family history, and response to treatment.

When hypoglycemia occurs repeatedly, a record or "diary" of the spells over several months, noting the circumstances of each spell (time of day, relation to last meal, nature of last meal, response to carbohydrate, and so forth) may be useful in recognizing the nature and cause of the hypoglycemia.
Glucose requirements above10 mg/kg/minute in infants, or 6 mg/kg/minute in children and adults are strong evidence for **hyperinsulinism**. In this context this is referred to as the glucose infusion rate (GIR).

Finally, the blood glucose response to glucagon given when the glucose is low can also help distinguish among various types of hypoglycemia. A rise of blood glucose by more than 30 mg/dl (1.70mmol/l) suggests insulin excess as the probable cause of the hypoglycemia.

For patients who have recurrent hypoglycemia the following tests might be needed depending on the history and physical examination: insulin, cortisol, and electrolytes,

Treatment

Management of hypoglycemia involves immediately raising the blood sugar to normal, determining the cause, and taking measures to hopefully prevent future episodes.

The blood glucose can be raised to normal within minutes by taking 10-20 grams of carbohydrate. It can be taken as food or drink if the person is conscious and able to swallow.

This amount of carbohydrate is contained in about 100-120 ml of orange juice or non-diet soda.

Starch is quickly digested to glucose, but adding fat or protein retards digestion. Symptoms should begin to improve within 5 minutes, though full recovery may take 10–20 minutes. Overfeeding does not speed recovery and if the person has diabetes will simply produce hyperglycemia afterwards.

If unconscious or for other reasons can not feed orally secure an IV line and give intravenous dextrose, concentrations varying depending on age (infants are given 2 ml/kg dextrose 10%, children are given dextrose 25%, and adults are given dextrose 50%).

Care must be taken in giving these solutions because they can be very necrotic if the IV is infiltrated.If an IV cannot be established, the patient can be given1 to 2 milligrams of glucagon in an intramuscular injection.

(For other details, refer to Hypoglycemia, under Endocrine and Metabolic Disease Conditions)

2. COMMON TRAUMAS AND EMERGENCIES

2.1 Trauma

2.1.1 General Management of Trauma

Major trauma is associated with fractures, multiple lacerations and other major injuries. Major trauma may occur as a result of motor vehicle accidents or fights. The aim in handling major trauma is to look for life threatening complications which if missed may endanger the patient's life.

ABCDE Trauma Protocol

Protocol	Assess	Intervention
A (airway)	Is it patent? Any secretions? Tongue fall? Any mouth/nose bleeding? Did patient drowned? Vomited? Aspirated?	Position him/her in semiquater prone. Place an oral airway. Raise the chin of mandible Suctioning if required Endotracheal intubation – ETT

B (breathing)	Record the respiratory rate (normal 10-20/min adults; 30-60/min children) Assess for chest asymmetry, abnormal movements or chest in-drawing Locate the trachea centrality Ensure air entry into both lungs by auscultation	Assist breathing by mouth to mouth, ambu bag or nasal prongs If fails do ETT and mechanical ventilation Place the chest tube in case of hemothorax, pneumothorax or tension types Plaster the open chest wound
C (circulation	Assess arterial pulse, BP and heart sounds for signs of shock	Treat shock accordingly Set an I.V. line with isotonic fluids
D (Disability)	Assess level of consciousness using GCS scale	Treat the head injury accordingly
E (exposure)	Un-dress the patient to observe for signs of soft tissue injuries. Blunt injuries to the chest, abdomen or the dorsal spine may indicate the life threatening ailment underneath	Catheterize NGT insertion Treat accordingly. Surgery may be indicated based on specialist requirement

Diagnosis

- There is usually a history of trauma or accident
- If the patient is conscious he/she may complain of pain at specific places on his/her body
- Some patients may present with confusion, some semi-conscious and others may be in coma and/or shock

General Treatment

If patient reports at primary healthcare facilities

Follow the ABCDE Trauma Protocol

- Clear airway
- Minimize bleeding and dress wounds
- If there are open wounds clean and dress and give

Ampicillin 500 mg IV 6 hourly **OR**

Chloramphenicol 500 mg IV 6 hourly

- Assess cardiac function – (arterial pulse, BP, capillary refill)
- Catheterize bladder in unconscious patient.
- Set up IV line normal saline or Ringer's lactate
- Do not feed patient
- Administer analgesics for pain control
  Diclofenac 75mg inj 8 hourly
- Splint long bone fractures
- If unconscious put in coma position and protect the spine.

Refer to higher level

At hospitals

Manage as above

Search systematically according to **ABCDE Trauma Protocol** for any signs of major injury such as:-

- Head injury
- Eye injury
- Dental trauma
- Fractured spine
- Chest injuries
- Internal Abdominal/Pelvic injuries

Manage accordingly. **Emergency/Casualty room set up is mandatory**.

Refer if specialist intervention is required

2.1.2 Abdominal Injuries

Traumatic injuries to the abdomen are common. The abdominal cavity contains many important organs, vessels and membranes. Acute abdominal injuries may be life threatening.

Causes

- Motor vehicle accidents
- Blows to abdomen (fighting, punching, kicking)
- Swab wounds

Investigations

- Full blood count, urea and electrolytes
- Sonar
- Abdominal x-ray

Symptoms and signs

- General vital signs can indicate shock (BP can e low, tachycardia, tachypnea)
- Acute abdomen:
  - Marked tenderness (localized or all over)
  - Rigidity or guarding (stiffness) or abdominal muscles
  - Bowel sounds are not heard
  - Rebound tenderness (sudden stabbing pain with deep palpation and sudden letting go)

Investigations

Management at primary health care facilities

General management of abdominal injuries:\take clear history

- Examine the vital signs; pulse, BP, breathe rate, confused or comatose state
- Examine the abdomen thoroughly
- Check for other injuries
- Test urine for blood

1. Management of patients in shock or seriously injured:

- Use ABCDE emergency resuscitation if necessary
- Give nothing orally
- Start an IV line with 5% dextrose or rehydration fluid
- Do not give a laxative
- Monitor patient carefully for changes in vital signs
- If the patient has an open trauma, cover and keep bowel inside abdomen

- If the patient has an abdominal obstruction (evidenced by excessive vomiting or abdominal distension), insert NGT
- Refer to higher level urgently!

2. If the patient has no signs of acute abdomen or shock:

- Check vital signs
- Observe for 4-6 hours
- Give simple analgesics (paracetamol)
- Instruct the patient to return to the health facility if:
    - Patient complains of weakness
    - Patient has blood in urine
    - Abdominal pain worsens
    - Patient notices abdominal distension
- Give only fluids for 24 hours, no solids
- If the patient is pregnant woman, check fetal heart and urine and refer to a specialist!

Management at higher level hospital

- Find the exact injury by special investigations
- Do a laparotomy for local inspection injury and treatment

2.1.3 Acute Bleeding (Hemorrhage) and Wound Care

A wound is a break in the skin from an injury that may be either superficial or deep and may be associated with

broken bones. It may be clean or contaminated by dirt or foreign bodies that can cause infection.

Causes

Trauma to the skin during motor vehicle accidents, occupational accidents, fights or stab wounds

Investigations

- Hb if patient has bled
- Group and cross-match blood if indicated
- X-ray of injured part may be required
- Wound swab for culture and sensitivity if wound is infected

If possible, find out the cause of the wound. It has important implications for the treatment. Fresh (less than 6 hours) wounds can be cleaned and sutured. Any skin damage overlying a fracture makes it an open fracture. Penetrating wounds should not be sutured but must be explored to assess deeper tissue damage

Management

1. Stop the bleeding
    a. Apply manual pressure or a temporary pressure bandage over wound
    b. Raise (elevate) the injured part
2. Inspect the wound. Look for tissue, vascular, nerve, bone and other local damage
3. Anesthetize the wound for inspection and suturing. Use **lignocaine 2%** for small appendages (eg., fingers, toes); **lignocaine plus epinephrine 2%** for other body parts

4. Prevent infection of the wound
5. Remove all dirt and foreign bodies from the wound
6. Thoroughly clean the wound with water, soap and diluted anticeptic such as chlorohexidine and iodine
7. Ligate or clamp arteries or veins with mosquito forceps
8. Suture larger, deeper wounds with a plaster strip to bring the edges of wound closer together. Superficial or shallow wounds usually do not require sutures. Suturing also a useful method to control bleeding in a wound.
   - Use catgut or chrome sutures
   - Remove chrome sutures after 5-7 days.

Note: Bites or gunshot wounds should be sutured only in cases of severe bleeding

9. Promote healing
   - Use clean dressings and change them frequently
   - Leave small wounds open
   - Elevate wound
   - Gunshot wounds, bites, and wounds that are more than 8 hours old should not be sutured, but rather cleaned or dressed

Pharmacological Treatment

Adults and children: fresh wounds can be cleaned with

- **Chlorhexidine topical solution** 0.5% ***or***
- **Iodine topical solution**2.5%

For anaesthesia, use

- **Lidocaine hydrochloride** injection 1% for local infiltration or as a peripheral nerve block.Maximum for adults 25 ml; maximum for children 0.4 ml/kg.

NB.If lidocaine 1% + epinephrine (adrenaline) 1:200,000 injection is used instead, the corresponding maximum doses are: adults 40 ml, children 0.7 ml/kg.

If the wound is grossly contaminated, give:

- **Tetanus antitoxin** 10,000 (children 5,000)
- **Tetanus toxoid vaccine.**
- **Benzylpenicillin** 1 million IU (children 25,000 units/kg) IM, as a single dose, ***followed by:***
- **Amoxicillin 500mg** (children 15 mg/kg) orally, every 8 hours for 7 days.

For patients with known penicillin hypersensitivity, give **Erythromycin** 250 mg orally, (children 10 mg/kg) every 6 hours for 5 days.

2.1.4 Chest Injuries

Trauma to the chest is a major problem in the emergency department of hospitals. Injury to the chest may affect the bony chest cage, pleurae and lungs, diaphragm, or mediastinal contents.

Classification

- *Blunt, non-penetrating injuries*- These injuries result in damage to the structure within the chest cavity without communicating with the outside of the chest wall. They ar caused primarily by impact with a motor vehicle steering wheel.

- *Penetrating injuries*- penetrating injuries disrupt chest wall integrity and result in alteration in the pressure inside the thoracic cavity. Such injuries usually result from stab or gunshot wounds.

Differential diagnosis

- Rib fracture (flail chest)
- Tension pneumothorax, pneumothorax
- Diaphragmatic rupture
- Heart injury, pericardial tamponade
- Aorta and esophagus rupture
- Vascular injury

2.1.5 Rib Fractures

Causes:

Most commonly blunt chest injury

Symptoms and signs:

- Pain in the site of injury, increasing on inspiration or coughing
- Localized tenderness and crepitus on palpation
- Shallow breathing plus impaired movement
- Anter-posterior compression of the chest produces pain
- Ribs 3-10 are most commonly fractured
- Pneumo-hemothorax

Management

Examine carefully

Look for symptoms and signs of pnemothorax

Provide pain relief with mild analgesic or NSAIDs (paracetamo)l, diclofenac IM or ibupruphen)

Do not strap the chest

Health Education

- Inform the patient that pain will last for a long time
- Advise the patient not to participate in sport until better
- Urge the patient to try to reduce irritants I lung and decrease coughing (eg., stop smoking0
- Suggest he or she do light work only.

2.1.6 Flail Chest

When multiple ribs or the sternum are fractured in more than one place, a portion of the chest wall becomes separated from the chest cage resulting in a flail chest.

Symptoms and signs

- Severe chest pain over the injured area
- Paradoxical (irregular) chest movement
- Severe dyspnea
- Tachypnea with shallow breathing
- Use of abdominal and other accessory muscles to breathe
- Decreased or absent breath sound on auscultation over the injured area
- Increased anxiety

Management

- Treatment depends on the state of patient. Follow these procedures:
- Refer and admit to hospital
- If a patient has no respiratory problems, intubate or ventilate as needed
- Watch out for tension pneumothorax

2.1.7 Pneumothorax

Pneumothorax may be classified as follows:

1. *Tension pneumothorax* occurs when air leaks into the pleural cavity and cannot escape during expiration. The accumulating air builds up positive pressure in the pleural cavity resulting in:

- Lung collapses on the affected side
- Mediastinal shift towards the affected side (i.e.,the heart is shifted to the opposite side of the injury
- Compression of mediastinal contents (i.e., the heart and great vessels are compressed resulting in acute shock and cardio-respiratory arrest)
- Surgical emphysema as diagnosed on anter-posterior (AP) and lateral CXR

2. Pneumothorax means air in the pleural cavity between the lung and the chest wall. It occurs as a result of either penetrating or non-penetrating injuries and can also occur spontaneously (eg., from the rupturing of emphysematous bullae)

3. *Hemothorax* means blood in the pleural cavity, following blunt chest trauma as well as from a penetrating injury. Source of the bleeding may be the chest wall, the lung tissue, or other vascular structures within the chest (e.g, the great blood vessels)
4. *Pneumo-hemothorax* means that both free air and blood accumulate in the pleural cavity.

Symptoms and signs for pneumo-hemothorax

- Tachycardia
- Low BP
- Fast, shallow breathing (rib retraction)
- Respiratory distress
- Recession of rib spaces (rib retraction)
- Use of accessory muscle of respiration
- Less movement on wounded side
- Labored breathing
- Bubbly crackly feeling skin
- A shift in trachea and heart apex
- On percussion: pneumothorax- resonant or hollow; hemothorax-dull
- Auscultation : decreased or no breath sounds
- Always check for abdominal injury
- Always check the heart and blood vessel injury. (acute shock=tachycardia, hypertension, profuse sweating, extremely anxious, pallor, acute distress, cardiac arrest.

Management

At primary healthcare facilities

- Dress the wound but do not suture
- Start an IV solution (Ringer's lactate solution)
- Look for bleeding. A quantity of blood loss. 50ml pe hour indicates the need for surgical intervention.
- Look for respiratory arrest or shock
- Resuscitate if necessary (i.e., use ABC)
- For tension pneumothorax, if no doctor is available to insert an intercostals drain, a health worker should drain chest in the following way:
  - Briskly and carefully insert a large needle through the chest into the pleural cavity.
  - Insert the IV needle in the second in and third rib space in the mid-clavicular line just above the upper border of the third rib, which covers the neuro-vascular bundle.
  - Connect the needle to an IV line ending in a bottle filled with anticeptic fluid or sterile water.
  - Leave the needle in until proper inter-costal drain has been inserted
  - Prevent air from entering pleural cavity by placing the end of the IV line in fluid.
- ***Refer to higher level for x-ray and further management!***

In higher level facility (fully equipped and staffed hospital)

- Perform x-ray examination
- Insert chest drain and underwater drain: right side (fifth intercostals space); lef side (sixth inter-costal space)
  - Use local anesthetic
  - Make an incision
  - Insert drain
  - Surgically fix drain to skin
  - Check drain regularly
- Assess speed of bleeding to rule out indications for urgent thoracotomy.
- Take chest x-ray to check correct positioning of drain.
- Check level of Hb, respiratory rate, and saturation

2.1.8 Disaster Management for Multiple Casualties

1. Sorting and Triage

When an accident or incident involves a number of injured people, triage must be performed. Assess the injuries using the following criteria.

Priority I – Life-threatening Injuries

- Severe head (intracranial bleeding) and neck injuries
- Severe facial injuries
- Uncontrollable hemorrhage
- Blunt abdominal trauma with hypotension
- Unstable chest injuries

Priority II- serious but not life-threatening

- Temporary loss of consciousness without excessive hemorrhage
- Multiple rib fractures without respiratory distress
- Blunt abdominal trauma without hypotension
- Severe soft tissue injury

Priority III-not serious but needing hospital assessment

- No hypovolemia
- No hypotension
- No head injury
- No abdominal injuries
- No respiratory distress

Priority IV- Does not need hospital treatment

Priority V- unsalvageable patient or patient who has died

Note*: All patients with serious multiple (I. II. III) Should be referred to hospital emergency department*

For Pre-hospital Assessment and Patient Evaluation: follow the latest national guidelines

2.1.9 Head Injuries

It is any episode of trauma to head. Possibility of mortality is increased if hypotension or airway/breathing problem is not adequately solved.

Diagnosis

- Head injury may be associated with ophthalmic, ENT and dental injuries which are discussed separately in the related chapters.

- It is classified into two:
- Involving scalp only;
- Traumatic brain injury
-

Illustration of Traumatic Brain Injuries

Mild Traumatic Brain injury	Glasgow coma scale 13-14 -Involves a "brief" period of loss of consciousness -Good progress with minimal or no long term sequel
Moderate Traumatic Brain Injury	- Glasgow coma scale 9-12 -Confused patient with focal neurological deficits but able to follow simple commands -Some mild long-term sequel -Good prognosis
Severe Traumatic Brain injury	Glasgow coma scale <8 (This is the definition of coma) -Unable to follow commands initially - Significant long-term disability

Treatment

If patient reports at primary level healthcare facility

- Clean and dress any wound
- Put in coma position
- Prevent spinal injury by stabilizing the neck with collar
- Take full history from patient, relatives or whoever has brought patient where indicated
- If unconscious, ensure airway is patent

- Keep patient warm
- Ensure adequate oxygenation
- Clean and suture wound as appropriate
- Record and monitor vital signs including pupil size and symmetry
- Inset IV line Normal saline or Ringer's lactate
- Treat seizures by giving Phenytoin (IM) 100mg 8 hourly
- Catheterize

Refer immediately if moderate or severe TBI, pupil asymmetry or cannot perform brain CT scan

Hospital Level Interventions

- Take history as above
- Examine patient thoroughly, note the level of consciousness, pupils' asymmetry and any lateralizing signs
- Brain CT scan if GCS score is 9 or below
- Admit to ICU if GCS score is 8 and below, or refer if required
- Craniotomy is indicated for specialist cases e.g. intracranial hematomas, depressed skull fractures based on pupil asymmetry, lateralizing signs and brain CT scan
- Refer or Consult the specialist if indicated especially moderate and severe traumatic brain injuryRefer if pupil asymmetry is noted

Use GLASGOW Coma Scale (GCS)

Score	Motor Response	Score	Verbal	Score	Eye
6	Observe verbal command	5	Oriented and converses	4	Eye open spontaneo usly command
5	Localizes painful stimuli	4	Disoriented and converses	3	Eye open to verbal command
4	Flexes limb to painful stimulus	3	Inappropriate words	3	Eye open to pain
3	Abnormal flexion painful stimulus	2	Inappropriate sound	2	Eye open to pain
2	Extension to painful stimuli	1	No response		
1	No response				

Severe Traumatic Brain Injury

It is the most disabling condition that is associated with great mortality if not treated optimally. It is invariably followed by permanent disabilities. Multidisciplinary approach is of paramount importance. Long-term admission is advised.

Treatment

- ICU admission
- Craniotomy if indicated based on brain CT scan findings
- Rehabilitation upon discharge from hospital

2.1.10 Soft tissue injuries

Diagnosis

- Pain only, traumatic swelling, bruises with intact skin, cuts, abrasions, puncture wounds or open wounds of varying size and severity
  - ✓ Injury to internal organs must be recognized and referred, including subtle signs of organ damage, e.g.:
  - ✓ blood in the urine – kidney or bladder damage
  - ✓ shock – internal bleeding
- blood or serous drainage from the ear or nose – skull base fracture

An injury causing a sprain or strain may be initially overlooked. Exclude fractures by performing appropriate X-rays

Note

- Referral must not be delayed by waiting for a diagnosis if treatment is logistically impossible
- Closed injuries and fractures of long bones may be serious and damage blood vessels
- Contamination with dirt and soil complicates the outcome of treatment

I. Emergency management

• Immobilize injured limb by POP cast or splint

• Monitor vital signs

• Monitor the arterial pulse and capillary refill below an injury on the limb with swelling.

II. Wound care

• Clean the wound

• Suture or splint when needed

• Avoid primary suture if:

- the wound is infected:
- Dirty or contaminated
- Crushed
- In need of debridement
- Projectile inflicted
- Caused by bites

III. Pharmacological Treatment

- **Paracetamol**15 mg/kg (O) 4–6 hourly when required. Maximum of 4 doses per 24 hours
- **Plus**
- **Cloxacillin** 500mg 6 hourly for 7 days
- **Plus**
- **Tetanus prophylaxis**: 0.5 mL Tetanus toxoid and 1 mL Tetanus immunoglobulin (Depending on the immunization protocol)

Protocol in Provision of Tetanus Prophylaxis Patient

Category	Non-tetanus prone	Tetanus prone
Immunized and booster within 5 years	nil	nil
Immunized and 5 to 10 years since booster	nil	TT
Immunized and >10 years	TT	TT
Incomplete immunization or unknown	TT and TIG	TT and TIG

2.1.11 Dislocations and Sprains

Dislocations are joints that have been displaced

- Pain, especially on movement from their anatomical position by force. Sprains are episodes of high impact of strain on the ligaments around a joint. There is no fracture of underlying bone. Injury is to soft tissue, causing inflammation

Causes

- Sports injuries
- Play in children
- Falling or tripping (Slips and twists)
- Motor vehicle accidents
- Abnormal posture

- Overuse of muscles

Symptoms and signs

- Acute pain (severe, dull pain, not sharp as in fracture) around joint
- History of recent incident
- Tenderness on touch, swelling, redness
- Limited movement
- History of trauma
- Movement of sprained joint still possible but painful
- Movemen of dislocated joint not possible
- Strange angulations of limb or joint

Note: In children always bear non-accidental injuries (assault) in mind.

Emergency treatment

- Realign dislocated joint immediately
- Immobilize with firm bandage and/or temporary splinting e.g. triangular sling, back slab etc
- Usually no POP necessary
- Perform X-ray to rule out dislocations or subluxations

Pharmacological Treatment

Pain relief: children over 12 years and adults:
Ibuprofen 200–400mg, 8 hourly with or after a meal
OR/Plus
Paracetamol, oral, 15 mg/kg 4–6 hourly when required. Maximum of 4 doses per 24 hours.

In children less than 6 months calculate dose by weight

Referral

- If severe progressive pain (Do X-ray to exclude bone fractures or joint dislocation).
- Progressive swelling
- Extensive bruising
- Deformity
- Joint tenderness on bone
- No response to treatment
- Severe limitation of movement

2.1.12 Fractures

Fractures (broken bones) are very common injuries. Fractures are not always obvious, and X-rays are often necessary to diagnose them. The two main types are simple and compound fractures. Fractures damage not only bones, but also surrounding blood vessels, nerves, tendons, and ligaments. Sometimes internal organs could be damaged.

Symptoms and signs

- History of recent trauma
- Painful sewlling
- Difficulties in moving
- Bone out of normal position
- Tenderness of bone on palpation
- An open wound

If the limb distal to fracture is cold, pale, and has no pulse, the injury is an emergency!

Investigations
X-ray of the deformed, suspected area

Management
1. Assess the injury
   - Examine the area of the suspected fracture for deformity movement, movement, and pain
   - Examine the blood supply distal to the possible fracture. Check the pulse, skin warmth and color
   - Examine the nerve supply to the distal limb. Check sensation and movement of distal limb
   - Examine the joint distal and proximal to the fracture for normal function and movement
   - Do a brief general examination (i.e., check for other injuries

Note: *if the limb distal to the suspected fracture is cold, pale, pulse less, painful and has no sensation, the limb needs urgent attention!*

2. Apply immediate first aid treatment
   - Resuscitate the patient as necessary
   - Clean any wound, and cover with sterile dressing
   - Stop bleeding by pressure
   - Immobilize the fracture using splint and bandage
   - If the fracture is severe or the patient is in shock, set-up IV line of normal saline or Ringer's solution
   - Give anti-pain medicines according to the severity of pain (parenteral NSAID or pethidine or morphine)
   - *Refer to higher level for further investigation and care (if the facility that received the case does*

not have the necessary skills and diagnostic facilities for proper management)

3. Immobilize in the best position
   - *Clavicle and shoulder:* an arm sling supporting the elbow
   - *Humerus:*a collar and a cuff
   - *Elbow:* immobilize with a POP back slab bend 90%. **Note***Always check pulse and sensation*
   - *Forearm:* immobilize with a POP back slab and a sling. Keep the hand elevated to help drain edema fluid
   - *Wrist and Hand:*ask the patient to hold a bandage or tennis ball in the palm of injured hand and apply a POP back slab under the wrist and hand
   - *Fingers:* immobilize by strapping fractured finger to the next finger.
   - *Pelvis and Femur:* immobilize whole body and transfer to hospital. Always give IV fluids.
   - *Knee and below:* immobilize by strapping injured leg to the other leg or use a a hard back slab splint. Apply POP.

Note: when blood supply and nerves to a distal limb are seriously damaged, sometimes gentle traction of the fracture can restore the blood supply to the distal limb.

4. Provide follow-up care
   - Check that plaster casts are not too tight, too loose, or worn out. Warning signs that POP cast is too tight, are swelling distally, numbness, pain, cold and bluish limb, loss of sensation.

Split open POP immediately , or refer to higher level (where there is a specialist for bones urgently.

- Advise on exercise to help strengthen the healing bone.

2.1.13 Spinal Cord Injuries

Fractures of the spinal column are serious and dangerous. Too much movement at the fractures site may cause injury to the spinal cord and result in permanent paralysis of the limbs.

Causes

- Motor vehicle accidents (eg. Motor car or motor cycle accident)
- Fall from a height
- All cases of near drowning, especially swimming in swimming pools, farm dams, or rivers,
- Stab wounds near the spine
- Gunshot injuries
- Sports injuries (foot ball and other contact sport)

Symptoms and Signs

- Pain over the spine
- Paresis or paralysis of the limb
- Low BP with normal or low pulse
- Autonomic dysfunctions (e.g, urinary retention or bowel incontinence)

Investigations

If available at the visited facility, X-ray of the neck and spine. These x-rays must always be taken in suspected cases.

Management

Take the necessary precautions if spinal injury is suspected-

1. Do not flex or bend the spine
2. Try not to move the position of the patient's back, neck and head
3. Place a rigid cervical collar around the neck or stabilize neck with blocks
4. Move the patient carefully onto a firm base; move and turn the patient aAs a single unit
5. Keep the head supported while moving the patient onto the base
6. Unless the patient is critically ill, take time and care in transporting.

For Emergency management of the severely injured follow the following procedures:

1. First attend to any life-threatening conditions such as an active hemorrhage or obstructed airway
2. Stabilize the patient's spine to prevent any further injury to the spinal cord
3. Evaluate respiratory function (e.g, rate, depth, pattern of breathing) **Note**: respiratory depression may occur in high cervical lesions as a result of injury,
4. Monitor the pulse, BP and respiratory rate

5. Give IV fluids (eg, Ringr's lactate or normal saline)
6. Give nothing orally,
7. Pass an NGT and leave to drain,
8. Insert an indwelling urinary catheter if control over bladder function is lost,
9. Administer analgesia

a. Give diclofenac 50 mg IV every 6 hours or as needed; for more severe pain give pethidine or morphine low dose

b. Do not give high dose of of opiates because the may depress respiratory function or anti-inflammatory medicines because they make cause gastri ulceration

10. Pay attention to pressure points
11. Give omeperazole or ranitidine, Note: this step is important
12. **Refer to higher level immediately**

<u>At higher level hospital (tertiary)</u>

CT-scan in patients who have injuries or who are unable to cooperate

Give steroids in consultation with a specialist, methyl prednsolone and not any other steroid within 3 hours of the injury. Dose 30mg/kg over one hour followed by 5.4 mg/kg per for 23 hours.

Transfer to a unit for specialist care.

2.1.14 Neck Injuries

Spinal injuries are seen more commonly in the cervical region than in the thoracic and lumbar regions.
Cervical injuries are usually more serious associated with more serious spinal injuries and hold greater risk of permanent disability.

Causes

- Motor vehicle accidents, such as whiplash injuries
- Sports injuries

Soft Tissue Injuries

The first type of neck injury to look for is a soft tissue injury.

Symptoms and signs

- History of trauma
- Stiff painful neck
- No neurological deficit
- Local pressure tenderness
- Sometimes severe limitation on ovement of neck

Management

Note: Regard all neck injuries as potential unstable and refer patient for medical management and x-rays of the neck after emergency management (see discussion of spinal injuries above)
Apply a rigid neck collar
Give anti-pain (paracetamol) or if no spinal injury is suspected give ibuprophen or diclofenac
Refer to a higher level for neck exray and further management.

2.1.15 Cervical Fractures

Cervical fractures may or may not be associated with spinal cord injuries. Spinal cord injuries could be:

- *Incomplete*; the patient has sparing of motor or sensory function (i.e., an area of sensation or a flicker of voluntary movement below the lesion)
- *Complete*; identified by poor prognostic sign (see below) in the absence of spinal shock.

Symptoms and signs

- Severe neck pain or severe pain in a specific area of the back
- Feeling of pins-and–needles or parastheses in the limbs:
  - In the hands and arms, the sensation indicates a cervical vertebrae (neck) lesion
  - In the lower limbs, it indicates a thoracic or lumbar vertebrae lesion
- Unexplained shock (i.e., bradycardia, hypotension, cold feet)
- Tenderness and pain or redness or injuries over fractured vertebrae
- Loss of sensation in the limbs below the fracture
- Paralysis of the limbs below the fracture
- Unexplained respiratory difficulty or marked diaphragmatic breathing
- Little or no control over micturition (i.e., urinary incontinence or retention and loss of bowel control)
- Priapism in males (i.e., inappropriate penile erection)

Management
In primary healthcare facilities (see: procedure for spinal cord injury above)

- Examine entire spine carefully. Note: if the patient has pain or decreased movement, suspect neck injury.
- Do not bend or flex spine
- Apply rigid neck collar
- Give pain relief (e.g paracetamol)

Refer to hospital urgently where the patient can be examined by a specialist!

- Transport carefully on firm base

Treatment

- Immobilize the neck by collar or pillows/sand bags
- Patient should lie flat in bed, preferably flat bed and air mattress
- Treat shock as per the guideline
- Catheterize if urine retention
- Immediate transfer to specialist care

2.2 Emergencies

2.2.1 Acute Abdomen

Acute Abdomen is a clinical term used to describe a syndrome whose major syndrome is severe acute abdominal pain.it is a serious condition and immediate management must be instituted before referral to the next level.

Causes

- Inflammatory
  - Acute peritonitis
  - Acute appendicitis
  - Acute pancreatitis
  - Pelvic inflammatory disease (PID)
- Bowel obstruction-any blockage of the bowel that prevents food and water from passing
  - Strangulated hernia
  - Volvulus adhesions
- Perforations
  - Acute perforation of hollow organs (e.g., stomach, duodenum, intestines, genitor-urinary dysplasia (GUD)
  - Blunt penetrating abdominal trauma
  - Typhoid perforations
- Colic
  - Acute cholocystitis, choloangitis, ot gallstones
  - Kidney stones
- Hemorrhagic
  - Ruptured ectopic pregnancy
  - Ruptured spleen
  - Twisted ovarian cyst
- Other causes that can mimic acute abdomen
  - Myocardial infarction
  - Diabetic ketoacidosis

- Pneumonia
- Inflammatory bowel syndrome (IBS)
- Gastro-enteritis
- Sickle cell crisis

Symptoms and signs

- Pain (colicky or continuous, increasing in severity, sudden or gradual onset)
- Signs of shock (cold, clammy, tachycardia, hypotension)
- Fever (in acute inflammatory conditions)
- Anorexia, nausea, vomiting, dyspepsia
- Signs of dehydration, such as abdominal distension

Investigations

- Pregnancy test should be done for al females in the reproductive age group
- FBC and differential WCC (appendicitis, inflammation, infection)
- Glucose, U+E
- Serum amaylase (pancreatitis)
- Erect CXR (to find air under diaphragm , pneumonia)
- AXR (to find distended loops in bowel obstruction)
- Ultrasound

2.2.2 Acute Peritonitis

Peritonitis is either localized due to an inflamed organ or diffused (general) usually de to rapture of an organ with internal spilling of bowel contents and acute inflammation.

Symptoms and signs

- Severe tenderness (localized or all over)
- Rigidity or guarding (stiffness) of abdominal muscles
- Bowel sounds soft or very loud (tinkling)
- Rebound tenderness (sudden stabbing pain wit deep palpation and sudden letting go)
- Abdominal distension

Management

The first priority is to start treatment (with available skill, supples and facilities) and not just to refer immediately.

Follow this procedure:

1. Establish an IV access with a wide bore IV cannula (16 G or 18 G)
2. Start an IV infusion with normal saline or any other IV fluid available (Ringer's solutions), maximum flow 1 liter every one to two hours (if the patient is in shock) until the blood pressure returns to normal, or every 4-6 hours if BP is normal.

3. Give nothing by mouth until the patient has been examined by a team that will decide on final treatment.
4. Pass an NGT with drainage bag if vomiting or abdominal distension is severe.
5. Ask patient to lie on her or his side. Place the patient in a comfortable position.
6. Give oxygen if the patient is in shock or tired.
7. Elevate legs if the BP is low.
8. If fever is present, initiate a broad –spectrum antibiotic treatment (gentamicine 5mg/kg IV dally) plus metronidazol 500mg IV every 8 hours (if these drugs are not available in the health facility refer) Alert the patient or relative that there may be a need to give consent for surgery.

9. Refer to the next level

2.2.3 Bowel Obstruction

A bowel obstruction is the interruption of the flow of matter through the lumen of the bowel.

Causes

- *Mechanical:* tumors, masses, or volvulus, adhesions, hernias
- Functional: ileus, pseudo-obstruction after surgery

Symptoms and signs

- Abdominal cramps
- Vomiting
- Altered bowel habits
- Abdominal distension
- Tympanic sound with percussion
- Bowel sounds, are initially increased then decrease gradually. Rectal examination usually shows an empty rectum
- Dehydration can be present

Management

- For mechanical obstruction, refer to surgery
- For functional obstruction, treat underlying cause

2.2.4 Acute appendicitis

Acute appendicitis is acute inflammation of the appendix. Initially the inflammation is localized in the appendix. But the appendix may perforate leading to peritonitis.

Symptoms and signs

Abdominal pain is initially around the umbilicus, which later shifts to the right lower quadrant of the abdomen. Pain worsens with coughing, jumping or walking.

- Nausea and vomiting
- No or low-grade fever
- Abdomen is tender
- Positive rebound tenderness can be present.

Investigations FBC and white cell differential count (WCC)
CRP

Management

1. Inform next level before referral for laparotomy and further investigations
2. Follow the procedure outlined for acute abdomen above.

Note: poor outcome from acute abdomen management may occur in the following situations:

- Old patients and children under 5 years of age
- Delayed presentation to health facilities
- Delayed diagnosis (eg,. Patient first treated for intestinal worms for some days before diagnosis of perforated appendicitis is made)
- Delayed initial and specific treatment in heath facilities
- Inadequate postoperative care, often in inappropriate environments
- Poor communication amongst health teams, between health facilities and with in health facilities.

2.2.5 Foreign Bodies

Foreign bodies may be introduced into any of the body orifices nose, ears, vagina and urethra. Foreign bodies introduced through the mouth (or nose) may be arrested in the larynx, bronchial tree, esophagus or stomach.

Diagnosis

It depends on the affected site. The symptoms may be due to obstruction or inflammation around the foreign body.
Foreign bodies into the ears, nose, urethra, vagina, larynx and bronchial tree invariably should be removed. Foreign bodies in the stomach rarely produce symptoms and active treatment is usually not required.

2.3 Burns

Burns may be:

- *first degree* (only reddening of the skin),
- *second degree* (if there are blisters), or,
- *Third degree* (if the skin is destroyed, exposing the underlying tissues).

Important complications are:

- Shock due to a combination of loss of body fluid, severe pain and fever. Rehydration and pain and fever management are crucial.
- Infection: large areas of damaged skin leave underlying tissue open to infections, including tetanus. Keeping the burned area clean is essential.
- Contractures can develop from shrinking scar tissue. Early referral is an important preventive measure.

Burns are by nature (initially) sterile. The aim of the treatment is to speed healing while minimising the risk of infection. All cases of burns with chemical substances have to be irrigated with a lot of clean water for 10 minutes before any wound treatment. Comfort and

reassurance is an important component of management of the patient with burns.

Management of burns

Before anything else, cool the burned area with cold water. While the area is cooling, determine the degree of the burn according to the area affected. Use the following table to calculate the Body Surface Area (**BSA**) affected:

Determining degree of the burn according to area affected

Body surface (BSA)	Age less than 2 (%)	Age 2 or over (%)
Entire head	18	9
Upper limb (each)	9	9
Trunk (each side)	18	18
Lower limb (each)	18	18
Perineum	1	1

General rules for referral:

First degree burns do not need to be referred

Second degree burns sometimes need to be referred

Third degree burns always need to be referred

- Patients with burns of more than 9% of BSA should be referred to hospital, to be given IV fluid therapy and special burn wound dressing.
- Deep burns of the face, neck or hands and burns into underlying tissues (eg muscles, fat, tendons, nerves etc) should also be referred for further assessment.

First degree burns

- Cool with water to prevent further tissue damage and to relieve pain. Continue cooling for at least 15 minutes
- For pain give:

Acetylsalicylic acid 500 mg orally, every 6 hours as required, preferably after food (not for children); max 4 g per day OR.

Paracetamol: Adults: 500 mg – 1 g orally, every six hours

Children up to 3 years: 125 mg (5 ml syrup) orally, every 6 hours) or 100 mg orally in tablet form every 6 hours.

Children over 3 years: 250 mg orally, every 6 hours. Do not exceed 4 doses in 24 hours

Second degree burns without blisters

- Put burned body part in cold water immediately, and leave it for at least 15 minutes.

For pain give:

- **Ibuprofen,** adults: 400-600 mg every 6-8 hours after food **OR**
- **Indomethacin** 25-50 mg orally, every 6-8 hours, with plenty of water. Children: **paracetamol** 10 mg/kg every 6 hours as needed.

Second degree burns with blisters:

- Put burned body part in cold water immediately, and leave it for at least 15 minutes.
- Do not open the blisters as they protect against infection, unless they are over a joint or are very

extensive, because they may mask underlying tissue damage in which case referral is necessary.

- If blisters are broken, gently cleanse the lesion with **normal saline solution**
- Dress the burn wound with **silver sulfadiazine** 1% cream and cover with sterile, non-stick dressing
- Change the dressing after 2-3 days, and as necessary thereafter.

NB. **Silver sulfadiazine** may NOT be used in term-pregnant women, and infants younger than 1 month. Instead, give:

procainebenzylpenicillin 3M IU IM once each dayfor 5 days; **(**children**:** 50 mg/kg**)**

For pain give: as in first degree.

Third degree (deep) burns

Management (in hospital only**!):**

- Give intravenous fluid according to a calculation of fluid replacement. A general formula that may be used for the first 24 hours is:
- **Ringer's lactate solution**: 1-1.5 ml/kg/percent BSA burned. Give ½ of the total in the first 8 hours, ¼ in the second 8 hours, and ¼ in the third 8 hours of each day.
- In addition, give the patient ORS and let him/her drink freely.

The object of fluid therapy is to maintain a normal state of hydration as reflected by urine output (0.5-1 ml/kg/hr), vital signs and mental status.

Gently cleanse the lesion with normal saline solution.

Dress the burn with **silver sulfadiazine** 1% cream, or alternatively, with **povidoneiodine topical solution** 0.5%. Change the dressing after 2-3 days, and as necessary.

NB. Silver sulfadiazine may NOT be used in term-pregnant women, and infants younger than 1 month.

For management of pain, give

Mild to moderate pain:

As in first and second degree but add if necessary:

Pethidine 0.5-2 mg/kg IM, repeated every 4 hours as required.

Moderate to severe pain:

Pethidine 25-100 mg SC or IM, repeated every 4 hours as required. Children: 0.5-2 mg/kg IM, every 4 hours.

OR,

M**orphine** 10 mg, SC or IM, every 4 hours, as required. Children, SC or IM, repeated every 4 hours, as required:

- up to 1 month: 150 micrograms/kg;
- 1-12 months: 200 micrograms/kg;
- 1-5 years: 2.5-5 mg;
- 6-12 years: 5-10 mg.

By slow IV infusion (2 mg/minute): ¼ to ½ of the corresponding IM dose.

Give also:

Aluminium hydroxide and magnesium hydroxide mixture 500 mg orally every 6 hours

Tetanus toxoid vaccine, if indicated

Tetanus antitoxin 10,000 IU (children 5,000 IU)

If the patient becomes ill after the burn infection, carry out culture and sensitivity testing on the exudates

and treat with systemic antibiotic(s) according to sensitivity findings.
Patients with severe burns need increased nutrition. All patients who can consume and tolerate food orally should be given a high calorie and high protein diet. In addition, give **vitamin B complex** tabs, 4 tablets every 8 hours.

2.4 Bites and Stings

Bites and stings are often painful. Multiple stings as wel as stings in the mouth or throat are dangerous because they can cause airway obstruction.

Urgently refer

Patients with signs of serious bites or stings for medical management e.g., those presenting with severe abdomin alpain, muscle cramps, shock, or acute allergic reactions

Animal and Human Bites

Always avoid suturing any kind of bite wound!

Animals that bite man include both wild and domesticated ones. Dogs are the main domesticated animals that bite humans. Hyena and wild pig are examples of the wild animals. Clinical features of these bites arise from the pathology inflicted by teeth and horns.

They produce lacerations, penetrating and crushing injuries. The combination of local wound treatment, passive immunization with human rabies immunoglobulin (HRIG), and vaccination is

recommended for all bites associated with severe exposures to rabies.

Thorough and prompt local treatment of all bite wounds and scratches that may be contaminated with rabies virus is very important as elimination of the rabies virus at the site of infection by chemical and physical means is the most effective method of protection.

Avoid contact with the patient's saliva, which is potentially infective.

Adults and Children flush and cleanse (scrub) the wound with

C**hlorhexidine topical solution 0.5 % OR**

Iodine topical solution 2.5%

Soap or **detergent*plus***

Flucloxacillin, oral, 500 mg 6 hourly for 7 days

Give **tetanus vaccine**, if indicated

Give **tetanus antitoxin,** 10,000 units IM (children 5,000 IU)

Replace any blood lost

If possible, capture and observe the animal for 5 days. If it is still alive at the end of this period, it could not have been rabid.

For further information refer to the viral infection section of the chapter on infections diseases

2.4.1 Bee and Wasp Stings

Majority of bee and wasp stings only produce a painful local reaction. They may occasionally cause allergic reactions which may lead to anaphylaxis with local pain, generalized urticaria, hypotension, and difficulty in breathing as a result of bronchospasm and oedema of the glottis. Death may occur.

SYMPTOMS

· Painful local reactions

SIGNS

· Swelling at site, urticuria, hypotension, difficulty in breathing and bronchospasm

Treatment objectives

To relieve pain and manage anaphylaxis if necessary

Non-pharmacological treatment

· Put ice compresses on the area. Detain for observation

· Give the patient plenty of fluids to drink

· In the case of bee sting remove stinger from skin by scraping. Do not pull it out.

Pharmacological treatment

· Adrenaline, SC, (1:1000) 0.5-1 ml stat

· Promethazine, IM, Adults 50 mg stat (Children 12.5-25 mg stat)

· Hydrocortisone, IV, 100-200 mg repeated 6 hours later if necessary

-IV fluids for shock

· Paracetamol, oral, for pain Adults 500 mg-1 g(children 15mg/ kg) 6 - 8 hourly

REFER

Refer patients with anaphylaxis who are not responding to treatment

2.4.2 Scorpion Stings

Scorpion stings leave a single mark, and the stings are extremely painful.

Symptoms

Pain and Swelling

Signs

Vomiting, Abdominal pain, Excessive salivation, Sweating, Rapid respiration and Single-puncture wound

Treatment objectives

· To relieve pain, to maintain hydration and to reassure patient

Non-pharmacological treatment

-Cleanse the area with soap and water to remove contaminated particlesleft behind by some insects

· Put ice compresses on the area. Detain for observation.

· Give the patient plenty of fluids to drink

Pharmacological treatment

· Paracetamol, Aspirin , Ibuprofen or Diclofenac, oral

· 1% Lidocaine (Lignocaine) 2-5 ml for local infiltration to relieve pain

-Treat itching at the site of the bite with antihistamine

-where there is an anaphylactic reaction treat according to guideline.

2.4.3 Snake Bites

Most snake bites are non- poisonous. Vipers are the commonest causeof poisonous snake bites in tropical Africa. Others are the cobras and watersnakes. All cases of snake bites (venomous/non-venomous) should

beobserved for at least 6 hours. Identify the type of snake if possible. Don't relytoo much on fang marks; however multiple fang marks usually indicate anon-poisonous bite whereas one or two fang marks suggest a poisonousbite. It is important to determine whether envenomation has occurred.

Start by looking for fang marks. If fang marks are definitely absent, no further action is necessary, other than comforting and re-assuring the patient.

If fang marks are present, if it is uncertain, follow the management guidelines below.

- Do not wash the wound
- Do not incise
- Do not use a tourniquet

Patients must be re-assured and kept perfectly still. Envenomation is rare, but may be manifested by some systemic poisoning. Venom mainly diffuses via the lymphatics; not via blood vessels.

Diagnosis of snake poisoning (envenoming)

• General signs include shock, vomiting and headache. Examine bite for local necrosis, bleeding or tender local lymph node enlargement.

• Specific signs depend on the venom and its effects. These include:

- Shock
- Local swelling that may gradually extend up the bitten limb
- Bleeding: external from gums, wounds or sores; internal especially intracranial

- Signs of neurotoxicity: respiratory arrest or paralysis, ptosis, bulbar palsy (difficulty swallowing and talking), limb weakness
- Signs of muscle breakdown: muscle pains and black urine

• Check haemoglobin (where possible, blood clotting should be assessed).

To determine if swelling is increasing, measure the circumference of the limb periodically at a point marked with ink.
If venom has been spat into the eyes, wash them with a lot of clean water.

Bites on Limbs

The aim is to delay movement of venom from the bite site while transporting the victim quickly to hospital.

1. Keep the patient perfectly still and reassure him/her.
2. Immediately apply a firm pressure bandage or clothing strips to the site of the bite, with the bitten part held *lower* than the rest of the body. Use the same pressure that would be used for a sprain. Do not stop the circulation.
3. Apply a second broad bandage to the entire limb. It is better to apply the bandage over trousers or clothes than to move the limb to remove them.
4. Ensure the limb is kept still by applying a splint and instructing the patient to keep the whole body perfectly still.

5. If possible, bring expert help and antivenom to the patient as quickly as possible. Otherwise keep the patient as still as possible and transport him/her promptly to a center where antivenom is available.
6. Do not give food or alcoholic drinks. Only small amounts of clear fluid should be given.
7. If the snake has been killed, take it to the referral center with the patient but do not waste time looking for the snake or trying to kill it. Prompt application of the pressure bandage is vital.

Where the trunk or head rather than a limb is bitten, firm pressure must be applied without restricting breathing in the case of the chest.
Maintain vital function if threatened and be prepared to maintain the patient's airway, breathing and circulation (the ABCs of first aid).

Managing of snake bite after refferal
If a snake has bitten, be prepared to treat for anaphylactic shock and give analgesics if required for pain.

- **Paracetamol,** adults: 500 mg – 1 g orally, every six hours
  Children up to 3 years: 125 mg (5 ml syrup) orally, every 6 hours) or 100 mg orally in tablet form every 6 hours
  Children over 3 years: 250 mg orally, every 6 hours

- **Pethidine** 25-50 mg SC or IM (children: 0.5-2 mg/kg IM) may be required if pain is severe, repeated after 4 hours if necessary.

Special points:

- Splints and bandages should be removed shortly after the patient is admitted to hospital.
- If the patient's condition deteriorates when the bandages are removed, because of the venom movement, they may be temporarily reapplied while antivenom is given.
- Bandage effectiveness is reduced if it is uncomfortably tight.
- It is vital that the snakebite victim be kept as still as possible.

In case of envenomation, **snake antivenom serum** can effectively reverse systemic poisoning, even if given hours after the bite. However, snake antivenom sera may be unavailable in all facilities, costly, problematic to store, difficult to use, sometimes dangerous and of arguable efficacy. They may also cause anaphylaxis! Therefore, they should only be used for patients with true signs of envenomation.

Administration of snake antivenom serum:

Ensure that the solution is clear. Check that the patient has no history of allergy. Keep a syringe with a 0.5 ml **epinephrine** injection 1/1,000 ready for SC use, in case of allergy. Give **Snake anti-venomserum**diluted in 300 ml of normal saline, 100 ml as an IV infusion, (children 0.4 ml/kg).

The infusion should be given slowly for the first 15 minutes (most reactions will occur within this period). Thereafter the rate can be gradually increased until the whole infusion is completed within 1 hour.

NB. NEVER give snake antivenom serum by any other route than IV.
If there is no clinical improvement by the end of the infusion, the same dose should be repeated.
If there is a reaction to the antivenom, give **epinephrine 1/1,000**, 0.5 ml SC. Cautiously restart the infusion, repeating the adrenaline injection if necessary.

3. CARDIOVASCULAR DISEASES

3.1 Hypertension

DESCRIPTION

A condition characterised by an elevated BP when either

i) The initial ***SBP is ≥ 140mmHg*** or

ii) The ***DBP is ≥ 90mmHg*** measured on three separate occasions, a minimum of 2 days apart and/or taken over period of two months a minimum of 3 blood pressure readings must be taken at the first visit to confirm hypertension.

Ensure that the ***correct cuff size*** is used in obese patients.

- If SBP is ≥ 160mmHg or DBP ≥100mmHg Stage II of JNC –VII – especially when SBP > 180 mmHg and/or DBP >110 mmHg Immediate drug treatment is needed - See Hypertensive crisis - Urgency/Emergencies section
- Consider Secondary hypertension with identifiable cause in young patients < 30 years or elderly patient > 60 years presenting for first time with hypertension.

Table showing level of hypertensionin adults:

Level of hypertension	Systolic mmHg	Diastolic mmHg
Mild	**140 – 159**	**90 - 99**
Moderate	**160- 179**	**100 – 109**
Severe	**> 180**	**>110**
Malignant hypertension	**> 180**	> 130, and exudates, haemorrhage or papilledema

Important notes:

1. Hypertension often has no symptoms: the aim of treatment is to lower the risk of end-organ damage, especially stroke.
2. Drug treatment for SBP >140 mmHg; DBP > 90 mmHg.
3. The aim of treatment is to bring the diastolic BP to around 90 mm Hg without unacceptable side effects.
4. Rapid blood pressure reduction may precipitate stroke or blindness and is only indicated in those patients with hypertensive emergencies.
5. Antihypertensive treatment is required for life in truly hypertensive patients.
6. Ensuring compliance, Patient education and addressing side-effects of drugs are essential.
7. Extra care should be taken with antihypertensive drugs administered to those over 60 years of age, because of increased side-effects.
8. An alternative contraceptive method should be recommended to hypertensive women using an oral contraceptive containing oestrogens.
9. Evidence of end organ damage, i.e. cardiomegaly, proteinuria or uraemia, retinopathy or evidence of stroke, dictates immediate referral for appropriate treatment.

10. Patients should be reviewed every 3 months, and referred if DBP remains above 90 mm Hg or if other signs (shortness of breath, oedema) are present.
11. Co-existent risk factors should be detected and treated.
12. Assess cardiovascular risk.
13. Lifestyle modification and patient education are essential in all patients.

Note: Patients should be evaluated for Risk Stratification - Major Risk Factors, Target Organ Damage and Associated Clinical Cardiovascular Condition and Co-morbidity

CAUSES

• **Primary hypertension**- In the majority of patients no specific underlying cause is identified. Risk factors associated with this type of hypertension include increasing age, family history, excess body weight, excessive alcohol intake.

• **Secondary hypertension** - In about 10% of cases, hypertension may be due to a kidney disease, endocrine disorder, renal artery stenosis or coarctation of the aorta.

General Management

Treatment Objective*:*

- Achieve and maintain the target BP**:**
  - In most cases the target BP should be: systolic below 140 mmHg and diastolic below 90 mmHg.

- Achieve target BP in special cases as:
  - In diabetic patients and patients with cardiac or renal impairment, target BP should be below 130/80 mmHg;
- Prevent and treat associated cardiovascular risks such asdyslipidemia and lifestyle modification

Non – pharmacological therapy

Education about general measures necessary for hypertension control should include on

Lifestyle modification:

- Weight Reduction; (BMI 18.5 – 24.9kg/m²)
  - •Adopt DASH*eating plan; Consume a diet rich in fibre - fruits, vegetable, unrefinedcarbohydrate and low fat dairy products with reduced content of saturated and total fat
- Reduce dietary sodium intake.
- Physical Activity; Engage in regular activity such as a brisk walking at least 30min/day most days a week (150 minuits/week)
- Stop using all tobacco products
- Moderation of alcohol consumption.
- Ensure regular fruit and vegetable intake
- Avoid excess stress

***DASH – Dietary Appropriate to Stop Hypertension**

Treatment choices without compelling indications

Pharmacological Treatment

First line treatment with out compelling indications

Low Dose Thiazide diuretics + Potassium sparing e.g. Hydrochlorothiazide 12.5 -25mg/d + Spironolactone 25mg

Second line treatment with compelling indications:

Compelling indications	Drug class
Angina	Beta blocker (atenolol)**or**Long acting calcium channel blocker (nifedipine)
Prior or Post-myocardial infarct	• ß-blocker and ACE inhibitor
Heart failure For volume overload:	• ACE inhibitor and atenolol • Diuretics – Spironolactone - Furosemide
Left ventricular hypertrophy (confirmed by ECG)	ACE inhibitor or ARB
Stroke:secondary prevention	Hydrochlorothiazide and ACE inhibitor
Diabetes Mellitus	ACE inhibitor or ARB, usually in combination with diuretic
Chronic kidney disease	ACE inhibitor, usually in combination with diuretic
Isolated systolic hypertension	Hydrochlorothiazide or Long acting calcium channel blocker (nifedipine)
Pregnancy	Methyldopa or Hydralazine **(**Avoid ACEI/ARB tetratogenic)
Prostatism	alpha-blocker
Elderly	Calcium channel blockers, CCB

Mild hypertension

When there is no risk factor and there is poor response to Life style modification measures after 3 month, initiate medicine therapy.

Presence of risk factors

Medicine therapy as well as lifestyle modification should be imitated after confirmation of diagnosis step 2.

Moderate hypertension

Diagnosis must be within 2 weeks.
Initial treatment after confirmation of diagnosis (medicine and lifestyle modification) at step 2

Severe hypertension

Confirm diagnosis within 1 hour.
In patients who are not symptomatic, initiate treatment (medicine and lifestyle modification) at Step 3.
Patients with symptoms of progressive target organ damage or associated clinical conditions: see hypertensive urgency and emergency, below

Note; All patient with hypertensiveemergency should be treated in hospital.

Treatment goal is to lower DBP to 100mmg slowly over 48 -72 hour this can be achieved with two oral agents preferably (Step 3)

- Long acting Calcium Channel Blocker (nifedipine)
- ACE Inhibitor use in low dosage initially
- Beta Blocker (atenolol)

•**Diuretic** – Thiazide or Loop diuretics beneficial in renal insufficiency and pulmonary oedema (furosemide or hydrochlorothiazide) and
•**Ca channel blockers (**Amlodipine or nifedpine) should be used, if there is renal insufficiency or evidence of pulmonary congestion.

- •All patients with hypertensive urgency should be referred to a hospital.

3.1.1 Hypertensive emergency

A marked elevated blood pressure systolic BP ≥ 180mmHg and/or a diastolic BP ≥130mmHg associated with life threatening situations one or more of the following:

- Unstable angina/chest pain
- Neurological signs e.g.severe headache, visual disturbances, confusion, coma or seizures.
- Acute left ventricular failure with severe pulmonary oedema (extreme breathlessness atrest)
- Excessive circulating catecholamines: e.g. phaeochromocytoma – rare cause of emergency;
- food or drug interaction with monoamine oxidase inhibitors
- Acute aortic dissection
- Eclampsia and severe pre-eclampsia
- Renal failure

Treatment goal requires immediate lowering of BP usually with parental therapy preferably intravenous agents as infusion with ***strictly monitoring of***

haemodynamics in high care depended unit or intensive care unit in the hospital

Preferable intravenous drugs are

- Glyceryl trinitrate
- Hydralazine

CAUTION- A hypertensive emergency needs immediate referral to hospital.

Stepwise treatment without compelling indications

STEP 1

Entry to Step 1	Diastolic BP 90- 99 mmHg and/or systolic BP 140/159mmHg without any existing disease **AND** No major risk factors..
Treatment	Lifestyle modification.
Target	BP control within month to BP <140/90 mm Hg.

STEP 2

Entry to Step 2	Diastolic BP 90–99 mmHg and systolic BP 140–159 mmHg without any existing disease **AND** No major risk factors **AND** Failure of lifestylemodification alone to reduce BP after 3 months **OR** Mild hypertension with major risk factors or existing disease **OR** Moderate hypertension at diagnosis,
Treatment	Lifestyle modification AND Hydrochlorothiazide, oral, 12.5 mg daily. .
Target	BP control within 1 month to BP < 140/90 mmHg.

STEP 3

Entry to Step 3	Failure to achieve targets in Step 2 after 1 month despite adherence to therapy. **OR** Severe hypertension
Treatment	Lifestyle modification **AND** Hydrochlorothiazide, oral, 12.5 mg daily. **ADD** ACE-inhibitor, e.g.:Enalapril, 10 mg daily **OR** Long acting calciumchannel blocker, e.g.: amlodipine, oral 5 mgdaily.(or Nifedipine)
Target	BP control within 1 month to BP <140/90

STEP 4

Entry to Step 4	Failure of step 3 after 1month of adherence.
Treatment	Lifestyle modification **AND** Hydrochlorothiazide,oral, 12.5 mg daily **AND** ACE-inhibitor, e.g.:Enalapril, increase to 20 mg daily **AND** amlodipine, oral, 5 mg daily.
Target	BP control within month to BP <140/90 mm Hg, with no adversemedicine reactions.

STEP 5

Entry to Step 5	Failure of step 4 after 1month of adherence.
Treatment	Lifestyle modification **AND** Hydrochlorothiazide, oral, increase to 25 mg daily. Enalapril, increase to 20 mg daily **AND** amiodipine, oral 10 mg daily. AND, ADD Atenolol, oral 50 mg daily.

Target	BP control within month to BP <140/90 mm Hg, with no adversemedicine reactions.

If not controlled on step 5 – Refer

Compelling indications for specific medicines	Medicine/therapeutic class
Angina	Atenolol **OR**amilodipineLong acting calcium channel blocker
Prior myocardial infarction	atenolol**AND**Enalaprils
Heart failure	ACE- inhibitors **AND**Spironolactone For significant volume overload: Loop diuretics
Left ventricular hypertrophy(confirmed ECG)	ACE- inhibitors
Stroke: secondary prevention	Hydrochlorothiazide **AND**enalapril
Diabetes type 1 and 2 with or without-evidence-of micro albuminuria or proteinuria	Enalapril usually in combination with diureticsprovided that the patien is not in renal failure.
Chronic Kidney disease	enalapril usually in combination with diuretics
Isolated Systolic Hypertension	Hydrochlorothiazide OR amlodipine
Pregnancy	Methyldopa

Contraindications to individual medicines

Hydrochlorothiazide

- » gout
- » pregnancy
- » severe liver failure

» kidney failure

Beta-adrenergic blocking agent e.g. atenolol
Absolute:
» asthma
» chronic obstructive airways disease
Relative:
» heart failure
» diabetes mellitus
» peripheral vascular disease
» bradycardia: pulse rate < 50 beats/minute

ACE-inhibitors (enalapril)
» pregnancy
» bilateral renal artery stenosis or stenosis of an artery to a dominant/single kidney
» aortic valve stenosis
» history of angioedema
» hyperkalemia

Calcium channel blockers, long acting (amlodipine)
» heart failure

REFERRAL

- Young adults (< 30 years of age).
- BP not controlled by 4 medicines and where there is no doctor available.
- Pregnancy.
- Signs of target organ damage e.g. oedema, dyspnea, proteinuria, angina etc.

- If severe adverse drug reactions develop.
- Hypertensive urgency and hypertensive emergency.

3.1.2 Hypertension in Children

Hypertension is defined as systolic and/or diastolic blood pressure **> the 95th** percentile for gender, age and height on at least 3 consecutive occasionstaken in the right arm with an appropriate cuff size that **covers 2/3** of the length of the arm (between shoulder and elbow) and encircling the whole arm.

- The choice of **appropriate cuff size is important**.
- Too small a cuff for the arm leads to false high BP.
- The cuff bladder must encircle **at least 80%** of the upper arm and should cover at least **75%** of the distance between the *acromion and the olecranon*.

In general, a blood pressure of:

- Children aged 2-5 years >110/70 mmHg and
- Children aged 6-12 years >115/76 mmHg and in
- Adolescents more than 128/82 mmHg is considered abnormally elevated and would require **a referral to, and evaluation by a pediatrician.**

• Infants and preschool-aged children are almost never diagnosed with essential hypertension and are most likely to have secondary forms of hypertension.

- With age, the prevalence of essential hypertension increases, and after 10 years of age, it becomes the leading cause of elevated BP.
- Obesity currently is emerging as a common comorbidity of essential hypertension in pediatric patients, often manifesting during early childhood.

REFER
All cases with BP above the 95t^{h} percentile

3.2 Arrhythmias

Note: Indications and dosages are only cursory. Consult special literature. **Refer** patient to hospital.

- ✓ For slowing of arterial tachycardia (fibrillation and flutter), give **digoxin** 0.25 mg daily.
- ✓ For ventricular tachycardia and fibrillation during ischaemia and after a myocardial infarction, give **lidocaine**, 500 mg/5 ml/ampoule. Initially 50–100 mg, IV slowly (ECG monitored), then 1–4 mg/min, IV continuous treatment.

— plus —

- ✓ **Propranolol**, 1 mg/ml/ampoule. 10 mg slowly, IV
- ✓ For atrial, supra, and ventricular extrasystoles and tachyarrhythmias, give **procainamide**, 250 mg tab. 250–500 mg in 5–8 divided doses daily.

3.3 Ischaemic Heart Disease

Major risk factors for ischaemic cardio- and cerebrovascular disease:

- diabetes mellitus
- hypertension
- central obesity: waist circumference ≥ 94 cm (men) and ≥ 80 cm (women)
- smoking
- dyslipidaemia
- family history of early onset cardiovascular disease in male relatives < 55 years of age and in female relatives < 65 years of age
- age: men > 55 years of age, women > 65 years of age

GENERAL MEASURES

Lifestyle modification

All persons with risk factors for ischaemic heart disease should be encouraged to make the following lifestyle changes as appropriate:

- ✓ weight reduction and maintain ideal weight, i.e. BMI < 25 kg/m^2in the overweight patient
- ✓ Reduce alcohol intake.
- ✓ follow a prudent eating plan i.e. low fat, high fibre and unrefined carbohydrates, with adequate fresh fruit and vegetables
- ✓ regular moderate aerobic exercise, e.g. 30 minutes brisk walking 3–5 times/week (150 minutes/week)
- ✓ stop smoking

Pharmacological treatmentshould be considered in the following conditions**:**

- Established atherosclerotic disease:
- Ischaemic heart disease
- Peripheral vascular disease
- Atherothrombotic stroke

Refer patients for lipid lowering medicine therapy

3.4 Acute Coronary Syndromes (ACS)

ACS is divided into

1. ST ElevationMyocardial Infarction (STEMI)
2. Non-STElevation myocardial Infarction (Non-STEMI)
3. Unstable Angina (UA)

3.4.1 ST Elevation Myocardial Infarction (STEMI)

Classical MI present with triad of typical chest pain*, typical ST elevation on the ECG or new LBBB and elevated cardiac biomarkers (CPK-MB I&II and triponigs)
**exclude or consider othercause pericarditis, pulmonary embolus, fractured ribs, and Aortic dissection, oesophageal spasm*

Treatment
Non Pharmacological

- ✓ admit to ICU for monitoring ,
- ✓ bed rest in Fowler's
- ✓ Oxygen via canular or mask
- ✓ Establish IV line
- ✓ ECG monitor & rhythm strip
- ✓ Reassurance.

PharmacologicalTreatment
Adjunctive therapy
Control cardiac pain

- ✓ **Glyceryl trinitrate sub-lingual**/ spray 0.5mg

For persistent pain and if oral therapy is insufficient

- ✓ **Isosoribide dinitrate** 5mg po bid plus
- ✓ **Morphine, IV**, 1–2 mg/minute dilute 10 mg up to 10 mL with sodium chloride solution 0.9%. Total maximum dose10 mg, repeat after 4 hours if necessary. **Or** 3-5 mg im/iv PRN

But pain not responsive to this dose may suggest ongoing unresolved ischaemia; appropriate measure should be taken to reverse the ischaemia. Check drug interaction.

Anti-platelets therapy

- **Aspirin** 300mg stat (O) then followed by 100 mg daily
- **Heparin** 5,000 -12,500U sc/iv a day
- **Simvastatin** 40 mg daily

- **Heparin**5000=12,500 iu sc or iva day plus LMW heparin 5-20,000 sc/iv
- **ß –Blockers (atenolol)** –Early use within 6 hours results in reduction of infart size, decrease mortality, incidence of re-infarction and sudden death.

In case of LV dysfunction
In settings of normal systolic function

- **Atenolol** 12.5 – 50mg once a day,
- **Enalapril (or other ACEIs)** early use within 24 hours of index event is beneficial in decreasing mortality especially in large infarct and if there is cardiac failure or LV dysfunction,give:
- **Enalapril** 10mg bid **OR**
- **Captopril** 6.25 -12.5mg tid **plus**

Supportive treatment
PPI (omeprazole) and laxatives (biscodyl)

Referral
All patients with STEMI should be referred toa hospital where there is a cardiology specialist or experienced internist for further management.

3.4.2 Non-STEMI and Unstable Angina

Non-STEMI
Chest pain that is increasing in frequency and/or severity or occurring at rest.The chest pain is associated with elevated cardiac enzymes and ST segment depression or T wave inversion or normal ECG.

Unstable Angina (AU)

- It is angina that is increasing in frequency and or severity, or occurring at rest.
- It also encompasses post-infarct angina.
- The chest pain may be associated with ST segment depression or T wave inversion or normal ECG. There is no rise in cardiac enzymes.

General Measures See STEMI Section above

Pharmacological Treatment - Adjunctive therapy See STEMI Section above

Referral
All NSTEMI/UA patients should be referred to tertiary level where there is a specialized cardiology unit.

3.5 Post myocardial infarction

General Management

- Risk stratification and modification, including attention to smoking and lipid lowering strategies
- Appropriate risk reduction diet
- Rehabilitation programme.

PharmacologicalTreatment
Continue medical management.

- ✓ **Aspirin** 300mg (O) stat then followed by 100 mg daily
- ✓ **Atenolol** 12.5 – 50mg once a day **OR**
- ✓ **Enalapril** 10mg bid **OR**

Referral

- Myocardial infarction
- Ongoing chest pain or post-infarct angina
- Refractory ventricular tachyarrhythmias

3.6 Chronic Stable Angina Pectoris

Characteristic chest pain due to myocardial ischaemia usually occurring on exercise and relieved by rest but stable in nature

General Management

- Lifestyle modification.
- Intensive health education.
- Modify reversible risk factors – optimal control of glucose in diabetic patient, optimal control of blood pressure, stop smoking.

Pharmacological Treatment

- ✓ **Aspirin** oral, 75 -100 mg daily **plus**
- ✓ **Atenolol** 12.5 – 100mg once a day, **OR**
- ✓ **Amlodipine**5-10 mg twice daily **OR nifedipine** 20-40 mg daily

- ✓ **Isosorbide dinitrate**, oral, 20–40 mg, twice daily in the morning and 6 hours later for both drugs in order to provide nitrates free period to prevent tolerance**Or** 5-10mg twice daily.

REFER

- When diagnosis is in doubt
- High risk patients poorly controlled hypertension, diabetic patients to evaluate severity of inducible ischaemia
- Failed medical therapy

3.7 Atherosclerosis

Atherosclorosis is patchy intimal plaques (atheromas) in medium and large arteries.
Risk factors include:

- Dyslipidemias:
- Diabetes
- Cigarette smoking,
- Family history
- Sedentary life, obesity and hypertension..

Symptoms and Signs

- Initially assymptomatic often for decades,
- Symptoms start when lesions impede blood flow,
- Transient ischemic symptoms (e.g., stable exrcise angina), transient ischemic attacks, intermittent claudication)

History and palpation of pulses confirms diagnosis

Non-pharmacological therapy

- Treatment involves aggressive modification of risk factors to slow progression and induce regression of existing plaques.
- Smoking cessation is essential and is the single most important intervention to prevent progression
- Exercise within exercise tolerance and other lifestyle modifications.

Pharmacological Treatment

Aspirin 100 mg daily

REFER

- For further assessment and pharmacological treatment;
- Ongoing vascular insufficiency, which may be surgically reversible

3.8 Acute Pulmonary Embolism

- Clinical spectrum less than two weeks
- Sudden onset of dyspnoea often with unexplained anxiety (most common)
- Pleuritic chest pain and haemoptysis
- Massive embolism: pleuritic chest pain, cyanosis, right heart failure and shock. Minor emboli or pulmonary infarction may herald massive embolism and must be treated vigorously
- Source of embolus may be found – deep vein thrombus

Investigations

If diagnostic facilities are available, otherwise refer to higher level!

- **ECG**– Not reliable test for diagnosis may be normal.
- **Arterial blood gases**; not diagnostic, the pO2decreased <60mmHg due to ventilation/perfusion mismatch.
- PCO2 decreased due to hyperventilation,
- pH increased but may decrease in shocked patient
- **Chest X-ray –**Not very reliable usually normal, diaphgram may be raised on affected area, atelectasis may occur, peripheral wedge shaped shadow & plural effusion

Treatment

I. General

- Administer O_2 – maintain; pO_2> 60mmHg,
- Treat shock
- Correct electrolyte and acid base abnormalities and arrhythmias
- Ventilate if patient in respiratory failure

I. Anticoagulation

- Heparin 10,000units IV bolus, then maintenance infusion starts with 6,000U over 6hours to keep PTT or clotting time 2-3 times above baseline.
- PTT should be performed 12hourly according to lab instruction then tobe continued with oral anticoagulants (warfarine 5 mg po daily)

Referral
All cases suspected of pulmonary embolus should be referred to a specialized hospital care

3.9 Heart Block (Second or Third Degree)

- The majority of cases occurs in patients over 60 years and is idiopathic, with an excellent long- term prognosis, provided a permanent pacemaker is implanted.
- Acute, reversible AV block commonly complicates inferior myocardial infarction.
- The condition may also be induced by metabolic and electrolyte disturbances, as well as by certain medicines.

CAUTION!! HEART BLOCK IS A MEDICAL EMERGENCY. REFER URGENTLY!

- All cases with a heart rate below 40 beats/minute after resuscitation and stabilisation
- All cases of second or third degree AV block, whether or not myocardial infarct or other reversible cause is suspected, and whether or not the patient is thought to be symptomatic
- A permanent pacemaker is the definitive form of treatment.

Non Pharmacological Treatment

- Emergency cardio-pulmonary resuscitation.

- Insertion of external pacemaker,if available, must be preceded by appropriate analgesia.

Pharmacological Treatment
Analgesia, if with external pacemaker:
- **Morphine** 10–15 mg IM 3–6 hourly

AV nodal block with narrow QRS complex escape rhythm only:
- **Atropine**, I.V bolus, 0.6–1.2 mg,
  - May be repeated until a pacemaker is inserted
  - Use in a patient with inferior myocardial infarct and hypotension and second degree AVblock.
  - It is temporary treatment of complete AV block before referral (urgently) for pacemaker.

OR
For resuscitation of asystole:
- **Adrenalin**e 1:10 000, slow IV, 5 mL (0.5 mg)
  - Used as temporary treatment of complete heart block when other drugs are not effective

3.10 Sinus Bradycardia and Sinus Arrest

This rhythm does not require treatment, unless they are causing symptoms, i.e. syncope, dizziness, tiredness and poor effort tolerance.

Sinus bradycardia < 50/minute or sinus arrest with slow escape rhythm, accompanied by hypotension, strongly suggests a treatable underlying cause:

- Acute inferior myocardial infarct
- Hyperkalaemia, especially if wide QRS and/or peaked T waves
- Drugs, especially combination of verapamil and ß – blocker or digoxin
- Hypothermia
- Hypoxia

Treat the cause. Consider atropine if inferior infarct.

3.11 Sinus Arrest

Refer all to a cardiology specialists.

3.12 Cardiac Failure, Congestive (CCF),

- Cardiac Failure (CF) is aclinical syndrome and has several causes.
- The causes and immediate precipitating factor(s) must be identified and treated to prevent further damage to the heart.

Acute Heart Failure (AHF) or Decompansated Acute Heart Failure (DAHF)

AHF defined as rapid or gradual onset of signs and symptoms of heart failure that result on urgent unplanned hospitalization or Emergency Department visits. The Clinical Signs and symptoms are significantly life threatening.

If the above features occurs in patient diagnosed with structurally heart disease categerlize as:

Decompansated Acute Heart Failure (DAHF).

- This is a condition in which the heart is unable to maintain adequate cardiac output to meet the body's metabolic requirements.
- The cardiac dysfunction may predominantly involve the left ventricle or the right ventricle.
- More commonly, however, both left and right ventricular dysfunctions co-exist. This is termed congestive cardiac failure (CCF).
- The functional classification of heart failure using the NewYork Heart Association (NYHA) Classification is described in the table below.

New York Heart Association functional Classification for Heart Failure (NYHA)	
CLASS I	No limitation of physical activity. Ordinary physical activity does not cause undue fatigue, palpitation, or dyspnoea
CLASS II	Slight limitation of physical activity. Comfortable at rest, but ordinary physical activity results in fatigue, palpitation or dyspnoea
CLASS III	Marked limitation of physical activity. Comfortable at rest, but slight activity causes fatigue, palpitation or dyspnoea
CLASS IV	Unable to carry out any physical activity without discomfort. Symptoms of cardiac insufficiency are present at rest. If any physical activity is undertaken, discomfort is increased

The cause and immediate precipitating factor(s) of the AHF must be identified and treated to prevent further damage to the heart.

Causes

- Decompensation of pre-existing chronic Heart Failure eg Cardiomyopathy, Peripartum Cardiomyopathy
- Acute Valvular Regurgitation – AR, MR2º endocarditis, rupture of chordae tendinae
- Worsening pre-existing valvular disease– MS MR AR AS
- Severe Aortic Stenosis
- Hypertensive crisis
- Acute Severe Myocarditis
- Acute Coronary Syndrome - NSTEMI/STEMI, RV infarction
- Mechanical complication of ACS
- Acute arrhythmias – VT /VF AF/flutter or other SVTs
- Aortic Dissection - Acute/chronic
- Pericardial Effusion with Cardiac temponade

Precipitating factors

- Lack of Compliance with medical therapy
- Infections –Pneumonia, UTI, septicemias
- Anaemia
- Pulmonary Embolus
- Thyroid disease – hypothyroidism

- Volume overload - iatrogenic
- Arrhythmias – Rapid AF other SVTs
- Drug abuse/Alcohol – eg thiamine deficiency

Signs and symptoms include:

Dyspnoea (breathlessness)	Tachypnoea - breathing rate > 18 breaths/minute in men - breathing rate > 20 breaths/minute in women
Fatigue	
Ankle Swelling With Pitting Oedema	
Orthopnoea	inspiratory basal crackles or wheezing on auscultation of the lungs
Tachycardia	enlarged liver, often tender
	raised jugular venous pressure

In children:

- Failure to thrive
- Difficulty in feeding

Treatment Goals

- To improve clinical symptoms and outcome,
- Management strategy should be based on clinical, laboratory and haemodynamic findings.
- All patient with AHF should be cared and admitted high care dependent unit or Intensive Care Unit

General Measures

Monitor body weight to assess changes in fluid balance.

• Salt (sodium chloride) restriction to less than 2–3 g/day.

- Regular exercise within limits of symptoms.
- Reduce weight in overweight and obese individuals
- Avoid alcohol
- Encourage moderate exercise

Pharmacological Treatment

All patients need to be assessed by a doctor for initiation or change of treatment.

•Many of the medicines used can affect renal function and electrolytes.

•Monitor sodium, potassium and serum creatinine.

Initial therapy of mild heart failure **(NYHA CLASS I-II)**

- **Furosemide** (frusemide), oral, Adults, 40-80 mg daily

  Children, 1-2 mg/kg daily

  Adults, 2.5-20 mg daily

Initial therapy of moderate heart failure (**NYHA CLASS III)**

•**Furosemide** (frusemide), oral,

Adults, 80-120 mg daily

Children, 2-4 mg/kg daily

- Spironolactone, oral, **Adults,** 25-50 mg daily

CAUTION
Spironolactone can cause severe hyperkalaemia and should only be used when serum potassium can be monitored. Do not use together with potassium supplements.

In patients with fast atrial fibrillation

- **Digoxin,** oral,
    - Adults**,** 250 micrograms 12 hourly for 24-48 hours, Then, 250 micrograms once daily
    - Elderly**,** 125 micrograms 12 hourly for 24-48 hours, Then, 125 micrograms once daily
    - Children**,** 5 micrograms/kg 12 hourly

Note –

- Diuretics may cause hypokalaemia, therefore monitor serum electrolytes closely.
- Give Potassium chloride, oral, 600-1200 mg, 12 hourly, when necessary to avoid hypokalaemia.
- Do not give potassium sparing diuretics such as spironolactone and potassium chloride supplements together.
- Avoid potassium supplements in renal failure.

Initial therapy of severe heart failure (**NYHA CLASS IV**)

- Admit patient
- Prop patient up in bed
- Oxygen, by nasal cannula or face mask
- Insert an intravenous cannula
- Furosemid**e,** IV, 40-80 mg, repeat after 30 minutes if necessary; Thereafter
- Furosemide, IV, 40-80 mg 12 hourly; if patient improves, change to Furosemide, oral, 40-80 mg, 12 hourly after 24- 48 hours of IV treatment

If patient does not improve,

- Continue Furosemide, , IV,40-80 mg,12 hourly and give in addition Morphine, IV, 5-10 mg slowly, and,add spirinolacton if K level is normal
- Metoclopramide, IV,10 mg to prevent vomiting

If there is fast **atrial fibrillation:**

- **Digoxin**, oral, 250 micrograms 12 hourly for 24-48 hours, then, 250 micrograms once daily
- Monitor urine output
- Encourage early ambulation
- Consider **anticoagulation prophylaxis** against venous thrombosis,
- Identify and treat (if possible) precipitating causes such as hypertension, myocardial infarction, anaemia or thyrotoxicosis

REFER

- All patients including those requiring surgery, must be referred to a specialist when clinically stable for the identification and treatment of the underlying cause of the heart failure and for long-term maintenance therapy.
- All patients with AHF should be treated at tertiary level where,at least,echocardiographic assessment canbe performed.

- Do not use **Diuretics** in kidney failure (Do not use if eGFR < 30 mL/min).
- **Vasodilators** – Mainstay of treatment of AHF/DAHF

Monitor blood pressure keep *SBP >90-100mmHg (Mean BP* 60 -65mmHg)

- Isosorbide dinitrate, 10 - 20mg (oral) 12 hourly **OR**
- Hydralazine 25 mg 6-8 hourly; Maximum dose: 200 mg/day (not indicated with CHF)

CAUTION Patients with CCF on diuretics may become hypokalaemic. Digoxin therapy should not be initiated if the patient is hypokalaemic

Special consideration:

1. Add: Enalapril l0 -20mg three times a day
2. When patient is out of congestation state and renal function (Urea & Creatinine, K+) is normal: add:

- A Beta blocker –(atenolol 25-50 mg)

3. All admitted patients with AHFe should be given anticoagulation: Unfractinated Heparin 5,000u subcutenous twice a day.

Note that

- Patients admitted with beta blocker have lower rate of ventricular arrhythmias, a shorter length of stay in hospital, reduced 6-month mortality compared those not receiving beta blocker

- Those who were maintained on them has significant lower rate of rehospitalization and death within 6 month after discharge
- Patient should continue their beta blocker during admission of AHF unless significant hypotension or cardiogenic shock present

3.13 Pulmonary Oedema

Common cause of pulmonary oedema

- Cardiac/Fluid overload
- Cardiac Failure
- Fluid over-load (eg renal failure, iatrogenic)

Acute Pulmonary Oedema (due to Acute Heart Failure)

- Characterised by severe shortness of breath, respiratory distress including wheezing and coughing accompanied by a mild raise in ascultation.
- Patients will be restless and serious cases will also experience chest wall retraction, cyanosis and coughing frothy sputum which may be blood-stained.

All cases of acute pulmonary oedema should immediately be referred to a hospital.

- If immediate referral is impossible, patients can be treated with **furosemide** 40-80 mg IV, repeated after

15-20 min, if necessary (maximum 120 mg, guided by BP).

- If available and if necessary, oxygen can be given 4-6 litres/minute.

Pain must be relieved, give:

- **Morphine** 3-5 mg IV SLOWLY, repeated after 15-30 min (total dose 10-15 mg).
- If morphine is not available use **acetylsalicylic acid** 600 - 1000 mg orally, every four hours if necessary (look for GI andother side effects)
  - At the regional level, if necessary for chest pain, use **glyceryl trinitrate**500 microgram.
  - **Isosorbide dinitrate** 5-20 mg sublingually may be added. If necessary, repeat this treatment after 30 minutes.
  - In case of tachycardia or rapid atrium fibrillation (pulse rate more than 100, give :
  - Di**goxin** 0.125-0.25 mg orally, (dose adjusted according to heart rate).

Non-Cardiac Pulmonary Oedema

Increased capillary permeability (ARDS);many causes including:

- Systemic Sepsis – particular gram negative infection
- Pancreatitis
- Head injury

- Aspiration of gastric contents
- Amniotic embolus

Conditions predisposing to Acute Respiratory DistressSyndrome (ARDS) *includes*;

- infections,
- shock,
- trauma (eg fat embolism, lung contusion)
- liquid aspiration (eg acid, drowning)
- drug overdose (eg heroin, barbiturates)
- inhaled toxins (eg Chloride gas),
- haematological disorders (eg DIC,massive blood transfusions, post cardiopulmonary bypass),
- metabolic disorders eg uraemia, hepatic failure),
- miscellaneous (eg increased intracranial pressure, eclampsia, pancreatitis, paraquat poisoning)

Referral

All cases of suspected pulmonary oedema should be referred to a specialized care with ICU hospital. However, patient should be stabilized first before referral.

Common presentation

- Dyspnoea/tachypnoeic/orthopnea, respiratory failure

3.14 Chronic Heart Failure

CHF is a clinical syndrome and has several causes.

Diagnosis

The diagnosis of chronic heart failure requires the following features:

- Symptoms of heart failure, typically breathlessness or fatigue, at rest or during exertion
- Objectiveevidence of cardiac dysfunction preferably by Echocardiography (Systolic and/or Diastolic)
- A clinical response to treatment is supportive but not sufficient for diagnosis

Hence diagnosis and management of CHF should be sought at referral centres where at least echocardiography assessment can be performed. Asymptomatic left ventricular dysfunction is considered as precursor of symptomatic HF and is associated with high mortality.

Treatment

Treatment of Systolic Heart Failure (LVEF< 45 - 50%)

Aims of Treatment

•Prevention of

A) Disease leading to cardiac dysfunction and heart failure e.g. hypertension, coronary artery disease, valve disease etc.

B) Progression to HF once cardiac dysfunction is established

•Maintenance or Improvement in quality of life

•Improve survival

Non pharmacological management

•Patient and family education

Pharmacological treatment

Combination of

- Diuretics –furosemide, spironolactone (potassium sparing agents)
- enalapril,
- Beta blocker especially - improve morbidity and mortality in CHF.

Add if patient in NYHA class III/IV

- Furosemide 40 – 80mg 2-3times/day
- Hydrochlothiazide 12.5 - 25mg (O) once a day
- Spironolactone 25 -50mg once a day **(**Recommended in addition to ACEIs, ß –Blocker and loop diuretics in advanced heart failure (NYHA-III/IV) and in patient with a recent myocardial infarction to improve survival and morbidity).
- Enalapril 2.5 10mg 2 times a day (. Recommended as first line therapy in patients with reduced LV systolic function with or without symptoms).
- Digoxin 0.125mg -0.25mg/day
- Hydralazine 25 mg 3 times a day. **OR**
- Isosorbide Dinitrate 10- 20 mg 2 times a day or **both**
- Heparin 5 000 units (SC) 8 hourly

- **Thiamine Supplement**

Referral
Ideally all patients with CHF should be managed on specialized tertiary hospitals

3.15 Infective Endocarditis (IE)

- The infective process of endorcadial layer of the heart can involve native or prosthetic valve and congenital defects/shunts.
- Alpha-haemolytic streptococci are the most common causes of native valve endocarditis but Staphylococcus aureus is more likely if the disease is rapidly progressive with high fever, or is related to a prosthetic valve (Staphylococcus epidermidis)

Diagnosis:
Use Modified Dukes Criteria below and consult microbiologist where possible.
Three sets of blood cultures should be taken before starting treatment.
Modified Dukes Criteria
Major Criteria
- Positive blood culturesof typical organism for IE from at least two separate blood cultures
- Evidence of endocardial involvement by Echocardiogram (Trans-thoracic Echo/Trans-oesophageal Echo)

Minor Criteria

- Fever > 38ºC
- Presence of Rheumatic Heart Disease, Congenital heart diseases
- Vascular phenomena; Major arterial emboli, Septic pulmonary infarcts, mycotic aneurysm, intracranial haemorrhage, Conjuctival hemorrhage, Janeway lesions
- Immunological phenomena; Glomerulonephritis, Oslers nodes, Roth`s spots, Rheumatoid factor.
- Serologic evidence of active infective endocarditis or blood culture not meeting major criterion.

Definitive IE

- Two Major Criteria **OR**
- One Major and three minor criteria **OR**
- Five Minor Criteria

Possible IE

Empirical Treatment

Table 1 Treatment for Native valves

Antibiotics	Dosage & Route*	Duration
Benzyl Penicillin Gor	18 -24milllion Units/24 hours IVI, 4hourly in equally divided dose2mg once daily IVI	4–6 weeks 4 – 6 weeks
Cloxacillin plus	500 mg IV every 6hourly	4 -6

Gentamicin **	80 mg (5mg/kg) IV every 8hours	weeks
Methicillin-Resistant Staphylococci Anaerobes (MRSA) add **Vancomycin**	30mg/kg/24hours IVI in two equally divided dose, not to exceed 2gm/24 hours unless serum levels are monitored	4 -6 weeks

*Dosage patient with normal renal function **It is important to assay serum gentamicin levels every 3 -4 days. One -hour peak concentration should not exceed 10mg/l and trough concentration (2 hour pre - dose) should be less than 2mg/l.

Prosthetic Valve Empirical treatment

Antibiotics	Dosage & Route*	Duration
Benzyl Penicillin G	18 -24milllion Units/24 hours IVI, 4hourly in equally divided dose	>6 weeks
or Cloxacillin	500 mg IVevery 6hourly	>6 weeks
plus Gentamicin**	80mg(5mg/kg) every 8hourly	>6 weeks2 weeks

At any stage, treatment may have to be modified according to:

- detailed antibiotic sensitivity tests

- allergy
- adverse reactions
- failure of response

Endocarditis leading to significant cardiac failure or failure to respond to antibiotics may well require cardiac surgery.

Referral

All patients with IE should be referred at specialized care center for treatment

Prophylaxis of Infective Endocarditis

To reduce the risk of bacterial endocarditis, antibiotic prophylaxis should be given to patients with congenital heart disease; acquired Valvular Heart disease (notably rheumatic heart disease), prosthetic heart valves that undergo any of the following:

- Dental procedures
- Upper respiratory tract surgery, e.g. tonsillectomy
- Urinary tract instrumentation and surgery
- Dilatation and Curettage (D &C) in presence of infection
- Surgery through infected tissues eg skin

Prophylaxix against Endocarditis

Dose	Frequency
Adult : **Amoxicillin** 3g po Paediatric : Amoxicillin 50mg/kg	One hour before procedure
Or Penicillin allergy or recent penicillin **Erythromycin** Adult 1.5 g and then 500mg Paed 20 mg/kg body weight then 10mg/kg body	One hour before operative procedure then Six hourly after operation, as long as necessary One hour before procedure

Dental procedures, upper respiratory tract, obstetrics and gynaecological procedures under general anaesthesia

Dose	Frequency
Adult Ampicillin IV 1g then 500mg OR Amoxicillin po 3g, then **1g** Paediatric Ampicillin (IV) 50 mg/kg body weight **Plus** Ampcillin (IV) 50mg/kg body weight **plus** Gentamicin (IV) 1.5-2 mg/kg body weight Penicillin allergy or recent penicillin administration <one month see under special risk groups below.	Half an hour before operation or During induction, then after 6hrs 4hrs before anaesthesia then 6 hours post-op. Half an hour before operation or During induction

Prophylaxis against endocarditis--Special high risk group; Dental procedures, upper respiratory tract, obstetrics and gynaecological procedures or genitourinary

Table 5:

Dose	Frequency
Adult Ampicillin (IV) 1g Cloxacillin (IV) 2g And Gentamicin) 5mg/kg body weight or 120mg. **Paediatric** Ampicillin (IV) 50 mg/kg body weight **Plus**Gentamicin (IV) 1.5-2 mg/kg body weight	Half an hour before operation or During induction Single dose, Half an hour before operation or At induction single dose

† Prosthetic cardiac valve or prosthetic material used for cardiac valve repair, Previous IE, Congenital heart disease (CHD) and Cardiac transplantation recipients who develop cardiac valvulopathy

3.16 Rheumatic Fever

A condition in whoch the body develops antibodies against its own tissues, following a groupA ß haemolytic streptococcal (GABHS) pharyngeal infection.
Diagnosis Use the Jones Criteria updated 1992 see table below

- Two major criteria **OR**
- One major criterion with two minor criteria, with evidence of antecedent streptococcal infection
- Sydeham's chorea is an exeption one majoir criteria is enough to diagnos RF.

Criteria for Rheumatic Fever Diagnosis

Major Criteria	Minor Criteria
Carditis Migratory polyarthritis Sydenham's chorea Erythema Marginatum	<u>Clinical</u> • Fever • Arthralgia <u>Laboratory</u> • Elevated Acute phase Reactants eg CRP • Prolonged PR interval
Plus Supporting evidence of recent group A streptococcal infection e.g. positive throat culture or antigen detection and/or elevated streptococcal antibody tests*	

*Anti –Streptolysin O, Anti –Deoxyribonuclease B

Treatment

Non pharmacological

<u>Acute stage</u>:

•Bed rest and supportive care until all evidence of active carditis has resolved

•Patient education.

•Intensive health education for prevention of sore throats.

Pharmacological treatment

- **Benzathine Penicillin** 1.2MU single dose; im paediatric> 5 years 0.3MU, 5-10 years 0.6 MU> 10 years 1.2.mu single dose IM. **OR**
- **Penicillin V** 500mg two to three times daily for 10 days orally.

- Children > 10years 500mg, **5-10 years** 250mg**,< 5years** 125mg two to three times daily for 10 days orally

If allergic to Penicillin

- Erythromycin 500mg or 40mg/kg 4 times per day for 10 days orally

Treatment of acute Arthritis and Carditis:

- Aspirin orally 25mg/kg* 4 times a day as required (*dose should be reduced if tinnitus or other toxic symptoms develop add PPI)*
- **Aspirin** should be continued until fever, all signs of joint inflammation and the ESR have returned to normal and then tapered gradually over 2 weeks.
- If symptoms recur, full doses should be restarted.
- In severe carditis with development of increasing heart failure or failure of response to aspirin, **Plus**
- **Prednisolone** 1-2mg/kg once a day for 3-4 weeks.

Then reviews, gradual reduction and discontinuation of prednisolone may be started after 3 -4 weeks when there has been a substantial reduction in clinical disease.
Heart failure should be managed in the usual way see Heart Failure Section.

Treatment of Sydenham's chorea:
Haloperidol
Adult:1.5-3mg (O) 8hourly a day as required.

Paediatrics: 50mcg/kg in 2 divided doses.

Referral: Ideally all patients should be referred to specialized care

- where surgery is contemplated
- management of intractable heart failure or other non-responding complications
- pregnancy

Antibiotic prophylaxis after rheumatic fever:

Prophylaxis should be given to all patients with a history of acute rheumatic fever and to those with rheumatic heart valve lesions.

The optimum duration of prophylaxis is controversial, but should be continued up to at least 21 years of age.

Note: Specific situations requiring prophylaxis for longer periods (up to 30 years as a guide):

- definite carditis in previous attacks
- high risk of exposure to streptococcal infection at home or work (crowded conditions, high exposure to children)

Medicines

- Benzathine Penicillin IM Adult 1.2MU monthly or every three weeks*
- Penicillin V (PO) 250mg 12 hourly; Paediatric<12yr 125-250mg 12 hourly a day up to 21-30yrs **OR**

- Erythromycin 250mg 12hourly a day, Paediatric <12yr 125-250mg 2 times a day up to 21-30yrs

**Every 3 week regimen is more effective*

3.17 Valvular Heart Disease

Valvular Heart Disease
These are chronic sequelae of acute Rheumatic fever or acute sequelae of infective endorcaditis or ischaemic heart disease, consisting of valvular damage, usually left heart valves, with varied progression of severity and complications.

Congenital Heart Disease
It is a congenital chamber defects or vessel wall anomalies
Valvular Heart Disease and Congenital structural Heart Disease may be complicated by:

- Heart failure
- Infective endocarditis
- Atrial fibrillation
- Systemic embolism eg Stroke

General measures

- Advice all patients with a heart murmur with regard to the need for prophylaxis treatment prior to undergoing certain medical and dental procedures

- Advise patients to inform health care providers of the presence of the heart murmur when reporting for medical or dental treatment and treat complications

Referral

- All patients with heart murmurs for assessment
- All patients with heart murmurs not on a chronic management plan
- Development of cardiac signs and symptoms
- Worsening of clinical signs and symptoms of heart disease
- Any newly developing medical condition, e.g. fever
- All patients with valvular heart disease for advice on prophylactic antibiotic treatment prior to any invasive diagnostic or therapeutic process

4. CENTRAL NERVOUS SYSTEM

4.1 Stroke

- A stroke or cerebrovascular accident is a rapidly developing focal (or global) disturbance of cerebral function lasting 24 hours or longer or leading to death, with no apparent cause other than a vascular origin.
- The risk factors for a stroke include hypertension, diabetesmellitus, cigarettesmoking, cardiac arrhythmias, obesity, plasma lipid abnormalities, heart and peripheral vascular disease and excessive alcohol intake.
- Strokes are usually sudden in onset or may show progression over several hours or occasionally days. The site of the brain lesion causing the stroke usually determines the neurological presentation.
- BP is often elevated in acute stroke and should only be treated if it persists > 2 days or is severely elevated.
- IF Diastolic BP > 120 mmHg. Reduce BP gradually.

CAUSES

- Cerebral infarction from
  - Thrombosis of a cerebral vessel
  - Embolism from a distant site (e.g. atrial fibrillation)
- Intracerebral haemorrhage
- Subarachnoid haemorrhage

SYMPTOMS

- Weakness of one side of the body including the face

- Inability to rise up from a sitting or lying position
- Sudden fall
- Seizures
- Loss of speech
- Unconsciousness in some patients
- Severe headache and/or neck pain (subarachnoid haemorrhage)

SIGNS

- Paralysis of a limb and/or the face
- Initial flaccidity, but spasticity and exaggerated reflexes occur later
- Loss of one-half of visual field (Hemianopia)
- Loss of sensation of one-half of body (Hemi-anaesthesia)
- Extensor plantar response
- Alteration of speech (dysarthria/dysphasia)
- Neck stiffness (in subarachnoid haemorrhage)

INVESTIGATIONS

- FBC, ESR
- Blood glucose
- Uric acid
- Serum lipid profile
- ECG
- Blood urea, electrolytes and creatinine
- Chest X-ray
- CT scan/MRI of the head

TREATMENT

Treatment objectives are to:

- limit the progression area of brain damage

- protect patients from the dangers of unconsciousness and immobili
- treat the underlying cause if possible
- institute measures to improve functional recovery
- support and rehabilitate patients who survive with residual disability
- prevent recurrence of cerebrovascular lesions

General Management

- Admit and monitor patient`s vital signs and neurological signs frequently
- Establish adequate airway in unconscious patients.
- Nurse in the lateral position with suctioning where necessary
- Prevent pressure sores by regular turning (every 2 hours) in bed.
- Maintain adequate hydration
- Insert nasogastric tube as early as possible for feeding and medications in unconscious patients or those with swallowing difficulties
- Insert urethral/condom catheter to keep patient clean and dry.
- Early physiotherapy as soon as practicable

4.1.1 Haemorrhagic Strokes

- Antihypertensive medications.

- Reduce blood pressure gradually over several days (see section on Hypertension)

Note: Do not give sublingual Nifedipine or other antihypertensive agent to reduce the blood pressure rapidly in patients with stroke. It may result in deterioration in their clinical state and death.

4.1.2 Infarctive (Ischemic) Strokes

• Aspirin, oral, 75 mg daily

REFER

- Patients with worsening symptoms and signs for specialist evaluation.
- If the underlying cause cannot be managed
- Refer all patients with neurological deficits to a speech therapist, occupational therapist or physiotherapist if required.

4.1.3 Subarachnoid Haemorrage

- It is bleeding into the subarachnoid space, most commonly due to the rupture of a vascular aneurism.
- Patients frequently present with an acute onset ofsevere headache and may have additional neurological symptoms and signs.
- Diagnosis is confirmed preferably by neurological imaging and, when this is not aveliable, urgently dolumbar puncture, demonostrating xanthocchromia.

General management
Maintain normal hydration and electrolyte status.
Control blood pressure.

Teatment
Analgesia if level of consciousness is not impaired:

- **Paracetamol**, oral, 1gm 4-6 hourly when required to a maximum of 4 dosers per 24 hours.If no response:
- **Morphine, IV**, 1-2mg/minute to a mximum total dose of 10mg. Dilute 10 mg up to 10ml sodium chloride solution 0.9%. This may be repeated 4 hourly.
- Avoid NSAID.
- In patients with grades 1-3 impairment of consciousness level while waiting for transfer to neurosurgeon:
  Give **nifedipine**, oral, 10-20 mg every 12 hours.

Referal

- All patients with minimal impairment of consciousness level for possible angiography and appropriate neurosurgical management.
- Patients initially deemed unsuitable for further investigation, may be referred at later stage, should their condition improve.
- For neurological imaging: pateints in whom the diagnosis has to be confirmed radiologically and

where a lumbar puncture may be considered hazardous.

4.2 Seizures (convulsion fits)

A seizure is a clinical event caused by a transient disturbance of cerebral function due to an abnormal paroxysmal neuronal discharge in the brain.It isa change in movement, attention or level of awareness that is sustained or repetitive.

Seizures may be secondary (where there is an underlying cause) or idiopathic (where no underlying cause is evident). When seizures are recurrent or typical of a specific syndrome, then the term epilepsy is used.

Seizures should be differentiated from:

» syncope
» hyperventilation
» transient ischaemic attack (TIA)
» pseudo-seizure
» rigors

Important conditions that should be excluded include:

- meningitis
- encephalitis or encephalopathy (including hypertensive encephalopathy)
- metabolic conditions, e.g. hypoglycaemia
- brain lesions

- Drugs: CNS stimulants, cyclosporine, strychnine etc..
- hyper pyrexia; fever, heatstroke

GENERAL MEASURES
If convulsing:

- Ensure that airways are clear. Follow ABCD.
- Protect the patient from injury and put in a lateral position
- Measure blood glucose and treat hypoglycaemia, if present.

Pharmacological Treatment
Treatment is indicated if the patient presents with a seizure that lasts > 5 minutes and the seizure is causing systemic compromise.
Children < 12 years of age

- **Diazepam** 10-20mg IV at a rate of 0.5ml (2.5mg) per 30 sec. Repeat if necessary after 30-60min. May be followed by intravenous infusion to max. 3mg/kg over 24 hours, per rectum 500mcgrms/kg up to max of 30g)Prepare to ventilate a patient if he develops respiratory failure secondary to diazepam.**OR**
- **Phenobarbitone** 20mg/kg 8 hourly, max. Dose 1.5
- If no response after two doses of diazepam, manage as Status Epilepticus. See: Status epilepticus.

Adults

- **Diazepam,** slow IV infusion, 10 mg at a rate not exceeding 2 mg/minute.
  - Repeat within 10–15 minutes, if needed.
  - If no response after the second dose of diazepam manage as Status epilepticus. See Section 21.20: Status epilepticus.

Always check blood glucose concentrations to exclude hypoglycaemia

For management of eclamptic convulsions in pregnancy, see Hypertensive disorders of pregnancy – Eclampsia.

After seizure

- All patients presenting with a first seizure must be investigated to exclude underlying causes, including meningitis.
- A patient who presents with a first seizure should not automatically be labeled as an epileptic, or started on treatment.
- When indicated, long term therapy should be initiated by a doctor.

REFERRAL

Urgent:

- All patients with status epilepticus or suspected meningitis.

- All patients following a 1 seizure should be examined by a doctor to exclude underlyig causes.

Note: Persons known to have epilepsy who recover fully following a seizure do not usually require referral.

4.2.1 Epilepsy

Epilepsy is defined as recurrent unprovoked seizures. Epilepsy is associated with many psychological, social and cultural misperceptions (stigma).

Symptoms

- Loss of consciousness
- Foaming at the mouth
- Tongue biting
- Incontinence of stool and/or urine
- Aura (may include a strange gut feeling, somatosensory manifestations - visual, olfactory, gustatory or auditory e.g. strangesmells/flashing lights)
- After a seizure, the patient may sleep for some time.

Signs

- A prodrome/aura with automatism (lip smacking, picking at items)
- Muscle twitching and movements which may be focal or generalized
- Episodes of mental confusion may follow (post-ictal psychosis)

- Examine carefully for evidence of neurological localizing signs, tongue laceration and evidence of trauma to the face or other parts of the body.

Diagnosis-

It iIs usually made clinically.

- Requires an accurate witness description of the seizure
- If patatient has *more than two seizurs in a year* of unknown cause, consider starting antiepileptic therapy.
- Always start with smoll dose.
- Increase dose gradually over weeks or months.
- Use maxiumum dose of one medicine befor adding anther.
- Treatmenrt should never be stopped suddenly due to risk of status epilepticus, but rather tapered-off over weeks or monthes.

Some different types of seizures

Partial	Simple partial	Seizure on one side of the body with no loss of consciousness
	Complex partial	Partial seizure associated with loss of consciousness.

Generalised	Generalised tonic clonic	Loss of consciousness preceded by: - a brief stiff phase, followed by - jerking of all of the limbs
	Tonic	One or more limbs become stiff without any jerking.
	Myoclonic	Brief, usually generalised jerks, with retained awareness.
	Absence	Occurs in childhood. Sudden cessation of activity followed by a blank stare. Usually no muscle twitching. Some children will smack their

GENERAL MEASURES

- Extensive health education
- Record keeping in a seizure diary recording dates and, if possible, the times of the seizures
- Present seizure diary at each consultation for assessment of therapy.
- Carry a disease identification bracelet, necklace or card.
- Counselling and advice on:
    - the adverse effect of alcohol on seizures,
    - the effect of missing a dose of medication,
    - the risks of discontinuing medicine treatment without advice of the doctor.

- Patient should be counselled about driving, working at heights, swimming and operating machinery - the patient should sign in the notes that they have this advice.

Pharmacological Treatment
Note:

- General rule: a single medicine is best.
- Combination therapy should only be initiated by a specialist.
- Recommended doses are general guides and will be effective in most patients.
- Some patients may need much higher or lower doses. Doses should only beincreased at 2-weekly intervals.
- Therapeutic monitoring will assist with dosage adjustments, or in suspected non-adherence. However, it is only mandatory in the case of higher than usual doses of phenytoin.

Medicine Interactions

- Anticonvulsants: Carbamazepine, phenytoin and phenobarbital are associated with many medicine interactions. Always check for possible interactions (Refer to ENF) before prescribing concomitant medicines.

- Oral contraceptives and sub-dermal implants may be less effective. Progestin-only injectable contraceptives or IUDs are preferred.

4.2.2 Generalised tonic clonic seizures

Adults

The aim is to use monotherapy, i.e. a single anticonvulsant, progressively increasing the dose until the seizures are controlled or clinically important side effects occur.

Carbamazepine, oral.100 mg 12 hourly for one week then, 200 mg 12 hourly,

titrate upwards every 2 weeks according to response to a maximum dose of 600 mg 12 hourly.

If the initial medicine fails to achieve satisfactory control with optimal dosages, or causes unacceptable adverse effects, then a 2nd medicine may be started. The 1st medicine should be continued for 2 weeks and then gradually reduced over 6–8 weeks until stopped.

Only if already well controlled on phenytoin, continue with:

Phenytoin, oral, 4.5–5 mg/kg daily on lean body mass, at night. Phenytoin is a useful and effective agent. However, doses > 300 mg/day are potentially toxic, and increased dosages should be monitored carefully, both clinically and by medicine concentrations.

Children The decision to initiate long-term therapy is generally made if the child has experienced ≥ 2 unprovoked convulsions (except febrile convulsions). Phenobarbital and carbamazepine are both effective in generalised tonic clonic seizures. Monitor the behaviour profile and academic performance of children on phenobarbital. Change treatment if any problems are identified.

Phenobarbital, oral, 3.5–5 mg/kg at night (< 6 months of age).***OR*** **Carbamazepine,** oral, 5 to 10 mg/kg 12 hourly for 2 weeks, then 7.5– 10 mg/kg 12 hourly . Maximum dose: 10 to 15 mg/kg 12 hourly.

HIV-infected individuals on ART

Children.For HIV-infected children on ART, **valproate** is preferred because of fewer medicine interactions. When switching to valproate, commence treatment with maintenance dose of the medicine as below and discontinue the other anticonvulsant after 7 days.

Valproate, oral, 5 mg/kg 12 hourly.

- Titrate according to response over 4 weeks up to 15 mg/kg 12 hourly.
- If poorly tolerated divide total daily dose into 3 equal doses.
- Maximum daily dose 40 mg/kg/day.

Adults

Poorly controlled epilepsy - Ask about the following, as these factors can influence decisions regarding medicine therapy:

- Has the patient been adherent in taking the medication regularly for at least 2 weeks or more before the seizure? Ask about medicine dosage and frequency.
- Has the patient recently used some other medicine? (i.e.,look for drug interactions).Is there a chance that alcohol is involved?
- If ≥ 1of theabove are present, address the problem/s but leave anticonvulsant therapy unchanged (unless dose adjustment is necessary because of a drug interaction). Reassess the patient within 2 weeks.

REFERRAL

- Patients with seizures other than generalised tonic clonic seizures, including absence seizures.
- Increased number of seizures or changes in the seizure type.
- Patients who have been seizure free on therapy for ≥ 2 years (to review therapy).
- Failure of carbamazepine monotherapy in adults or phenobarbital and carbamazepine monotherapy in children.
- Pregnancy.

- Development of neurological signs and symptoms.
- Adverse medicine reactions or suspected toxicity in children.

Provide full information on the seizures that should accompany each referral case.

4.2.3 Absence (Petit mal Seizures)

It is mainly a disorder of children. The attack is characterized by a brief loss of consciousness (5-10 seconds) in which posture is retained but other activities cease.

- The child has a vacant stare
- Previous activities are resumed at the end of the attack
- Several attacks may occur in a single day

Pharmacological Treatment
Ethosuximide initially 500mg daily in 2 divided doses - Increase if necessary by 250mg every 4-7 days up toa usual daily dose of 1-1.5g
Child >6 years: As above
Child <6 years: Initially 250mg single dose at night, increased gradually as required to usual 20mg/kg , daily in 2 divided doses**OR**
Valproate, initially 5 mg/kg twice or three times daily increased by 5-10mg/day at weekly intervals

4.2.4 Status Epilepticus

- Continous seizure activity or seizors without recovery of consciousness for > 30 minuts.
- Always an emergency, mortality is high.
- Clear airways, insert IV line, position patient in recovery position. Donot insert any object in between the teeth.

Pharmacological Treatment

Adults:

- **Diazepam** 5-10 mg IV. Repeat every 10 minuts until the patient stops convulsing(Max 30 mg). If patient is not controlled give continuous diazepam IV infusion with careful attention of respiratory depression.
- **Phenytoin** 15mg/kg (600-1200)IV. Dilute with 100 ml normal saline and give slowly, no more than 100mg minute.

If still fitting after 10 minutes, then give:

- **Phenobarbiton** 10 mg/ kg (400- 600) IV: dilute with water for injection 1:10 and give slowly, no more than 100mg/ minute,**OR 200mg** IM in each buttock.

Check blood sugar and if suspicious of hypoglycaemia, give:

- **Glucose,** If patient suffers from alcoholism**, give Thiamine** 100mg IV or IM daily before giving glucose.Countinue for 3 days.
- If still no improvement, cosider general anaesthesia (in ICU setting preferably).
- If patient improves, start anti-epileptic treatment and continue until cause of status epilepticus is treated.

Status Epleptics in children

- Diazepam 0.2 to 0.3 mg/kg IV is given every 10 to 15 minuts 2 to 3 times. If convultion is controlled, try to identify the underline causes. Don't forget to get bed side blood glucose level, and electrolytes if available.
- If seizur is not controlled with diazepam, start with loading dose of phenobarbiton 10-20 mg/kg , maximum dose 100mg/min or 2mg/kg/min. You can repeat 10 mg/Kg if convultion is not controlled.
- Phenitoin : 6 months-3 years, 8-10 mg/kg, 4-6 yrs; 7-8 mg/kg, 10-16 yr, 6-7mg/kgis;.
  It has an advantage in that it does not cause respiratory depression.
- If at patient continue to convulse despite aggressive treatment general anesthesia and mechanical ventilation is warranted in ICU setting.

If convultion is controlled, try to identify the underline causes, immadiatly after seizur is arrested maintenance dose of phenobarbiton is needed depending on underline cause.

4.2.5 Febrile Convulsions

DESCRIPTION - A febrile convulsion is a seizure occurring in a child between the ages of 6 months and **6**years of age in association with a significant fever in the absence of an intracranial infection. These are the most common type of seizures in children of this age. However, the diagnosis requires the exclusion of other causes of seizures.
Febrile convulsions can be simple or complex.

Simple febrile convulsions:

- are generalised,
- occur once per illness
- always last for < 15 minutes (typically lasting 1–2 minutes),
- are not associated with any neurological deficit,
- Are self limiting

Complex febrile seizures:

- last > 15 minutes; or
- Are recurrent within the same febrile illnessmore than 2 times in 24hrs; orhave a focal onset.

Note:

- Treat the underlying cause
- Look for a cause of the fever.
- Always exclude meningitis.

GENERAL MEASURES

- Reassure parents and caregivers.
- Symptomatic treatment of fever.
- Children with febrile convulsions have a good prognosis, and very rarely develop epilepsy

Pharmacological Treatment

If convulsing, give:

- **Diazepam, rectal**, 0.5 mg/kg/dose **OR**
- **Diazepam** 0.2 to 0.3kg/dose **IV**as a single dose.
- If no response after the 2nd dose of diazepam, manage as Status epilepticus.

For symptomatic relief:

Paracetamol, oral, 10–15 mg/kg/dose 6 hourly when required. Paracetamol has no effect on seizure prevention.

REFERRAL

- All febrile convulsions except where:
- the diagnosis of recurrent simple febrile seizures has been well established **AND**
- Child regains full consciousness and function immediately after the seizure **AND** meningitis has been excluded.
- Complex convulsions.

4.3 Parkinson's disease

It is a clinical syndrome which is mainly seen in males and is characterised by:

- Muscular rigidity,
- Resting tremor (which usually abates, rigidity during voluntary movement)
- Bradykinesia(slowness and poverty of movement),
- An impairment of postural balance leading to disturbance of gait

Parkinson's Diseases can be primary, the cause of which is unknown or secondary, ie., drug induced or due to uncommon disorders that may initially resemble parkinson's disease

Differential diagnosis

- Any causes of tremor
- Thyrotoxicosis
- Dementia

Investigations

Good history and clinical examination

Treatment Objectives

- Minimise disabling symptoms.
- Prevent complications and avoid serious drug-induced side effects.
- To exclude secondary forms

Management

- Educate the patient.
- Occupational and physiotherapy improves activities of daily living alongwith mood and mobility.

Pharmacological Treatment

- Parkinson's disease (primary)
- **Carbidopa/levodopa** 25/100 mg oral, 8 hourly.
- Increase graduallyevery 1–2 days until the desired response is achieved. Maximum dose: 800mg.
- It should be taken 30 minutes before meals.

OR

Bromocriptine:

- 5– 10mg (oral) daily for 1 week.
- Increase according to response:
- Week 2: 2.5 mg daily;
- Week 3: 2.5 mg twice daily;
- Week 4: 2.5 mg 3 times daily;
- Week 5: 5 mg 3 times daily

4.4 Infections of the Nervous System

Infections of the nervous system can arise secondary to bacteria, fungi, protozoa or viruses. Clinical features will depend on the site of the nervous system involved.

4.4.1 Meningitis

AcuteMeningitis

DESCRIPTION - Infection of the membranes of the brain.

(Inflammation of the layers (meninges) covering the brain and spinal cord).

Clinical signs and symptoms include:

» headache » impaired level of consciousness
» neck stiffness » photophobia » fever
» vomiting » bulging fontanelle in infants
» convulsions » coma may occur

- **Neck stiffness** is rare in young childrenless than 18 months, and especially neonates, and may be absent in adults, especially debilitated patients and the elderly.
- In infants under 1 year diagnosis is much more difficult therefore always think of it in a sick child if:
    - Refusal to eat and or suckle drowsiness and weak cry
    - Focal or generalized convulsions
    - Hypotonia, neck is often not stiff
    - Irritability
    - Bulging fontanelle
    - Fever may be absent

Young children with fever, vomiting and convulsions or an impaired level of consciousness must be assumedto have meningitis. Signs may be even more subtle in newborns.

Initial management

If safe, perform a lumbar puncture. Send cerebrospinal fluid (CSF) in separate sterile containers (for culture, microscopy, chemistry and glucose) with patients.

General management

Emergency Measures

» Stabilise before referral.

» Treat for shock, if present.

» If patient's level of consciousness is depressed:
  - maintain airway
  - give oxygen

» Ensure hydration.

• Control of fever and pain with Paracetamol

• If unconscious, insert NGT for feeding and urethral catheter

Pharmacological Treatment

Initiate medicine treatment before transfer.

I. Where the organism is not known:

Adults:

- Chloramphenicol 1 g every 6 hours IV initially, and after a good clinical response continue with oral treatment at the same dose for 14 days **Plus,**
- Benzyl penicillin 4 MU, IV every 4 hours initially, and after good clinical response give same dose i.m. for 10 days.

Children and Infants < 3 months:

- Ampicillin 50mg/kg/dose IV 6 hourly for 10 to 14 days **Plus**
- Gentamicin 7.5mg/kg once daily for 10 to 14 days

Children 3 months to < 18 years:

- Chloramphenicol 25mg/kg/dose maximam dose 2 gram/24hrs IV 6 hrly **Plus**
- Ampicillin 50mgkg/dose 6 hourly **OR**
- Benzyl penicillin 100,000IU (60mg)/kg/dose 6 hourly for 10 to 14 days

Note: For old age, immunosuppression, diabetic or alcoholic patients treat as above for adults, and, if no improvement, give:

- Ceftriaxone 2g I.V 12hrly (this may be available only in higher levely hospital)**Plus**
- Ampicillin 2g I.V 6hrly **OR,**
- Cotrimoxazole 50mg/kg I.V daily in two divided doses.

Where the patient has convulsions:

- Diazepam 0.25-0.5 mg/kg body weight by slow I.V. until control is achieved

In neonates:

C: Phenobarbitone loading dose of 15 mg/kg. If convulsions persist repeat Phenobabitone15 mg/kg afterhalf an hour, thereafter, 10 mg/kg uptoa maximum of 40 mg/kg

II. Where the organism is known the following is advised:

Meningococcal meningitis and pneumococcal meningitis
Adults & children >2yrs
Chloramphenicol (in oil suspention)(IM) 100 mg/kg as a single dose Max. 3g

OR
C: Ceftriaxone(IM) if available, 100mg/kg as a single dose (divide into 2 injections if needed & inject half-dose in each buttock)
Haemophilus influenza meningitis
Adult
Ampicillin (IV) 3 g IV every 6 hours initially, then change to oral dose medication as soon as possible **OR**
Chloramphenicol50-100mg/kg/day for 10 days
Children
Ampicillin 50-100 mg/kg/day for 10 days **OR**
Chloramphenicol50 mg/kg body weight every 6 hours for 10 days

NOTE: Neonates require treatment for 3 weeks and the recommended treatment is:
Chloramphenicol (IV) 6 mg/kg body weight every 6 hours. But should NOT be used in premature/low-birth weight infants

4.4.2 Meningitis, Meningococal Prophylaxis

- Bacterial meningitis is frequently caused by the bacteria *N. meningitidis*, and there is risk of spread to other people.
- Although mass chemoprophylaxis of large populations is frequently suggested, prophylaxis is recommended

for selected groups only -- those with close contact with a patient.

- In cases of meningococcal infection, the following close contacts should receive prophylaxis.
  - Close contacts include: household members, child-care centre contacts, and anyone directly exposed to the patient's oral secretions, e.g. kissing, mouth-to- mouth resuscitation, endotracheal intubation, or endotracheal tube management.
  - Chemoprophylaxis is only effective for the current exposure. The policy concerning prophylaxis during an epidemic of bacterial meningitis will be determined by the Ministry of Health, CDC programme. When prophylaxis is advised to be taken by the Ministry of Health, give:
    - R**ifampicin** 600 mg (children 10 mg/kg up to the adult dose) orally, every 12 hours for 2 days.
    - For neonates younger than 1 month, give**rifampicin** 5 mg/kg orally, every 12 hours for 2 days

4.4.3 BrainAbscess

- ***Brain abscess*** is a focal collection of pus/ necrotic tissue within the brain parenchyma,
  which can arise as a complication of a variety ofinfections, trauma or surgery.

- The manifestations of brain abscess initially tend to be nonspecific, resulting in a delay in establishing the diagnosis.

Diagnosis

• Headache is the most common symptom, neck stiffness, lethargy progressing to coma, vomiting, and focal neurologic deficit.

General management

• Control of fever and pain with Paracetamol

• If unconscious, insert NGT for feeding and urethral catheter

Management of Brain Abscess

Condition	Treatment	Duration
Brain abscess (unspecific bacterial)	**Benzyl penicillin**(I.V) 5 MU every 6hours(children 125,000 IU/kg/24 hours)**Plus Metronidazole** (IV) 500mg every 8 hours (children 7.5 mg/kg/day)	4-6weeks 4-6 weeks
Brain abscess (Staph aureus)	**Cloxacillin** (I.V) 2g every 6 hours(children 5 –100 mg/kg/day)	6weeks

Note: Where the patient is allergic to penicillin, chloramphenicol 500 mg every 6 hours can be used instead

4.4.4 Cryptococcal meningitis

It develops in patients who are immune-compromised e.g. HIV-positive patients with low CD4 cell count.

Diagnosis

- Headache, fever, intolerance to light and sound, neck stiffness, vomiting, seizures, deafness and blindness
- In advanced stages it may present with confusion, altered consciousness and coma.

General management
Refer to section on bacterial meningitis

Pharmacological Treatment
Fluconazole 400-800mg (12-15mg/kg/day in children) IV or oral, depending on the patient's condition for 6-10 weeks, then 200mg for the rest of the patient's life.
Patients started on IV should beswitched to oral therapy as soon as patients are clinically stable.
Consider LP as diagnostic and theurapeutic tool for cryptococal meningitis.
Cryptococcal antigen test should be done as there are cases of negative Indianink results with criptococal meningitis.
For more details, Refer to Eritean National Guidelines for the treatment of HIV/AIDS.

4.5 Primary Headache

A Headache is defined as a pain in the head or upper neck.
It is one of the most common locations of pain in the body and has many causes. Headache can be benign or

seriousand can have serious underlying causes including:

- encephalitis
- mastoiditis
- hypertensive emergencies
- meningitis
- brain tumour
- venous sinus thrombosis
- benign intracranial hypertension
- stroke

Headache due to a serious disease will often be associated with neurological symptoms and signs including: vomiting, impaired consciousness, fever, confusion, mood change, focal paralysis, convulsions, neck stiffness, cranial nerve fall-out, visual disturbances, pupillary changes and difference in size, etc.

There are three major categories of headaches:

1. Primary headaches,
2. Secondary headaches, and
3. Cranial neuralgias, facial pain, and other headaches

Assessment of headache should be comprehensive for example to include:

- Age at onset
- Presence or absence of aura and prodrome

- Frequency, intensity and duration of attack
- Number of headache days per month
- Quality, site, and radiation of pain
- Associated symptoms and abnormalities

Primary headaches include migraine, tension, and cluster headaches, aswell as a variety of other less common types of headache

4.5.1 Migraine Headache

Migraine is a chronic, episodic primary headache.Symptoms typically last 4-72 hours and may be severe. Pain is often but not always unilateral, throbbing, worse with exertion and accompanied by autonomic symptoms a9 nausea, , sensitivity to light, sound or odors) It is more common in females than in males often there is a family history of migraine.

Associated precipitants include:-

- Dietary (cheese, chocolate or red wine)
- Psychological stress

General Measures–

- Reassure patient that this is a benign condition**.**
- Attempt to identify any precipitating factors or food allergies from the history and try to diminish patterns of tension.

- Avoidance of precipitants
- Relaxation to reduce stress

Pharmacological Treatment

1. In acute attack give:
- **Paracetamol** 1g immediately then every 4 hours; max 4g per day, - **OR-**
- **Aspirin** 600mg, repeat after 4 hours if needed.
2. In severe attack give:
    - **Sumatriptan** 25mg-50 mg**plus**
    - **Metoclopramid**e oral/IM, 10 mg 3 times daily
3. For prevention purposes give:
    - **Propranolol 8**0-160mg daily***OR***
    - **Amitriptyline** 10-50mg at night.

Referral

- Patient with additionalneurological signs or additional risk factors for an alternate diagnosis, such as immune deficiency. These patients require brain imaging. Sudden onset of a first severe headache may indicate serious organic pathology, such as subarachnoid haemorrhage
- Acute migraine, not responding to treatment
- Recurrent migraine not controlled with prophylactic therapy

4.5.2 Tension Headaches

While tension headaches are the most frequently occurring type of headaches,
the cause is most likely contraction of the muscles that cover the skull. When the muscles covering the skull are stressed, they may spasm and cause pain. Common sites include the base of the skull, the temple and the forehead. Tension headaches occur because of physical or emotional stress placed on the body.

Diagnosis

- The pain begins in the back of the head and upper neck and is described as a band-like tightness or pressure.
- Often, it is described as pressure encircling the head with the most intense pressure over the eyebrows.
- The pain usually is mild (not disabling) and bilateral (affecting both sides of the head).
- The pain is not associated with an aura, nausea, vomiting, or sensitivity to light and sound.
- The pain occurs sporadically (infrequently and without a pattern) but can occur frequently and even daily in some people.
- The pain allows most people to function normally, despite the headache.

Note:

- The key to making the diagnosis of any headache is the history given by the patient
- If the health care practitioner finds an abnormality, then the diagnosis of tension headache would not be considered until the potential for other types of headaches have been investigated.

GENERAL MEASURES

- Teach relaxation techniques where appropriate.
- Reassurance, where applicable.
- Exclude analgesia-overuse headache.

Pharmacological Treatment

Tension headaches are painful, and patients may be upset that the diagnosis is "only" a tension headache. Even though it is not life-threatening, a tension headache can affect the activities of daily life. The following work well for most people:

- *Aspirin* (300-900mg) every 4-6 hrs max 4g daily) ***OR***
- *Ibuprofen* (1.2-1.8g daily in 3-4 divided doses preferably after food max dose 2.4g daily, maintenance dose of 0.6-1.2g daily may be adequate.) ***OR***
- Paracetamol 1g (O) 8hrly **OR**
- Naproxen 0.5-1g in 1-2 divided daily doses

Massage, and stress management can all be used as adjuncts to tension headaches.

When pain medications are used for a prolonged period of time,

headaches can recur as the effects of the medication wear off. Thus, the headache becomes a symptom of the withdrawal of medication (rebound headache).

REFERRAL

- Suspected meningitis should be referred immediately after initial treatment.
- Headache in children lasting for 3 days.

- Recent headache of increasing severity.
- Headache with neurological manifestations.
- Analgesia- overuse headache.
- Newly developed headache persisting for > 1 week in an adult.
- Chronic recurrent headaches in an otherwise healthy patient: if noimprovement after 1 month of treatment.
- Tension headache due to muscle spasm:, if no improvement after 1 month of treatment.

4.5.3 Cluster Headaches

Cluster headaches are headaches that come in groups (clusters) lasting weeks or months, separated by pain-free periods of months or years. The cause of cluster headaches is uncertain.
Some evidence shows that brain scans performed on patients who are in the midst of a cluster headache, shows abnormal activity in the hypothalamus.
Cluster headaches:

- May tend to run in families and this suggests that there may be a genetic role

- May be triggered by changes in sleep patterns
- May be triggered by medications (for example, nitroglycerin)
- If an individual is in a susceptible period for cluster headache, cigarette smoking, alcohol, and some

foods (for example, chocolate) also can be potential causes for headache.

Diagnosis

- Pain typically occurs once or twice daily and last for 30 to 90 minutes
- Attacks tend to occur at about the same time every day
- The pain typically is excruciating and located around or behind one eye. The affected eye may become red, inflamed, and watery

Note: Cluster headaches are much more common in men than women.

Pharmacological Treatment

Note: all recommended drugs for this cas,are category 3 drugs and may be available only in regional or natioanl referral hospitals.

- Sumatriptan 6mg; Dose may be repeated after 1 hour. Max dose 12mg a day **OR**
- 100% Oxygen at the rate of 10-15L/min for 10-20 minutes
- Prevention of the next cluster headache may include the following:
- Verapamil 240-960mg (O) 8 -12 hourly divided doses ***OR***

- Amitryptiline 25-50 mg (O) daily

Prevention ofcluster headaches

Since cluster headache episodes may be spaced years apart, and since the first headache of a new cluster episode can't be predicted, daily medication may not be warranted.

Lifestyle changes may help minimize the risk of a cluster headache flare.

Stopping smoking and minimizing alcohol may prevent future episodes of cluster headache.

4.6 Secondary Headache

Secondary headaches are due to an underlying disease or injury that needs to be diagnosed and treated. Early diagnosis and treatment is essential if damage is to be limited

Examples of secondary headache

- Head and neck trauma
- Blood vessel problems in the head and neck
  - Stroke or transient ischemic attack (TIA)
  - Arteriovenous malformations (AVM) may cause headache before they leak
  - Carotid artery inflammation
  - Temporal arteritis (inflammation of the temporal artery)
- Non-blood vessel problems of the brain

  - Brain tumors, either primary, or metastatic
  - Seizures
  - Idiopathic intracranial hypertension, once named pseudo tumor cerebri,
- Medications and drugs (including withdrawal from those drugs)
- Infection: Malaria , HIV/AIDS, Meningitis, Systemic infections , Encephalitis

Diagnosis • If there is time, the diagnosis of secondary headache begins with a complete patient history followed by a physical examination and laboratory and radiology tests as appropriate

However, some patients present in crisis with a decreased level of consciousness or unstable vital signs. In these situations, the health care practitioner may decide to treat a specific cause without waiting for tests to confirm the diagnosis

4.7 Neuropathy

DESCRIPTION - Defective functioning of nerves, which may involve peripheralnerves (peripheral neuropathy) and/or cranial nerves.

Clinical features may be predominantly of a sensory, sensori-motor or motor nature.

4.7.1 Bell's palsy

Unilateral paralysis of all the muscles of facial expression (the corner of the mouth drops, the forehead is unfurrowed, and the eyelids will not close).
Taste sensation may be lost unilaterally and hyperacusis (painful sensitivity to loud sounds) may be present.
Most patients recover within a few weeks or months.

GENERAL MEASURES

- HIV testing.
- Referral for facial muscle massage and exercises.
- Eye pad for protection of the eye during sleep.

Pharmacological Treatment
No treatment has proven effective for idiopathic Bell's palsy, but the following may slightly reduce duration and degree of residual paralysis.
Adults: Prednisone, oral, 60 mg daily for 7 days started within 3 days of onset.
Children: Prednisone, oral, 2 mg/kg daily for 7 days within 3 days of onset.

Wt/kg	Dose mg	Tabs 5mg	Age Mn/yrs
>17.5–25 kg	40mg	8 tabs	>5-7yrs
>25–40 kg	55mg	11 tabs	>7-12yrs

REFERRAL - All cases for physiotherapy.

4.7.2 Peripheral Neuropathy

Initially sensory symptoms consisting of tingling, prickling, burning in the balls of the feet or tips of the toes or in a general distribution over the soles. The symptoms are symmetrical and with progression spread proximally.

Later sensory loss over both feet and weakness of dorsiflexion of the toes may be present. Patients may experience difficulty in walking on their heels and foot drop becomes apparent.

Common causes include HIV, diabetes mellitus, isoniazid, antiretrovirals (stavudine and didanosine) and alcohol.

GENERAL MEASURES

- HIV testing.
- Avoid alcohol.
- A balanced diet to prevent nutritional deficiency.

Pharmacological Treatment

- Stop the offending medicine or give suitable substitute e.g. substitute stavudine or didanosine with tenofovir or lamivudine.
- Patients on isoniazid (TB treatment or prophylaxis): increase **pyridoxine** to 25– 50 mg 8 hourly for 3 weeks, followed by 25–50 mg daily.

- **Amitriptyline**, oral, 25 mg at night. Ttitrate at 2 weekly intervals to a maximum of 75 mg at night.

REFERRAL

- All children.
- Difficulty in walking or foot drop.
- Unsteady/ataxic gait. •Severe sensory loss.

4.8 Mental Health Problems

Psychiatric Emergencies

Patients who present with severe changes in mood, thoughts, or behaviour and those experiencing severe, potentially life-threatening drug adverse effects need urgent psychiatric assessment and treatment. Non-specialists are often the first care providers, but whenever possible, such cases should be evaluated by a psychiatrist after initial assessment at the health facility of first visit.

4.8.1 Anxiety and Stress Relatyed Disorders in Adults

DESCRIPTION

Anxiety is a condition characterized by the subjective and physiologic manifestations of fear. Individuals experience apprehension, but, in contrast to fear, the source of the danger is unknown. The physiologic manifestation of fear includes weating, shakiness, dizziness, palpitations, mydriasis, tachycardia, tremor, gastrointestinal disturbances, diarrhoea, and urinary urgency and frequency. Anxiety becomes pathological when:

- fear is greatly out of proportion to risk/severity of threat
- response continues beyond existence of threat or becomes generalized to other similar ordissimilar situations
- social or occupational functioning is impaired
- often comorbid with substance use and depression

A group of related disorders which manifest as a response to a threat in a situation (stress) or reaction to stress (anxiety) or spontaneously and include the following:
•Panic attack and panic disorder,
•Generalised anxiety disorder,
•Obsessive-compulsive disorder, and,
•Acute stress disorder and post-traumatic stress disorder.

Pharmacological Treatment

GENERAL MEASURES

•Always consider whether there is an underlying medical condition (e.g. cardiac, lung disease, and thyrotoxicosis) or a substance-related condition (intoxication or withdrawal).
Medicine use (caffeine) and medicine or substances withdrawal (alcohol, opiates, benzodiazepines) can cause anxiety. If medical disorders, medicine use or withdrawal is a plausible reason for anxiety, the underlying cause should be treated.

- Empathic listening, reassurance and guidance should always be offered.
- Psychotherapeutic techniques should be offered
- Use simple relaxation techniques to alleviate the symptoms.
- Reassurance/information and support of the patient and family.
- Use simple relaxation techniques to alleviate the symptoms.

Pharmacological Treatment

For acute management of anxiety:
Diazepam may be given in oral doses of 2 mg one to three times daily, up to oral doses of 5-10 mg twice a day for a maximum of 10 days. Lower doses are generally advised in children and adolescents.

- advise patients not to drive or operate machinery
- do not prescribe diezepam in patients with respiratory problems

REFERRAL

- Poor response to treatment.
- Ongoing symptoms despite acute treatment.
- Co-morbid medical or Psychiatric condition..

4.8.2 Acutely Disturbed Patient

Only a small number of people showing disturbed or aggressive behaviour do so because of mental illness.

It is extremely important to investigate underlying medical causes.*This sort of investigation can only be done by medical and psychiatric specialists so referral is necessary.*

People who are under stress may become extremely disturbed and threaten to commit suicide or harm others. People with mental illnesses such as mania or delirium may become very confused and have little contact with reality. They may place themselves and others at risk.

Whether the underlying cause of the disturbance is medical or psychiatric, the possible danger of the situation, to other people or to the patient himself,

may make it necessary for help to be sought to manage the patient during a crisis. For example the patient may possess weapons or other forms of physical threat.

It is essential to approach the patient with a calm, professional non-threatening manner.

If it is possible to obtain trust, oral medication can be used to calm the patient. Oral medication is much less threatening to the patient than forced injectable medication. Use:

Chlorpromazine100 mg orally, (tablets or syrup) repeated every 2 hours, up to a maximum of 400 mg orally, in 24 hours.

If it is necessary to use an injection, use Chlorpromazine 100 mg IM, repeated every 2 hours if necessary, up to a maximum of 400 mg in 24 hours.

Chlorpromazine may cause postural hypotension and with high doses, the patient should be cared for lying down.

Urgent referral to a higher level should be organised. The patient must be assessed to exclude medical causes. If a psychiatric cause is determined, the treatment must be individualised to the patient's needs for a stable result. Drugs available at the specialist level which may be helpful are:

- ✓ fluphenazine decanoate,
- ✓ haloperidol and,
- ✓ Thioridazine.

All these drugs have some side effects including some potentially frightening side effects such as acute dystonia and laryngeal spasm. When treatment with these drugs is initiated, the patient's response must be carefully monitored by specialists who have access to other drugs such as benzhexol which can be used to treat any serious side effects.

4.8.3 Acutely Disturbed Child or Adolescent

Pharmacological Treatment
Exclude medical causes, e.g.

- Encephalopathy or other intracranial pathology,
- infection,
- seizures,
- metabolic disease,
- Medication adverse effects and intoxication.

For children < 6 years of age:
Sedation with psychotropic agents should only be considered in extreme cases and only after consultation with a specialist.
For children > 6 years of age:
Diazepam IM, 2mg dose as a single dose. Onset of action: within 5 minutes. If sedation is inadequate:
Haloperidol, IM, 0.025–0.05 mg/kg/day in 2–3 divided doses to a maximum of 0.15 mg/kg/day.
Extrapyramidal side effects
If extrapyramidal side effects occur (such as dystonia, rigidity or tremor) with the lowest effective dose of antipsychotic medication, co-prescribe an anticholinergic agent, such as biperiden or benzhoxol.

CAUTION
Always consult with a doctor, preferably a psychiatrist where possible, when prescribing antipsychotic medication to children and adolescents.

4.9 Mood Disorders

Mood disorders are characterized by a disturbance in the regulation of mood, behavior, and affect.

- Mood disorders are emotional disturbance consisting of prolonged periods of excessive sadness, excessive joyousness, or both.
- Mood disorder is diagnosed when sadness or elation is overly intense, continues longer than expected for a causative event, or occurs without cause; function must also be impaired.

In such cases intense sadness is termed depression, and intense elation is termed mania.

- Mood disorders are divided into depressive disorders and bipolar disorder which includes manic and depressive episodes.

Mood disorders consisit mainly of:

1. ***Major depressive disorder***: episodes of major depression, according to accepted diagnostic criteria.
2. ***Bipolar disorder***: one or more episode of mania with or without episodes of major depression.
3. ***Mood disorder due to a general medical disorder***: the mood disturbance is secondary to an underlying medical condition.
4. ***Substance-induced mood disorder***: secondary to substance use or withdrawal.

4.9.1 Major depressive disorder

Major depressive disorder is a mood disorder characterised by history of at least 2 weeks history and the person must have atleast two of the following core symtoms of depression

- Depressed mood for most of the day, almost everyday for children and adolescents irritability or depressed mood
- Loss of interest and pleasure in activities That are normally pleasurable
- Decreased energy or easily fatigability

Accompanied by three of other symptoms of depression for two weeks

- Reduced concentration and attention
- Reduced self-esteem and self-confi dence
- Ideas of guilt and unworthiness
- Bleak and pessimistic view of the future
- Ideas or acts of self-harm or suicide
- Disturbed sleep
- Diminished appetite

Note: rule out other conditions, e.g., hypothyroidism
Check for recent bereavement or other major loss in prior 2 months.

GENERAL MEASURES

- Psychoeducation for the person and his or her family, as appropriate
- Addressing current psychosocial stressors
- Reactivate social networks
- Structured physical activity programme
- Offer regular follow-up
- Ask for suicidal ideation in all patients, before initiating a drug treatment.

Pharmacological Treatment

Adults
The general principle is "**Start low and go Slow**"

- Do not prescribe an antidepressant if there is a recent history of bereavement or major loss
- Do not prescribe an antidepressant if the depression is due to a physical cause

- Do not prescribe an antidepressant if the person is a child/pregnant/breastfeeding

Fluoxetine *(*SSRI antidepressant***),***
Dosing fluoxetine in *healthy adults*

- Initiate treatment with 20 mg daily (to reduce risk of side effects that undermine adherence, one may start at 10 mg (e.g. half a tablet) once daily and increase to 20 mg if the medication is tolerated).
- If no response in 4 – 6 weeks or partial response in 6 weeks, increase dose by 20 mg (maximum dose 60 mg) according to tolerability and symptom response.

Dosing fluoxetine in *adolescents*

- Initiate treatment with 10 mg (e.g. half a tablet) once daily and increase to 20 mg after 1 – 2 weeks (maximum dose 20 mg)
- If no response in 6 – 12 weeks or partial response in 12 weeks, consult a specialist.

Make sure

- your assessment is correct
- The patient is taking the medication as prescribed
- The dose is adequate

If a sedating antidepressant is required:

- ***Amitriptyline (***tricyclic antidepressant***),***

Dosing amitriptyline in *healthy adults*

- Initiate treatment with 50 mg at bedtime. Increase by 25 to 50 mg every 1 – 2 weeks, aiming for 100 – 150 mg by 4 – 6 weeks depending on response and tolerability.
- If no response in 4 – 6 weeks or partial response in 6 weeks, increase dose gradually (maximum dose 200 mg) in divided doses (or a single dose at night).

Common side-effects are dry mouth and drowsiness which usually disappear. (For further details refer to ENF)

CAUTION

- Tricyclic antidepressants can be fatal in overdose.
- Caution is advised when prescribing these agents to outpatients with possible suicidal ideation and requires risk assessment.
- The elderly are more sensitive to side effects and tricyclic antidepressants should be used with caution.
- Avoid tricyclic antidepressants in patients with heart disease, urinary retention, glaucoma and epilepsy.
- Do not prescribe antidepressants to a patient with bipolar disorder without consultation with a specialist, as antidepressants may precipitate a manic episode.
- Be careful of interactions between antidepressants and any other agents that the patient might be taking. (including traditional medicine)

Note:
In cases of one episode of major depressive disorder, continue SSRI treatment with fluoxetine (SSRI s) 6 months after symptoms have resolved.
In cases where there have been multiple episodes, or where other complications exist, longer treatment is indicated which should be reviewed at least annually.
Do not increase the dose too quickly. Although some patients show early improvement, in others, response is delayed for up to 4–8 weeks.

REFER
all patients with**:**

- Suicidal ideation.
- Major depression with psychotic features.
- Bipolar disorder.
- Failure to respond to antidepressants.
- Patients with concomitant medical illness, e.g. heart disease, epilepsy.
- Poor social support systems.
- Pregnancy and lactation.
- Children and adolescents.

4.9.2 Bipolar Disorder

Bipolar disorder is characterized by episodes in which theperson's mood and activity levels are significantly disturbed. This disturbance consists on some occasions of an elevationof mood and increased energy and activity (mania), and on others of a lowering of mood and decreased energy and activity (depression).

Characteristically, recovery is completebetween episodes.
People who experience only manic episodes are also classified as having bipolar disorder.
A **manic episode** is a clinical condition characterized by a persistent elevation of mood, increased energy and activity, and usually marked feelings of well-being and both physical
and mental efficiency. Mood is elevated out of keeping with the patient's circumstances and may vary from carefree joviality to almost uncontrollable excitement. Increased sociability, talkativeness, over-familiarity, increased sexual energy, and a decreased need for sleep are often present. Self-esteem is often inflated with grandiose ideas and overconfidence.

GENERAL MEASURES

- Reassurance and support of the patient and family

For agitated and acutely disturbed patients:

- Always use non-pharmacological de-escalation techniques first.
- Calm the patient.
- Manage in a safe environment.
- Ensure the safety of all staff members.

Pharmacological Treatment

- **Diazepam,** oral, 5 mg, immediately **OR**if the patient is placing himself/herself and others at

significant risk: consider**diazepam 5mg, IM** treatment Repeat after 30–60 minutes if needed. **OR**

- **Haloperidol**, IM, 5 mg, immediately. Repeat after 30–60 minutes if needed. **AND**

Always monitor vital signs of sedated patient.

Refer refer to psychiatrist for management where the patient may be given Mood stabilizer such as Lithium, Carbamezapine, Valporate after further assessment.

4.10 Psychosis

DESCRIPTION –

- Psychosis is characterized by distortions of thinking and perception, as well as inappropriate or narrowed range of emotions.
- Incoherent or irrelevant speech may be present.
- Hallucinations (hearing voices or seeing things that are not there), delusions (fixed, false idiosyncratic beliefs) or excessive and unwarranted suspicions may also occur.
- Severe abnormalities of behaviour, such as disorganized behaviour, agitation, excitement and inactivity or overactivity, may be seen.
- Disturbance of emotions, such as marked apathy or disconnect between reportedemotion and observed

affect (such as facial expressions and body language), may also be detected.
- People with psychosis are at high risk of exposure to human rights violations.

4.10.1 Acute Psychosis

DESCRIPTION –
Acute psychosis is a clinical state characterised by recent onset of psychotic symptoms such as hallucinations, delusions, disorganized or illogical speech, agitation or bizarre behaviour and extreme and labile emotional states.
These symptoms may be preceded by a period of deteriorating social, occupational and academic functioning.

GENERAL MEASURES

- Ensure the safety of the patient and those caring for them.
- Minimise stress and stimulation (do not argue with psychotic thinking).
- Avoid confrontation or criticism, unless it is necessary to prevent harmful or disruptive behaviour.

Pharmacological Treatment
Always use non-pharmacological de-escalation techniques first.
- •Calm the patient.
- •Manage in a safe environment.

•Ensure the safety of all staff members.

Give:

Diazepam, oral, 5 mg, immediately

If oral treatment fails after 30–60 minutes, **OR** the patient is placing himself/herself and others at significant risk: consider IM treatment

OR

• **Haloperido**l, IM, 5 mg, immediately. Repeat after 30–60 minutes if needed.

Always monitor vital signs of sedated patient:

• Vital signs: pulse, respiratory rate, blood pressure, temperature.

Monitor every 5–10 minutes for the first hour, and then every 30 minutes until the patient is ambulatory.

CAUTION
Always monitor for acute dystonic reactions after administration of antipsychotic agents

REFERRAL: All patients.

4.10.2 Chronic Psychosis (Schizophrenia)

DESCRIPTION

Schizophrenia is the most common chronic psychosis. It is a severe disorder that typically begins in late adolescence or early adulthood; it is found approximately equally in men and women, though the onset tends to be later in women, who also tend to have a better course and outcome of this disorder.

It is further characterised by:

• Positive symptoms, delusions, hallucinations and thought process disorder

• Negative symptoms, blunting of affect, social withdrawal
• Mood symptoms such as depression may be present

There are a number of factors which act together to produce the illness. These are:

• Heredity (it runs in families).
• Psycho-social environment
• Biochemical factors

Clinical features include:

• *Delusions*: fixed, unshakeable false beliefs (not shared by society)
• *Hallucination*s: perceptions without adequate corresponding external stimuli, e.g. hearing voices
• *Disorganized thoughts and speech*: e.g. derailment or incoherence
• *Grossly disorganised or catatonic behaviour*
• *Negative symptoms*: affective flattening, social withdrawal
• *Social and/or occupational dysfunction*

Only make the diagnosis if:

- there is social or occupational dysfunction
- signs and symptoms are present for at least 6 months (if less:consider schizophreniform disorder)
- general medical and substance-related causes are excluded

Treatment

The goal of the treatment is to reduce psychologicalsuffering and disabling symptoms, particularly on the relational level.

It offers real benefits, even if chronic symptoms persist (tendency toward social isolation, possible relapses and periods of increased behaviouralproblems, etc.).
Supportive intervention includes:

- family counselling and psycho-education to patient and family,
- Supportive group therapy for patients with schizophrenia

Rehabilitation may be enhanced by:

- assertive community programs
- work assessment, occupational therapy and bridging programmes before return to the community
- appropriate placement and supported employment

Note: At non-speciality hospital, consultation with a community psychiatrist nurse isessential to confirm diagnosis and treatment in specific cases. See referral criteria.

Pharmacological Treatment

- The treatment should last at least one year, with a gradual dose reduction. Low dose may bemaintained for longer periods if necessary.
- Uncertainty about the possibility of follow-up at one year or beyond is no reason not to treat.

However, it is better not to start pharmacological treatment for patients who have nofamily/social

support (e.g., homeless), provided they do not have severe behavioural disorders.

- Check weight and blood pressure before initation of treatmen.
- It is generally suggested to use one antipsychotic at a time. The concurrent use of two or more antipsychotics do not provide additional benefit, while it produces additional adverse reactions and may interfere with treatment adherence.

Start treatment at a low dose:

- **Chlorpromazine** 25–100 mg oral every 8 hrs **–or**
  - Injection, 50 mg/ampoule.
  - 10 mg/kg/day in 3 divided doses (max: 300 mg per day).
- **Haloperidol oral:** 5 mg/day in 2 divided doses; if insufficient, 10 mg/day in 2 divided doses. Not to exceed 20 mg/day.
  - In elderly patients, reduce the dose by half, whichever medication is used.

Extrapyramidal effects, which are common with chlorpromazine and haloperidol canbe counteracted by adding **Benzhexol,** 2 mg/tab. 2 mg every 12 hrs — or —Benzhexol, 1 ml IM every 12 hrs-or **biperiden**

REFERRAL

- Poor social support.
- High suicidal risk or risk of harm to others.
- Children and adolescents.

- Pregnant and lactating women.
- No response or intolerance to medicine treatment.
- Concurrent medical or other psychiatric illness.
- Epilepsy with psychosis.
- The elderly
- If antipsychotic overdosage is suspected,

4.11 Substance Use Disorders

DESCRIPTION - Substance use disorder.
Is a neurobiological disorder involving compulsive substance seeking and taking, despite adverse consequences, with loss of control over substance use (think issues with the "3 Cs": compulsive, consequences, control)

Substance-induced disorders include intoxication, withdrawal and other substance/medication-induced mental disorder.

GENERAL MEASURES
Reassurance and support of the patient and family

Pharmacological Treatment
For severe anxiety, irritability and insomnia:
• Benzodiazepine, e.g.: Diazepam, oral, 5–10 mg as a single dose or 12 hourly for 5–7 days.
• For seizure control and /or sedation: Diazepam, slow IV, 10 mg

REFERRAL

- Severe alcohol dependence.
- Past history of Delirium Tremens.

- Past history of withdrawal seizures or a history of epilepsy.
- Younger (< 12 years of age) or older age (> 60 years of age).
- Pregnancy.
- Significant polydrug use.
- Cognitive impairment.
- Lack of support at home or homelessness.
- Previous failed community detoxification attempts.
- Opioid substance use disorder.

4.11.1 Alcohol Withdrawal (uncomplicated)

DESCRIPTION-

- The term “withdrawal state” refers to a group of symptoms of variable clustering and severity occurring on absolute or relative withdrawal of a substance after repeated, and usually prolonged and/or high-dose, use of that substance.
- The withdrawal state in alcohol dependence usually presents with symptoms of sweating, tremor, nausea and vomiting, elevated blood pressure, tachycardia, anxiety and agitation, craving for alcohol, sleeplessness, and may be complicated by convulsions or delirium tremens.
- The duration of alcohol withdrawal, that usually develops after 24-48 hours after absolute or relative

withdrawal from alcohol, lasts 1-3 and sometimes up to 5-7 days.

GENERAL MEASURES
Assess for comorbid infections.

Pharmacological Treatment
•**Thiamine,** oral, 300 mg daily for 14 days. AND
•**Diazepam**, oral, 10 mg immediately.

- Then 5 mg 6 hourly for 3 days.
- Then 5 mg 12 hourly for 2 days.
- Then 5 mg daily for 2 days.
- Then stop.

5. EAR, NOSE AND THROAT DISEASES

5.1 Ear Disorders

5.1.1 Acute Otitis Media

Introduction

Acute inflammation of the middle ear due to pyogenic organisms

Usually secondary to upper respiratory infection spreading from nasopharynx.Common in infantsandyoung children; more frequent during winter and rainy periods

Usual organisms are *streptococcus, pneumococcus* and *staphylococcus*

Symptoms

- Main symptoms:
- Earache,
- Fever,
- Deafness,
- Ear discharge,
- Malaise and in babies, irritability
- Clinically increasing inflammation and redness of the eardrum
- Later, perforation and pulsating mucopurulent discharge

Differential diagnoses

Acute otitis externa, Referred otalgia

Complications:
Acute mastoiditis, facial nerve paralysis, labyrinthitis, Intracranial: meningitis, brain abscesses, lateral sinus thrombosis

Investigations:

- Ear swab for culture and sensitivity- swab taken properly without contamination,
- Full Blood Count

Treatment objectives:

- Control infection
- Restore normal hearing

Non-drug treatment

- Repeated ear wicking, ear toilet and antiseptic cleaning.
- Myringotomy for persistent mucopurulent collection in middle ear with bulging eardrum

Pharmacological Treatment

- Amoxicillin
  Adult: 500 mg -1 g orally every 8 hours for 5 - 7 days, Child:40 mg/kg orally every 8 hours
- Paracetamol: Adult: 500 mg - 1 g orally every 4 - 6 hours (to a maximum of 4 g) for 5 - 7 days, Child over 50 kg: same as adult dosing : 6 - 12 years: 250 -500 mg; 1 - 5 years: 125 - 250 mg; 3

5.1.2 Otitis Externa and Media

It is an inflammatory condition of the pinna, external auditory meatus and/or the middle ear cavity.

5.1.3 Otitis Externa

Diagnosis

- Itchy, dry and scaly ear canal and painful ear
- There may be a water or purulent discharge and intermittent deafness,
- Pain may become extreme when the ear canal becomes completely occluded with edematous skin and debris.

Treatment

- Exclude anyunderlying chronic otitis media before commencing treatment
- Do a thorough aural toilet at least once a week (ear suctioning under direct vision
- Instruct the patient to thoroughly clean the ear with a cottonwick regularly and keep it dry

Pharmacological Treatment

Give adult and children:

- **Ciprofloxacin ear drops** 3-4 drops 8 hourly for 7 days or more**OR**

- **Boric acid ear drops** 3-4 drops 6 hourly for 7 days or more

5.1.4 Otitis Media (acute or chronic)

Diagnosis

•Ear pain, a sensation of fullness in the ear, hearing loss

•If the tympanic membrane has perforated, there is an aural discharge

•Onset usually follows an upper respiratory tract infection.

•Chronic otitis media is nearly always associated with perforation of the eardrum.

Investigation: Examine the pinna; using an otoscope carefully examine the external auditory canal and the tympanic membrane

5.1.5 Acute Suppurative Otitis Media

It is acute purulent exudates in the middle ear cavity with an ear discharge (perforated tympanic membrane) of not more than 2 weeks duration.

Diagnosis

•Discharge of pus from ear

•Perforated tympanic membrane

Acute otitis media and acute suppurative otitis media Pharmacological Treatment

Adults

- ***Phenoxymethylpenicillin***250 – 500 mg every 6 hours for 7 daysChildren up to 5 years: 6 mg/kg every 6 hours for 7 days; 6-12 years: 250 mg every 6 hours for 7 days or more
- ***Amoxicillin***: 500mg 8 hourly for 7 days , Children 40mg/kg daily in 3 divided doses (max. 3g daily)
- ***Erythromycin*: Adult and children above 8 years** 250 – 500 mg every 6-8 hours for 7 days or more

NOTE: Treatment periods shorter than seven days increase the risk of treatment failure.

Symptomatic treatment of acute otitis media

• ***Paracetamol*** 10 mg/kg body weights every 6-8 hours **OR**

• ***Acetylsalicylic acid (***Avoid ASA if it is a viral infection)

• Bed rest

Decongestive nasal drops or nasal spray e.g. Xylomethazoline1-2 drops into each nostril up to 3-4 times daily for not more than 5 days

Referral to ENT specialists

- Children with severe ear pain, headache, and altered state of consciousness
- A chronically discharging ear that persists in spite of proper treatment.

- Foul smelling ear discharge
- Mastoiditis
- Otitis in the normal (or better hearing) ear combined with permanent hearing loss in the other ear.

5.1.6 Mastoiditis

It is due to infection of the mastoid air cells in the middle ear, a complication of otitis media. It presents as a fluctuant painful swelling on the post auricular area. The overlying skin is inflamed. ***This is an emergency condition.*** The patient must be referred to hospital.

Treatment

Aspirate the swelling before incision and drainage, and then refer after the first dose.

5.1.7 Secretory Otitis Media

It is a multifactorial non-purulent inflammatory condition in the middle ear with serous or mucous discharge. Also there is a residual condition after acute otitis.

Diagnosis

• Little or no pain • No ear discharge
• Gradual loss of hearing • often discovered by chance

Treatment

• Close follow-up
• Nasal drops, oral decongestants and antihistamines have no demons ratable effect on this condition

Refer: secretory otitis with hearing loss that does not improve should be referred to a specialist

5.2 Nose Disorders

5.2.1 Acute Rhinitis and Sinusitis

It is inflammation of the mucosal lining of the nose and paranasal sinuses, almost always occurring concurrently, thus also referred as rhino-sinusitis, of not more than 12 weeks duration.
Rhinitis is caused by a variety of viruses.
Acute sinusitis starts with an obstruction of the sinus ostium due to mucosal edema from a viral infection, followed by reduced sinus ventilation, retention of mucous in the sinus and bacterial multiplication.

5.2.2 Acute rhinitis

Acte rhinitis also calledrhinopharyngitis/common cold.It is a viral inflammatory condition in the nasal mucous membrane, usually part of a more wide-spread infection of the upper respiratory tract.

Non-PharmacologicalTreatment
Bed rest

Treatment

- Xylomethazoline hydrochloride (0.05%)1-2 drops into each nostril up to 3-4 times dailyfor not more than 5 days **OR**
- Beclomethasone nasal spray adult and child over 6 years, 100 micrograms (2 sprays) into each nostril twice daily; max. Total 400 micrograms (8 sprays) daily; when symptoms controlled,

dose reduced to 50 micrograms (1 spray) into each nostril twice daily

- Oral drugs to reduce swelling of the mucous membrane, with topical vasoconstrictors (e.g, oxymethazoline or phenylephrine) Unless strictly necessary do not use in children below 5 yrs.

Antibiotics are not indicated.

5.2.3 Acute purulent sinusitis

Bacterial infection with pus accumulation in one or more of the sinuses

Diagnosis

- Anterior rhinoscopy – watery/purulent nasal discharge occasionally foul smelling;
- nasal congestion
- Plain paranasal sinuses X ray
- mucosal thickening; air fluid levels

Symptomatic Treatment
Bed rest

Pharmacological Treatments
Amoxycillin, adults**,** 500 mg every 8 hours for 14 or more days, children up to 10 years, 10 mg/kg every 8 hours for 14 or more days
OR:
Erythromycin

OR
Doxycycline200 mg on the first day as a single dose then100 mg from the following day every 24 hours for 14
NOTE: Doxycycline for adult only and children above 8 years
Children: **Co-trimoxazole**: 6 weks – 5 years; 0.5 ml/kg every 12 hours for 14 or more days; 6-12 years: 480 mg every 12 hours for 14 or more days
Treatment duration of less than 2 weeks will result intreatment failure

Referral to specialist

- Adults with treatment failure and pronounced symptoms
- Children with ethmoiditis presenting as an acute periorbitalinflammation or orbital cellulitis must be hospitalized immediately
- If sinusitis of dental origin is suspected
- Recurrent sinusitis (>3 attacks in a year) or chronic sinusitis (duration of illness of >12 weeks)

5.2.4 Allergic Rhinitis

It is irritation of the nasal mucosa by an allergen in a previously sensitized individual. Common allergens include house dust (mite's feaces), pollens, cockroach antigen, animal dander, moulds (in-door)

Diagnosis

- Itchy nostrils, throat, eyes
- Watery nasal discharge
- Nasal congestion
- Sneezing

Investigation
Anterior rhinoscopy – watery nasal discharge, nasal congestion
Skin allergy test

Treatment

- Avoidance of an allergen (if possible)
- Cetrizine10mg daily for adults, 5mg daily for children aged 2-6 years)
- Beclomethasone, one puff each nostril 3 times a day

5.2.5 Epistaxis

It is nose bleeding. May be due to:

- a local cause (in the nasal cavity – trauma, tumor, foreign body, septal varisces, septal deviation) or
- due to a systemic cause (blood disorders, vascular disorders, renal failure, hepatic failure, use of anticoagulants (wafarin, heparin)

Management

- Stabilize the patient: put an open intravenous line, blood grouping and cross matching.
- Put the patient in a sitting position, put on a gown, sterile gloves, glasses, and head light
- Advise the patient to pinch the soft part of the nose gently for 3 minutes.
- Evacuate clots and do a thorough head and neck examination. Remove a foreign body; cauterize septal varisces using silverex stick
- If the patient is still bleeding do an anterior nasal packing by introducing as far posterior as possible sterile vaseline gauzes
  (or iodine soaked gauzes if not available) using a dissecting forcep (if bayonet forcep is not available).
- Put rolled dry gauze on the nose and plaster it.
- If the patient is still bleeding do a posterior nasal packing using a Folley's catheter introduced through the nasal cavity into the oropharynx, balloon it with normal saline up to 10-15cc while pulling it outward to impinge on the posterior nasal coana, then do anterior nasal packing as above.
- Put dry gauze on the nose to prevent necrosis and fix the catheter on the nose with an umbilical clamp.

Almost all of the nasal bleedings will be controlled by this way.

Pharmacological Treatment
Put the patient on oral antibiotics (**Amoxycillin** 500mg 8 hourly for 5 days),
Analgesics (Paracetamol 1g, 8 hourly for 5 days) and, Trenaxamic acid 500mg 8 hourly for 3 days. Remove the packs after 72 hours. Put an icecube on the forehead, extending the neck or placing a cotton bud soaked with adrenaline in the vestibule will not help this can be shortened.

Referral
• If the patient is still bleeding repack and refer immediately
• Failure to manage the underlying cause, refer the patient

5.3 Laryngeal and Throat Disorders

5.3.1 Pharingo-tonsilitis

It is an acute inflammation of the pharynx and/tonsils, characterized by fever and a painful throat. Pharyngo-tonsillitis is caused by virus or bacteria. Clinicalimportant pathogens are Group Abeta-haemolytic streptococci (GAS) and Epstein –Barr virus (EBV). In practice GAS is an indication for treatment with antibiotics.

Pharmacological Treatment
As general rule pharyngotonsillitis caused by GAS should be treated with antibiotics. If treatment is begun

early, duration of the illness can be shortened. Antibiotics can hinder the spread of infection and reduce the risk of complications.

• ***Phenoxymethylpenicillin***: 500 mg every 8 hours for 10 days***OR***

• ***Amoxicillin*** 250 – 500mg every 8 hours for 10 days ***OR***

• ***Erythromycin;*** 250 – 500 mg every 8 hours for 10 days;

Children up to 8 years10 mg/kg every 8 hours for 10 days

• ***Paracetamol*** 10 mg/kg body weight every 8 hours until fever is controlled. Children (See under treatment of purulent sinusitis) **Plus**

• Paracetamol 10 mg/kg body weight every 8 hours until fever controlled.

NOTE: Duration of treatment is ten days. Shorter treatment involves increased risk of therapy failure

Refer the patient to the specialist with tonsillitis if:

• Chronic tonsillitis

• Recurrent tonsillitis (>3 attacks in a year or 5 or more attacks in 2 years)

• Obstructive tonsillitis (causing an upper airway obstruction)

5.3.2 Cervical Adenitis

- Before anything else, search for a primary focus of infection and treat accordingly. Examine the head and neck to exclude other causes, in particular if the nodes are not painful. Painful cervical adenitis may

be treated with antibiotics, but a treatment period of several weeks is often needed.

- Failure to respond to antibiotics may indicate a tuberculosis infection or another condition where antibiotics are not indicated.

Refer these cases to a hospital.

Pharmacological Treatment

- **Phenoxymethylpenicillin** 500 mg, (children: 12.5 mg/kg) orally, every 6 hours for 10 days.***or,***if there is a history of penicillin hypersensitivity
- E**rythromycin** 500 mg (children: 10 mg/kg) orally, every 6 hours for 10 days.
- For pain or fever (if 38.5 ^{o}C or higher) give:
- P**aracetamol (**children up to 3 years: 125 mg (5 ml syrup) orally, every 6 hours) or 100 mg orally in tablet form every 6 hours.children over 3 years: 250 mg orally, every 6 hours. Do not exceed 4 doses in 24 hours.

5.3.3 Laryngitis

Thisis an infectious or non infectious, acute/chronic inflammatory condition of the larynx
Causes include:

- Viruses (for acute laryngitis),
- Bacteria,
- Fungi,

- laryngeal reflux disease,
- bronchitis
- thermal injuries,
- cigarette smoking,
- trauma (vocal cord abuse), and,
- Granulomatous conditions (for chronic laryngitis).

The picture of the disease is different in children and adults due to the small size of the larynx in children. Acute subglottic laryngitis (pseudocroup) occurs mainly in children under the age of seven. It is a viral infection. Edema of the mucous membrane of the subglottic space causes breathing difficulties, especially on inspiration. So, laryngitis in children may require active treatment.

Non-pharmacolgical Treatment

- Symptomatic treatment (acute laryngitis**)**
- Parents should behave calmly and avoid frightening the child
- Bed rest
- Keep the air damp and cold
- Give extra fluid
- Nasal drops or spray may be helpful
- Smoking cessation

Pharmacolgical Treatment

- No specific treatment is aveliable for viral laringitis.

- Cough suppresantes and steam inhalations relieve symptoms and promote resolution of acute laryngieties.
- Epinephrine (Adrenaline) inhalation effectivelyreduces symptoms, but the effect may be short – lived

Hospitalization

If severe symptoms persist or worsen or recur after Epinephrine inhalation hospitalization is indicated. Treatments to contol gastro-esophageal reflux, acute bronchits and rehydration may be bebeficial,

If disease persists refer to a specialist

5.3.4 Acute Epiglotitis (AE)

It is an acute infectious inflammation of the epiglottis, supraglottic and hypopharynxis. It is a potentially lethal disease. Edema of the epiglottis may cause acute airway obstruction. Epiglottitis occurs both in children and adults. Haemophilus influenzae is often the cause.

Diagnosis
AE is characterized by:

- Throat pain,
- Difficulty swallowing,
- Drooling, husky voice,
- Fever often high and with chills;

- Patients prefer sitting posture with an extended neck, laborious inspiration, cough in some cases and anxiety.

Investigation:
Plain X ray of the neck, lateral view characteristically presents with a positivethumb sign (edematous epiglottis)

Immediate Measures to be taken

- hospitalization, preferably in the ICU
- Transportation: sitting, with oxygen supplementation
- Be prepared to treat respiratory failure (intubation or tracheotomy)
- Antibiotics may be given if transport lasts more than one hour.

5.3.5 Recurrent Respiratory Papillomas

Recurrent respiratory papillomas (laryngeal papilomas) is the commonest benign laryngeal tumor of the larynx caused by Human papilloma virus (HPV), occurring in both children and adults.
It has a higher recurrence rate in children than in adults, among adults it may turn into a malignancy

Signs and Symtoms
• Progressive hoarseness of voice
• Progressive difficulty in breathing

• Progressive inspiratory stridor
• on and off cough

Investigation

- Physical examination
- Thorough respiratory system examination
- Hoarse voice, audible respiration (inspiratory stridor)
- Indirect laryngoscopy – papilloma croups on the larynx
- Chest X ray - foreign body inhalation, pneumonia (coincidental finding)

Treatment

- Refer the patient for microlaryngeal surgery
- If in distress, perform a tracheostomy first then **refer.**

5.3.6 Croup (Acute Laryngio-tracheobronchitis)

Croupis is an inflammation of the upper and lower respiratory tracts, characterised by stridor and respiratory distresswhich occurs in young children (usually between 6 months to 3 years of age).
It arises as a result of narrowing of the airway in the region of the larynx.
The most common cause is viral infection (particularly parainfluenza viruses) but may also be due to bacterial

infection. The obstruction is due to inflammation and oedema.

A clinical diagnosis of viral croup can be made if

- Apreviously healthy child develops progressive inspiratory airway obstruction with stridor and a barking cough, 1–2 days after the onset of an upper respiratory tract infection. Such symptoms usually occur at night.A mild fever may be present.
- Suspect foreign body aspiration if there is a sudden onset of stridor in an otherwise healthy child.
- Suspect epiglottitis if the following are present in addition to stridor:
  - » very ill child
  - » high fever
  - » sitting upright with head held erect
  - » drooling saliva
  - » unable to swallow

Assessment of the severity of airway obstruction and management in croup :

Grade1 Inspiratory stridor only	- Prednisone, oral, 1–2 mg/kg, single dose. - Do not give if measles or herpes infection present. » Refer.
Grade2 Inspiratory and expiratory stridor	- Prednisone, oral, 1–2 mg/kg,as a single dose -Epinephrine, 1:1 000 diluted in sodium chloride 0.9%, nebulised, immediately. -- Repeat every 15–30 until stridor disappears. » Refer.

Grade 3 Inspiratory and expiratory stridor with active expiration, using abdominal muscles	» Treat as above. » If no improvement within one hour, refer Urgently(intubate before refer if possible)
Grade 4 Cyanosis, apathy, marked retractions, impending apnoea	»Intubate (if not possible give treatment as above). » Refer urgently.

General management

- Prevent asphyxiation
- Hospitalization may be necessary
- Treat inflammatory edema
- Continue oral fluids
- Humidification of inhaled air
- Keep child comfortable

Pharmacological Treatment

- **Paracetamol,** oral, 10–15 mg/kg/dose 6 hourly when required.

Children grade 2 or more stridor- while awaiting transfer:

Admit to hospital, give Oxygen therapy to all patients with chest in-drawing (using nasal prongs only, DO NOT use nasopharyngeal or nasal catheter) until the lower chest wall in-drawing is no longer present

• ***Dexamethasone*** 0.6 mg/kg orally daily in 1-2 divided doses or 0.6 mg/kg Im stat**Plus**
• ***Nebulized Adrenaline*** (400mcg/kg) every 2 hours if effective; repeat after 30 min if necessary.
• Epinephrine (adrenaline), 1:1000, nebulised, immediately using a nebuliser. If there is no improvement, repeat every 15 minutes, until the child is transferred. Dilute 1 mL of 1:1000 epinephrines (adrenaline) with 1 mL sodium chloride 0.9%. Nebulise the entire volume with oxygen at a flow rate of 6–8 L/minute.
• ***Prednisone***, oral, 1–2 mg/kg immediately as a single dose.
If epiglottitis suspected:

•Ceftriaxone, IM, 80 mg/kg/dose immediately as a single dose and refer.
• Do not inject more than 1 g at one injection site.
Management during transfer:
» Give the child oxygen.
» Continue nebulisations with epinephrine (adrenaline).
» If grade 3, contact ambulance or nearest doctor.
» If grade 4, intubate and transfer.

REFERRAL

Urgent

» Children with:
»chest indrawing » altered consciousness
» rapid breathing » inability to drink or feed
» For confirmation of diagnosis.
» Suspected foreign body.»Suspected epiglottitis.

Non Urgent

» All children grade 2 or more stridor.

5.3.7 Diphtheria

Diphtheria is an acute contagious disease caused by *Corynebacteriumdiphteriae*. It is directly transmitted from person to person by droplets. Children between 1-5 years of age are most susceptible although non-immune adults are also at risk.

Diagnosis

It is characterised by a grey adherent membrane on the tonsils, composed of dead cells, fibrin, leucocytes and red blood cells as a result of inflammation due to multiplying bacteria.

General management

- Be very careful when examining the throat as it is very easy to cause complete obstruction.
- Isolate the child
- Gently examine the child's throat – can cause airway obstruction if not carefully done.
- NGT for feeding if unable to swallow
- Avoid oxygen unless there is incipient airway obstruction
- May need tracheostomy if there is incipient airway obstruction

Pharmacological Treatment

- ***Penicillin V*** (250 mg four times daily) for a total treatment course of 14 days ***OR***

- ***Erythromycin*** 125-250 mg every 6 hours for 14 days ***OR***
- ***Penicillin G*** (Benzyl Penicillin) 25,000 to 50,000 units/kg to a maximum of 1.2MU IV every 12 hours until the patient can take oral medicine) ***Plus***
- **Diphtheria antitoxin** (IM or slow IV) dose depends upon the site and severity of infection:
  First give a test dose of 0.1ml of 1 in 10 dilution of antitoxin in 0.9% Sodium Chloride intradermal to detect hypersensitivity

  It should be given immediately because delay can lead to increased mortality
  The dose should be administered intravenously over 60 minutes in order to inactivate toxin rapidly: 20,000 to 40,000 units for pharyngeal/laryngeal disease of <48 hours duration,
  • 40,000 to 60,000 units for nasopharyngeal disease
  • 80,000 to 120,000 units for >3 days of illness or diffuse neck swelling ("bull-neck")

NOTE-Tracheostomy may be required for airways obstruction

5.3.8 Whooping Cough (Pertussis)

It is a highly infectious childhood disease caused by Bordetella pertussis. It is most severe in young infants who have not yet been immunized.

Diagnosis

- After an incubation period of 7 –10 days, the child develops fever, usually with a cough and nasal discharge which are clinically indistinguishable from a common cough and cold;
- In the second week, there is paroxysmal coughing which can be recognized as pertussis;
- The episodes of coughing can continue for 3 months or longer;
- The child is infectious for a period of 2 weeks up to 3 months after the onset of illness;
- The main clinical feature is paroxysmal cough associated with a whoop.

General management

- During paroxysms of coughing, place the child head down and prone, or on the side, to prevent any inhaling of vomitus and to aid expectoration of secretions.
- Care for the airway but avoid, as far as possible, any procedure that could trigger coughing, such as application of suction, throat examination
- Do not give cough suppressants, sedatives, mucolytic agents or anti-histamines.
- If the child has fever (>38.5^0 C) give paracetamol.
- Encourage breastfeeding or oral fluids

- Whooping cough is preventable by immunization with pertussis vaccine contained in DPT triple vaccine.
- Admit infants aged less than 6 months to hospital; also admit any child with pneumonia, convulsions, dehydration, severe malnutrition, or prolonged apnea or cyanosis after coughing.

Pharmacological Treatment

- **Erythromycin**12.5 mg/kg (PO) every 6 hours for 10 days.This does not shorten the illness but reduces the period of infectiousness

If there is fever or if erythromycin is not available

- **Chloramphenico**l 25 mg/kg (PO) every 8 hours for 5 days
- Give ***oxygen*** to children who have spells of apnea or cyanosis, or severe paroxysms of coughing.

Note: Use nasal prongs, not a nasopharyngeal catheter or nasal catheter which can provoke coughing.

5.3.9 Inhaled foreign body

Inhaled foreign bodies may cause stridor and persistent cough. If the child is seen soon after the choking event, hold it upside down and slap the back. If this method is unsuccessful,

refer the patient to the hospital for removal of the foreign body. Careful follow-up is needed in case serious complications develop.

5.4 Orodental Conditions

5.4.1 Gingivitis

Gingivitis is an inflammation of the gingivae, causing bleeding with swelling, redness and exudates
The most common cause of gingivitis is poor oral hygiene.

General Measures

- Give advice on good oral hygiene, eg daily cleaning of the teeth using either a tooth brush or the traditional tooth stick.
- A special condition is acute necrotising ulcerative gingivitis (ANUG) in children.
- Recommendincreased intake of fruits such as orangesand tomatoes.

Further treatment is as follows.
Adults: Refer to dental unit
Children:

- Start antibacterial therapy withmetronidazole 7.5 mg/kg orally, every 8 hours for 5 days
- At the same time an antibacterial mouth-wash should be used. **Chlorhexidine**0.1% as a mouth

wash, repeated 2-3 times daily.Use 10-15 ml of the solution in a third of a glass of warm water

Refer the patient to the dental unit for further management.

5.4.2 Oral Candidiasis (Thrush)

Oral candidiasis is an infection by the fungus, ccandida species. Oral Candidiasis (Thrush) occurs frequently in:

- Patients with malnutrition,
- Chronically sick patients,
- Patients with diabetes,
- Patientswith underlying immune deficiencies and,
- Patientstaking long-term antibiotics

Pharmacological Treatment
Adults
N**ystatin pessary100**,000 units, sucked orally, every 8 hours after food for at least 10 days.
Children:
G***entian violet*** paint 0.5% applied topically, to the lesions 2-3 times daily.
N**ystatinsuspension/ other alternatives**

5.4.3 Mouth Sores

Good nutrition and dental hygiene must be encouraged.
Treat symptomatically initially with**chlorhexidine**0.1% as a mouth wash, repeated 2-3 times daily. Use 10-15 ml of the solution in a third of a glass of warm water
Seek further advice if:

- sores continue for more than 3 weeks
- sores are spreading
- there is associated painless lymphadenopathy
- In cases of oral candidiasis, treat accordingly

5.4.4 Caries / Toothache

Give further symptomatic relief as follows and refer to a dental practitioner.
A**cetylsalicylic acid** 500 mg orally, every 6 hours as required, preferably after food (not for children); maximum 4 g per day.***Or***
Paracetamol: Adults: 500 mg – 1 g orally, every six hours
Children up to 3 years: 125 mg (5 ml syrup) orally, every 6 hours) or 100 mg orally in tablet form every 6 hours
Children over 3 years: 250 mg orally, every 6 hours

5.4.5 Dental Abscess

A dental abscess should be treated in a hospital.
Pain relief is important. Use
Adults:
Acetylsalicylic acid 500 mg orally, every 6 hours as required, preferably after food (not for children; max 4 g per day).
Paracetamol
Adults: 500 mg - 1 g orally, every 6 hours
Children up to 3 years: 125 mg (5 ml syrup) orally, every 6 hours) or 100 mg orally in tablet form every 6 hours
Children over 3 years: 250 mg orally, every 6 hours

Start antibiotic treatment and refer the patient.
PhenoxymethylpenicillinAdults and children older than 12 years: 500 mg to 750 mg orally, every 6 hours for 5 days
Children 6 years to 12 years: 250 mg orally, every 6 hours for 5 day

6. PULMONARY DISORDERS

6.1 Acute Bronchitis

It is a self-limited inflammation of the bronchi due to upper airway infection. This respiratory condition is generally caused by a virus. Pertussis is the only indication for antibacterial agents in the treatment of acute bronchitis. In children, check carefully for fast breathing and chest indrawing, the diagnostic signs of pneumonia.If there is only cough, with or without clear sputum, antibiotic treatment should not be given..

Diagnosis –

- Patients with acute bronchitis present with a cough lasting more than five days (typically one to three weeks), which may be associated with sputum production.
- Acute bronchitis should be distinguished from chronic bronchitis; it is not aform of COPD.

Symptomatic pharmacological treatment

- **Paracetamol** or **aspirin**
- **Cough suppressant syrups**

If there is cough with yellowish, foul smelling sputum, or acute exacerbations of chronic bronchitis, treat with:

- **Cotrimoxazole** 80/400 mg orally, every 12 hours for 5 days.

6.2 Chronic Bronchitis

It is defined by a chronic productive cough for three months in each of two successive years in a patient in whom other causes of chronic cough have been excluded. Patients may get secondary bacterial infection with development of fever and production of thick smelly sputum.

Non Pharmacolgical Treatment

- Stop smoking and/or remove from hazardous environment
- Prompt treatment of infective exacerbations
- Controlled oxygen therapy
- Physiotherapy
- Bronchodilator may give some benefit

Pharmacolgical Treatment

- **Salbutamol** (O) 4-8mg 6 – 8 hourly and
- **Prednisolone** (O) 20mg once daily for 5 days **if there is any possibilityof reversible airways obstructions**

6.3 Chronic Obstructive Pulmonary Disease (COPD)

Definition -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 (WHO) **Clinical symptoms and signs.**

•Chronic cough and sputum production often precede the development of airflow limitation by many years.
•Abnormal shortness of breath and increased forced expiratory time

COPD diagnosis

- Diagnosed based on factors such as signs/symptoms, patient history, physical examination, chest X-rays.
- Is confirmed by a simple test called spirometry, which measures how deeply a person can breathe and how fast air can move into and out of the lungs.

COPD Exacerbations

A sustained **worsening of the patient's** condition, from the stable state and beyond normal day -to-day variations, that is acute in onset and necessitates a change in regular medication in a patient with underlying COPD.
Additionally, a generalized sub-classification of exacerbations based on health-care utilization is proposed.

- **Mild**: patient has an increased need for medication, which he/she can manage in his/her own normal environment.
- **Moderate**: patient has an increased need for medication, and he/she feels the need to seek additional medical assistance.

• **Severe**: patient/caregiver recognizes obvious and/or rapid deterioration in condition, requiring hospitalization.

Clinical signs and symptoms

• Increased dyspnoea,
• Productive cough with altered sputum
• Fever.
•Alternatively, the symptoms may be more nonspecific, such as malaise, fatigue, insomnia or sleepiness, and depression.

The major diseases included inthis category are:

• **Chronic bronchitis** - a chronic, inflammatory condition of the bronchi characterized by coughing and expectoration (spitting-up) of sputum (mucous coughed-up from the lungs) occurring on most days and lasting 3 months or longer for at least two consecutive years.
• **Emphysema** - a respiratory disorder that is characterized by enlargement and eventual destruction of the air sacs (alveoli) in the lungs, through which oxygen passes from the lungs into the bloodstream.
• **Bronchiectasis** is characterized by inflamed and easily collapsible airways, obstruction to airflow, and frequent hospital visits and admissions.
• Although **asthma** is also a condition that is associated with airway obstruction, and many people with COPD

also suffer with asthma, as a general rule, asthma is not included under the category of COPD.

Non- pharmacological treatment:

The role of supplemental treatments in the management of patients with COPD, including:

• Pulmonary rehabilitation
• Nutrition
• Psychosocial support
• Patient education
• Supplemental oxygen therapy

Pharmacological Treatment

The major types of medications that are often prescribed for patients with stable COPD:

- Inhaled bronchodilators
- Theophylline.
- Inhaled corticosteroids
- Surgical treatment options for the treatment of patients with advanced emphysema, which include:
- Bullectomy
- Lung transplantation
- Lung-volume reduction surgery

6.4 Bronchiolitis / Wheezing

Acute Bronchiolitis in Children

Acute bronchiolitis is a common cause of wheezing and cough in first two years of life. It is caused by viral

infections and presents with lower airways obstruction due to inflammation and plugging of the small airways. Recurrent episodes can occur, usually during winter. Bronchiolitis (children younger than 1 year old) and asthma (children 1 year and older) are often manifested by wheezing. If treatment of wheezing proves difficult, consider pneumonia or foreign body.

Child presents with:

» rapid breathing; » decreased breath sounds
» chest indrawing » an audible wheeze

GENERAL MEASURES

» Minimise contact with other children.
» Avoid use of antibiotics and corticosteroids.
» Do not sedate child.

Pharmacological Treatment

- Oxygen, humidified, using nasal prongs or nasal cannula, at 1–2 L/minute. ***AND***
- Salbutamol 0.5%, solution, 0.5–1 mL diluted to 2–4 mL with sodium chloride 0.9%, nebulised over 3 minutes (single dose).

Bronchiolitis does not usually respond to salbutamol. If there is a good response, consider asthma as a cause of the symptoms.

If no response

- Epinephrine (adrenaline) 1:1000,1mL diluted in 2–4 mL of 3–5% sodium chloride, nebulised over at least 3 minutes, single dose; mix 3 mL of 3–5% sodium chloride with 2 mL water to make 3% sodium chloride solution. Evaluate the response to the nebulisation. If there is a good response which is maintained for at least 2 hours, send patient home.

Note:Advise the patient that there may be a relapse and in such case advicethe patient to return promptly.

REFERRAL

- Chest indrawing and distress not responding to nebulisation.
- Difficulty in feeding.
- Previous admission for same problem.
- Oxygen saturation < 90% in room air.

6.5 Bronchiectasis

Bronchiectasis is characterized by inflamed and easily collapsible airways, obstruction to airflow, and frequent hospital visits and admissions.

Diagnosis

The diagnosis is usually established clinically on the basis of chronic daily cough with viscid sputum production, and radiographically by the presence of

bronchial wall thickening and luminal dilatation on chest x-rays.

General management

•Antibiotics are used to treat an acute exacerbation and prevent recurrent infection by suppression or eradication of existing flora.

•Physiotherapy and postural drainage

•Avoid smoking

•Respiratory care during childhood measles helps prevent the development of bronchiectasis in children

Treatment

Management of bronchiectasis is aimed at treating the underlying cause

(eg, removal of an airway foreign body or treatment of aspirationorhumoral immunodeficiency),improving mucocilliary clearance, treating and preventing infection, and controlling inflammation.

Acute exacerbation

Adults

• **Ciprofloxacin** 500mg every 12 hours for 7-10 days

Plus

• **Metronidazole** 500mg every 8 hours for 7-10 days

Children:

• **Amoxycillin** 40mg/kg (O) in 3 divided doses for 5-7 days

Plus

• **Metronidazole** 7.5 mg/kg every 8 hours for 5-7 days

Prevention of infection

• ***Ciprofloxacin*** 500mg (PO) once daily for 7 – 14 days/ month ***OR***

• **Erythromycin** (PO) once 250-500mg for 7-14days/month

6.6 Pneumonia

Pneumonia is an acute infection of the lung parenchyma. It can either be primary (to the causing organism) or secondary to pathological damage in the respiratory system.The common causative organisms for pneumonia are bacterial (for example Streptococcus pneumoniae, Hemophilus influenza, and Staphylococcus aureus, and Mycoplasma pneumoiae)
Viralor parasitic e.g Pneumocystis jirovecii,

Management is guided by:

- Age,
- co-morbidity, and,
- severity of the pneumonia

Signs and symptoms

- Malaise, in severe cases, shock and respiratory failure
- Fever, often with sudden onset and with rigors
- cough, which becomes productive of rusty brown or yellow-green sputum
- pleuritic type chest pain
- shortness of breath

On examination there is:

- Fever
- crackles or crepitations
- tachypnea
- bronchial breath sounds
- There may be a pleural rubbing sound or signs of a pleural effusion.

Predisposing conditions include:

- very young or old age
- other concomitant diseases
- malnutrition
- HIV infection

Pneumococcal pneumonia often occurs in previously healthy adults. Adults with mild to moderately severe pneumonia may be managed at PHC level, depending on the response to initial treatment (see below).

1. Pneumonia in Children

Pneumonia should be distinguished from viral upper respiratory infections. The most valuable sign in pneumonia is the presence of rapid breathing.
Assess the child for the severity of the pneumonia.
Classify children according to the severity of the illness:
Non-severePneumonia: fever, cough and rapid breathing, but no chest indrawing (of the lower chest wall) and no flaring of nostrils.
Severe pneumonia: fever, cough, rapid breathing, chest indrawing and flaring nostrils.

For more details, refer also to the latest MOH: Integrated Management of Neonatal and Childhood Illness (**IMNCI**) guidelines

If the chld is unable to drink or breastfeed, if he vomits everything, if he has had convulsions, or if he is lethargic or unconscious, he should also be **referred urgently** to hospital.

Note: Children < 2 months of age with rapid breathing should be classified as having severe pneumonia.

Rapid breathing is defined as:

» infants birth–2 months ≥ 60 breaths/minute
» infants 2 months–1 year ≥ 50 breaths/minute
» children 1–5 years ≥ 40 breaths/minute

Danger signs indicating urgent and immediate referral include*:*

1. oxygen saturation of < 90% in room air
2. cyanosis
3. inability to drink
4. < 2 months of age
5. grunting
6. impaired consciousness

General Measures

- Ensure adequate hydration.
- Continue feeding.

- Oxygen therapy if available
- Supportive care

Pharmacological Treatment
Amoxicillin, oral, 30mg/kg/dose 8 hourly for 5 days
For* Penicillin *allergy: Children< 18 kg
•**Erythromycin**, oral, 10–15 mg/kg/dose 6 hourly for 5 days.

Non-severe pneumonia

- Amoxicillin 25 mg/kg 12 hourly for 5 days
- Give the first dose at the clinic and teach the mother how to give the other doses at home.
- Encourage breasting and feeding.

Severe pneumonia:

- Oxygen, using nasal cannula at 1–2 L/minute before and during transfer.
- Ampicillin 50 mg/kg I.V/I.M every 6 hours **Plus**
- Gentamicin (7.5 mg/kg I.V/I.M once a day) for 5 days;

If child **responds well,** complete treatment at home or in hospital with • **Amoxicillin** (15 mg/kg three times a day) ***Plus*• Gentamicin** 7.5 mg/kg I.M once daily for a further 5 days.

Alternatively,

• **Chloramphenicol**(25 mg/kg I.M or I.V every 6 hours) until the child has improved. Then continue orally 4 times a day for a total course of 10 days.
If the child **does not improve within 48 hours**, switch to
• Gentamicin (7.5mg/kg I.V/IM once a day) weeks.

REFERRAL, urgent

- All children with severe pneumonia, i.e. chest indrawing (of the lower chest wall), flaring nostrils or cyanosis;
- All children < 2 months of age

Non urgent

- Inadequate response to treatment
- Children coughing for > 3 weeks to exclude other causes such as TB, foreign body aspiration or pertussis

2. Pneumonia in Adults

Uncomplicated Pneumonia

Diagnosis
A chest X-ray should ideally be taken in all patients to confirm the diagnosis. Send one sputum specimen for TB DNA PCR (Xpert MTB/RIF) to exclude pulmonary tuberculosis.
Pharmacological Treatment

If not severely ill (see referral criteria below):

- **Amoxicillin, oral**, 1 g 8 hourly for 5 days.

For Penicillin allergy:

- **Erithromycin**, oral, 400 mg daily for 5 days.

REFERRAL

Any of the following:

- Confusion or decreased level of consciousness;
- Cyanosis.
- No response to treatment after 48 hours.
- Respiratory rate of ≥ 30 breaths/minute
- Systolic BP < 90 mmHg.
- Diastolic BP < 60 mmHg.
- Deterioration at any point;
- Patients with pneumonia:
  - from a poor socio-economic background, who are unlikely to comply with treatment,
  - living a considerable distance from health centres ,
  - who have no access to immediate transport

3. Pneumonia in Adults with Underlying Medical Conditions or patients 65 years and above

A chest X-ray should ideally be taken in all patients to confirm the diagnosis. Send one sputum specimen for TB DNA PCR (Xpert MTB/RIF) to exclude pulmonary tuberculosis.

Common underlying conditions include:

- Diabetes mellitus.
- Alcoholism

- COPD
- HIV infection
- Chronic liver disease.
- Cardiac failure
- Chronic kidney disease.

Most of these patients will require referral to a doctor.

Pharmacological Treatment

Mild pneumonia:

• **Amoxicillin/clavulanic acid** 875/125 mg, oral, 12 hourly for 5 days.

Penicillin allergy:

• **Erithromycin** oral, 250mg every 6 hrs daily for 5 days.

Severe Pneumonia

Severe pneumonia is defined as any two or more of the following:

» confusion or decreased level of consciousness
» respiratory rate of ≥ 30 breaths/ minute
» systolic BP < 90 mmHg, diastolic BP < 60 mmHg
» > 65 years of age

Pharmacological Treatment

While awaiting transfer:

• Oxygen, to achieve a saturation of 92%.

CAUTION

Do not administer calcium containing fluids, e.g. Ringer-Lactate, concurrently with ceftriaxone.

REFERRAL
Urgent
All patients

6.6.1 Pneumocystis Pneumonia

Interstitial pneumonia occurring with advanced HIV infection due to Pneumocystis jiroveci (formerly carinii). Patients usually present with shortness of breath or dry cough. Chest X-ray may be normal in the early stages, but typically shows bilateral interstitial or ground glass pattern.

GENERAL MEASURES
Ensure adequate hydration.

Pharmacological Treatment
Adults

- Cotrimoxazole, oral, 6 hourly for 3 weeks.

Approx. weight kg	Use one of the following tablets	
	80/400 mg	160/800 mg
<40 kg	2 tablets	1 tablet
>40–56 kg	3 tablets	1½ tablets
>56 kg	4 tablets	2 tablets

For secondary prophylaxis

- Cotrimoxazole, oral, daily.

Use one of the following tablets	
80/400 mg	160/800 mg
2 tablets	1 tablet

REFERRAL

- All children.
- Shortness of breath with mild effort
- Breathing rate > 24 breaths/minute.
- Cyanosed patients.
- For antiretroviral treatment, if not available at clinic.

6.7 BronchialAsthma

Asthma is a chronic inflammatory disorder of the airways associated with airway hyper-responsiveness that leads to recurrent episodes of wheezing, breathlessness, chest tightnessand coughing. These episodes are usually associated with airflow obstruction within the lung, often reversible, either spontaneously or with treatment.

Factors that **precipitate**/**aggravate** asthma include:

- allergens,
- infection,
- exercise,
- drugs (aspirin), tobacco, etc.

In young children, most initial episodes of asthma-like symptoms are associated with arespiratory tract infection, with no symptoms between infections.
Wheezing episodes usuallybecome less frequent with time; most of these children do not develop asthma.

1. Asthma attack (acute asthma)

Asthma attack is a substantial worsening of asthma symptoms. The severity and duration ofattacks are variable and unpredictable.

The severity of the asthma attack must be rapidly evaluated by the following clinical criteria.Not all signs are necessarily present.

Assessment of severity

Assessment of the severity of asthma attackin children under 2 years and adults

Mild to moderate attack

- Able to talk in sentences
- Respiratory rate (RR): Children 2-5 years ≤ 40/min , Children > 5 years ≤ 30/min
- **Pulse :** Children 2-5 years ≤ 140/min, Children > 5 years ≤ 125/min
- No criteria of severity

Severe attack

Cannot complete sentences inone breathor too breathless to talk or feecd: talk or feed

RR : Children 2-5 years> 40/min Children > 5 years > 30/min

Adults ≥ 25/min

Pulse

Children 2-5 years> 140/min

Children > 5 years > 125/min

Adults ≥ 110/min
O 2 saturation ≥ 92%

2. Life threatening attack

Altered level of consciousness (drowsiness, confusion, coma)
Exhaustion, Silent chest, Paradoxical thoraco-abdominal Movement, Cyanosis, Collapse
Bradycardia in children orarrhythmia/hypotension in adults
Oxygen saturation ≥ 92%

Treatment

Treatment and follow-up depend on the severity of the attack and the patient's response:

Mild to moderate attack

– Reassure the patient; place him in a 1/2 sitting position.

Pharmacological Treatment:

1. **Salbutamol (aerosol**): 2 to 4 puffs every 20 to 30 minutes, up to 10 puffs if necessary duringthe first hour.
2. In children, use a spacerto ease administration (use face mask in childrenunder 3years). Single puffs should be given one at a time, let the child breathe 4 to5 times from the spacer before repeating the procedure.

3. **Prednisolone** oral one dose of 1 to 2 mg/kg

If the attack is completely resolved: observe the patient for 1 hour (4 hours if he lives farfrom the health centre) then give outpatient treatment:

1. **Salbutamol** for 24 to 48 hours(2 to 4 puffs every 4 to 6 hours depending on clinical evolution) and,
2. **Prednisolone** oral (1 to 2 mg/kg once daily) to complete 3 days of treatment.

– If the attack is only partially resolved: continue with 2 to 4 puffs of salbutamol every 3 to4 hours; if the attack is mild; 6 puffs every 1 to 2 hours; if the attack is moderate, untilsymptoms subside, then when the attack is completely resolved, proceed as above.

– If symptoms worsen or do not improve, treat as **severe attack**

Hospitalise the patient; place him in a 1/2 sitting position.

Administer:

- O**xygen** continuously, at least 5 litres/minute or maintain the oxygen saturation between94 and 98%.
- **Salbutamol (aerosol):** 2 to 4 puffs every 20 to 30 minutes, up to 10 puffs if necessary

inchildren under 5 years, up to 20 puffs in children over 5 years and adults. Use a spacer toincrease effectiveness, irrespective of age.**OR**

- **Salbutamol (**solution for nebulisation),
- **Prednisolone** oral: one dose of 1 to 2 mg/kg

In the case of vomiting, use;

- **Hydrocortison**e IV every 6 hours (children: 5 mg/kg/injection, adults:100 mg/injection) until the patient can tolerate oral prednisolone.
- If the attack is completely resolved, observe the patient for at least 4 hours. Continue thetreatment with **salbutamol** for 24 to 48 hours (2 to 4 puffs every 4 hours) and **prednisolone** oral (1 to 2 mg/kg once daily) to complete 3 days of treatment.

- Reassess after 10 days: consider long-term treatment if the asthma attacks have beenoccurring for several months. If the patient is already receiving long-term treatment, reassessthe severity of the asthma and review compliance and correctuse of medication and adjust treatment if necessary.

If symptoms worsen or do not improve, see Life-threatening attack

Life-threatening attack (intensive care)

Insert an IV line and administer:

- **Oxygen**continuously, at least 5 litres/minute or maintain the O2 saturation between94 and 98%.
- **Salbutamol** solutions for nebulisation:
- **Corticosteriods** (prednisolone oral or hydrocortisone IV) as for severe attack.

– If the attack is resolved after one hour: switch to salbutamol aerosol and continueprednisolone orally as for severe attack.

– If symptoms do not improve after one hour:

- administer a single dose of **magnesium sulfate**by IV infusion in 0.9% sodium chloride over20 minutes, monitoring blood pressure:Children over 2 years: 40 mg/kg, Adults: 1 to 2 g
- Continue **salbutamo**l by nebulisation and corticosteriods, as above.

Notes:

– In pregnant women, treatment is the same as for adults. In mild or moderate asthmaattacks, administering oxygen reduces the risk of foetal hypoxia.

– For all patients, irrespective of the severity of the asthma attack, look for underlying lunginfection and treat accordingly.

3. Chronic asthma

Chronic Asthma should be suspected in patients with episodic respiratory symptoms (wheezing,chest tightness, shortness of breath and/or cough) of variable frequency, severity andduration, disturbing sleep, and causing the patient to sit up to breathe. These symptoms mayappear during or after exercise.

– Chest auscultation may be normal or demonstrate diffuse sibilant wheezes.

– Atopic disorders or a personal or family history of atopy (eczema, allergic rhinitis/conjunctivitis) or a family history of asthma increases probability of asthma but their absencedoes not exclude asthma.

Patients with typical symptoms of asthma and a history of disease that is characteristic ofasthma should be considered as having asthma after exclusion of other diagnoses.

The assessment of the frequency of daytime and nigthtime symptoms and limitations ofphysical activity determines whether asthmais intermiotent or persistent.

Pharmacological Treatment

Only patients with persistent asthma need long-term treatment. The mainstay of treatment is **inhaled corticosteroids**.

Treatment is started at the step most appropriate to initial severitythen, re-evaluated and adjusted according to clinical response. It aims to abolish symptomswith the **lowest possible dose of inhaled corticosteroids.** An intervening severe exacerbation or loss of control necessitates reassessment to re-evaluate treatment.

Long-term treatment does not mean treatment for life. Asthma attacks may occur over months oryears, with intervening asymptomatic intervals when long-term treatment is not required.

Long-term treatment of asthma according to severity

Categories	Treatment
Intermittent asthma • Intermittent symptoms (< once/week) • Night time symptoms < twice/month • Normal physical activity	No long term treatment Inhaled salbutamolwhen symptomatic
Mild persistent asthma • Symptoms > once/week, but < once/day • Night time symptoms > twice/month • Symptoms may affect activity	Continuous treatment with inhaled beclometasone + Inhaled salbutamolwhen symptomatic

Moderate persistent asthma • Daily symptoms • Symptoms affect activity • Night time symptoms > once/week	Daily use of salbutamol Continuous treatment with inhaled beclometasoneplus Inhaled salbutamol(1 puff 4 times/day)
Severe persistent asthma • Daily symptoms • Frequent night time symptoms • Physical activity limited by symptoms	Continuous treatment with inhaled beclometasone + Inhaled salbutamol(1-2 puff/s 4 to 6 times/day)

Inhaled corticosteroid treatment: **beclometasone** dose varies according to the severity of asthma. Find the minimum dose necessary to both control the symptoms and avoid local andsystemic adverse effects:

Children: 50 to 100 micrograms twice daily depending on the severity. Increase to200 micrograms twice daily if the symptoms are not controlled. In patients with severe chronicasthma the dosage may be as high as 800 micrograms/day.

Adults: start with 250 to 500 micrograms twice daily depending on to the severity. If a totaldosage of 1000 micrograms/day (in 2 to 4 divided doses)

is ineffective, the dosage may beincreased to 1500 micrograms/day, but the benefits are limited.

The number of puffs of beclometasone depends on its concentration in the inhaledaerosol: 50, 100 or 250 mt

Restrict exercise. If exercise is a trigger for asthma attacks, administer 1 or 2 puffs of salbutamol 10 minutes beforehand.

In pregnant women, poorly controlled asthma increases the risk of pre-eclampsia, eclampsia, haemorrhage, in utero growth retardation, premature delivery, neonatal hypoxia and perinatalmortality. **Long-term treatment remainsinhaledsalbutamol and beclometasone** at the usualdosage for adults. Whenever possible, avoid oral corticosteroids.

If symptoms are not well controlled during a period of at least 3 months, check the inhalationtechnique and adherence before changing to a stronger treatment.

If symptoms are well controlled for a period of at least 3 months (the patient is asymptomatic or the asthma has become intermittent):

try a step-wise reduction in medication, finallydiscontinuing treatment, if it seems possible. Provide patients with a salbutamol inhaler for any possible attacks. Evaluate after 2 weeks. If the results are satisfactory, continue for 3 months and then re-evaluate. If the patient has redeveloped chronic asthma, restart long-termtreatment, adjusting doses, as required.

6.8 Lung abscess

Lung abscess is a cavity within the lung parenchyma filled with necrotic tissues which occurs as a result of tissue-destroying infection.

Diagnosis

It is characterized by high fever, breathlessness, cough productive of large amounts of foul- smelling sputum and haemoptysis.

General management

Postural drainage

Pharmacological Treatment

- **Ampicillin** (start with IV then oral) 500-1000mg every 8 hours for 4-6 weeks (children 50mg/kg/dose) Plus
- **Metronidazole** start with IV then oral 500 mg every 8 hours for 4-6 weeks (children 7.5mg/kg)

7. ENDOCRINE DISORDERS

7.1 Diabetic mellitus

7.1.1 Type1 Diabetes mellitis

Type 1 diabetes mellitus, previously known as juvenile onset diabetes mellitus and as insulin-dependent diabetes mellitus (IDDM) occurs because of a lack of insulin. The result is an increase in blood glucose concentration.

Symptoms (Clinical presentation)

- hunger
- thirst
- polyuria
- unexplained weight loss
- tiredness
- ketoacidosis

Diagnosis
Type 1 diabetes mellitus is diagnosed when the classic symptoms of polyuria and polydipsia are associated with hyperglycaemia:
Random plasma glucose ≥ 11.1 mmol/L***(>200mg/dL***)

- Random is defined as any time of day without regard to time since last meal

OR

- **Fasting** plasma glucose ≥ 7.0 mmol/L ***(≥125 mg/dL***)

Fasting is defined as no caloric intake for ≥ 8 hours

General Measures

- Lifestyle modification, including self-care practices.
- Education regarding diabetes and its complications.
- Even and regular meal consumption.
- Dietary emphasis should be on regulating carbohydrate, fibre and fat intake.
- Increased physical activity, aim for 30 minutes 5 times a week.
- Appropriate weight loss if weight exceeds ideal weight
- Encourage stoppage of smoking
- Encourage reduction of alcohol
- Monitor for development of depression.

Type 1 Diabetes mellitus in Children and adolescents
Note: Oral anti-diabetic medicines **should not** be used to treat children with type 1diabetes mellitus.

All children with confirmed or suspected type 1 diabetes mellitus should be referred to a hospital immediately for management.

Type 1 Diabetes Mellitus in Adults

Type 1 diabetes mellitus is a rare condition and should be diagnosed and monitored at hospital level. Only

stable patients may be down referred for chronic medicines.

Monitoring Following down Refferal
At every visit:
Finger-prick blood glucose, weight, blood pressure

Annually: • **Hb, A1C**, one month before next hospital appointment.

Treatment targets

Parameter	Optimal	Acceptable	Additional action suggested
Finger-prick blood glucose values:			
– **Fasting**	4–7	<8	>8
– **2-hr-post-prindial(mmo/l)**	5-8	8-10	>10
Glycosylated hemoglobin (HbA1c) (%)	<7	7-8	>8
Blood-pressure Systolic/Diastolic	<140 mmHg <90 mmHg		

The increased risk of hypoglycaemia must always be weighed against the potential benefit of reducing microvascular and macrovascular complications.

Pharmacological Treatment

As type 1 diabetes mellitus usually presents with diabetic ketoacidosis, treatment is usually initiated with **insulin** and the patient is stabilised at hospital level.

Oral anti- diabetic medicines **should not** be used to treat type 1 diabetics.
Insulin dose requirements will decrease as kidney disease progresses.

Types of insulin

1. **Insulin, short acting**, SC, three times daily, 30 minutes before meals. ***Regular human insulin***.
   - Onset of action: 30 minutes.
   - Peak action: 2–5 hours.
   - Duration of action: 5–8 hours.
2. **Insulin, intermediate acting**, SC, once or twice daily usually at night at bedtime, approximately 8 hours before breakfast. ***Neutral Protamine Hagedorn (NPH) insulin***.
   - Onset of action: 1–3 hours.
   - Peak action: 6–12 hours.
   - Duration of action: 16–24 hours.
3. **Insulin, biphasic**, SC, once or twice daily. ***Mixtures of regular human insulin and NPH insulin*** in different proportions, e.g. 30/70 (30% regular insulin and 70% NPH insulin)
   - Onset of action: 30 minutes.
   - Peak action: 2–12 hours.
   - Duration of action: 16–24 hours.

Insulin regimens

<u>Basal bolus regimen</u>

All type 1 diabetics should preferentially be managed with the “basal bolus regimen” i.e. combined

intermediate-acting (basal) and short-acting insulin (bolus).
This consists of pre-meal, short-acting insulin and bedtime intermediate-acting insulin not later than 10PM.
The initial total daily insulin dose: • 0.6 units/kg body weight.
The total dose is divided into: • 40–50% basal insulin
• the rest as bolus insulin, split equally before each meal.
Adjust dose on an individual basis.
Education related to insulin therapy
REFERRAL
All type 1 diabetic patient

7.1.2 Type 2 Dibetic Mellitis

Type 2 Diabetes mellitus, Adults
Type 2 diabetes mellitus is a chronic debilitating metabolic disease characterised by hyperglycaemia with serious acute and chronic complications. It is an important component of the metabolic syndrome.
Most adults with type 2 diabetes mellitus are overweight with a high waist to hip ratio.

Criteria for screening for diabetes in children
• Body mass index > 85 percentile for age and sex.
• Family history of type 2 diabetes mellitus.
• Presence of hyperlipidaemia, hypertension or polycystic ovarian syndrome.
AND
• Physical signs of puberty or age > 10 years of age.

In adults the condition might be diagnosed only when presenting with complications,
e.g.: ischaemic heart disease; deteriorating eyesight; peripheral artery disease; foot ulcers; stroke; erectile dysfunction

Symptoms
Symptoms of hyperglycaemia include:

- Thirst, especially noticed at night
- tiredness
- polyuria
- Periodic changes in vision due to fluctuations in blood glucose concentration
- Susceptibility to infections, especially of the urinary tract, respiratory tract and skin

Note: It is important to distinguish type 2 diabetes mellitus from type 1 diabetes mellitus. Suspect type 1 diabetes mellitus among younger patients with excessive weight loss and/or ketoacidosis.

DIAGNOSIS

- Symptoms of diabetes plus a random plasma glucose ≥ 11.1 mmol/L (200mg dL).Random is defined as any time of day without regard to time since last meal.
- Fasting plasma glucose ≥ 7.0 mmol/L (126 mg/dL). Fasting is defined as no caloric intake for ≥ 8 hours.

It is difficult todistinguish type 2 fromtype 1diabetes mellitus, as many type 1 diabetics may be overweight, or have a family history of type 2 diabetes mellitus, given the increasing prevalence of both obesity and type 2 diabetes mellitus.
The diagnosis of type 2 diabetes mellitus in adolescents should be made in consultation with a specialist.

MONITORING

At every visit:
• Finger-prick blood glucose.
• Weight.
• Blood pressure
Baseline:

- Serum creatinine concentration (and calculate estimated glomerular filtration rate (eGFR)).
- Serum potassium concentration, if on ACE-inhibitor or eGFR < 30 mL/min.
- Urine protein by dipstix.
  If dipstix negative, send urine to laboratory for albumin: creatinine ratio, unless already on an ACE-inhibitor.
  If dipstix positive, see Section: Diabetic nephropathy.
- Blood lipids (fasting total cholesterol, triglycerides, HDL and LDL cholesterol).
- Foot examination.
- Eye examination to look for retinopathy.

- Abdominal circumference.

Annually:

- Serum creatinine concentration (and calculate eGFR).
- Serum potassium concentration, if on ACE-inhibitor or eGFR < 30 mL/min.
- Urine protein by dipstix.
  •If dipstix negative, send urine to laboratory for albumin: creatinine ratio, unless already on an ACE-inhibitor.
- HbA1c, in patients who meet treatment goals (3–6 monthly in patients whose therapy has changed, until stable).
- Eye examination to look for retinopathy.
- Foot examination.

Treatment targets

Parameter	Optimal	Acceptable	Additional action suggested
Finger-prick blood glucose values:			
– **Fasting**	**4–7**	**<8**	**>8**
– **2-hr-post-prindial(mmo/l)**	**5-8**	**8-10**	**>10**

Glycosylated haemoglobin (HbA1c) (%)	**<7**	**7-8**	**>8**
Blood-pressure Systolic Diastolic	**<140 mmHg <90 mmHg**		

- In the elderly, the increased risk of hypoglycaemia must be weighed against thepotential benefit of reducing microvascular and macrovascular complications.
- Prevent acute complications, e.g. hyperglycaemic and hypoglycaemic coma.

Management of type 2 diabetes mellitus includes:

- Treatment of hyperglycaemia
- Management of chronic conditions associated with diabetes.
- treatment of hypertension and dyslipidaemia after risk-assessment
- Prevention and treatment of microvascular complications.

GENERAL MEASURES

Life-style modification including self-care (refer to Type 1 Diabetes), Education about foot care.

Diet

•Consider the following for a person-centred approach to diet therapy:

•Weight. • Lifestyle and physical activity.

Dietary emphasis for improved glycaemic control should be on:

- Even and regular meal consumption.
- Low-glycaemic and high fibre foods. These foods are digested slowly resulting in a slow and steady rise in blood glucose concentrations.
- Reduced amounts of fat, sugary foods and sugar-containing beverages.
- Fruit and vegetables
- Carbohydrate: Make starchy foods the basis of most meals.
- **Fat and cholesterol:** Reduce total intake of fat, saturated and transfat.
- **Salt :** Salt restriction may help to control blood pressure

Pharmacological Treatment

Oral blood glucose lowering agents

Stepwise approach:

- **Metformin**.

If therapy with metformin alone (together withdietary modifications and physical activity/exercise) has not achieved the HbA1c target

- Combination therapy with **metformin** plus a **sulphonylurea (**glibenclimide**,** glimepiride**)** is indicated.

For persisting HbA1c above acceptable levels and despite adequate adherence to oral hypoglycaemic agents: add:

- **Insulin** and withdraw sulphonylurea. Start insuln low dose insulin and then gradualy increase according to the response.

Ensure patient is adherent at each step.
Oral agents should not be used in type 1 diabetes mellitus, renal impairment or clinical liver failure.

STEP 1
Lifestyle modification plus metformine

Entry to step 1	**Teatment and duration**	**Target**
•Typical symptoms-thirst, tiredness, polyuria. **AND** •Random-plasmaglucose >11.1mmol/L. **OR** •Fastingplasmaglucose ≥ 7 mmol/L.	•Lifestyle modificationfor life. •Appropriate diet. •Weight loss until at ideal weight. Initiate therapy with: Metformin. Assess monthly.	•2-hour-post-prandial finger-prick blood Glucose: 8–10 mmol/L. **OR** fasting finger-prick blood glucose: 6–8 mmol/L. **AND/OR** HbA1c:7–8%.

- Metformin, oral, 500 mg daily with meals.

- ✓ Titrate dose slowly dependingonHbA1c and/or fasting blood glucose concentrations to a maximum dose of 850 mg 8 hourly.
- ✓ Contraindicated in:
  - uncontrolled congestive cardiac failure
  - severe liver disease
  - patients with significant respiratory compromise

In patients with renal impairment, adjust dose according to table:(if it is possible to determine eGFR**)**

eGFR	Action
>30-60 mL/minute	Continue use 50% of dose (max.500mg12 hourly) Increase frequency of renal function monitoring (3-6 monthly)
<30 mL/minute	Stop metformine

STEP 2
Add sulphonylurea:

Entry to step2	Teatment and duration	Target
•Failed step 1: HbA1>8 % or fasting finger-prick blood glucose >8mmol/L despiteadherence to treatmentplan in step 1 andmaximal dose of metformin for 2-3months. **OR** •2-hour post-prandial finger-prick blood glucose > 10 mmol/L despite adherence to treatment plan in step 1 and maximal dose of metformin for 2–3months.	•Lifestyle modification. AND •Combination oralhypoglycaemic agents,i.e.:Metformin. AND Sulphonylurea.	•2-hour post-prandial finger prick blood glucose<8–10 mmol/L. OR fasting finger prick Blood glucose: 6–8mmol/L. AND/OR •HbA1c:7–8%.

Sulphonylurea derivatives include: glimepiride or glibenclamide. •**Glimepiride**, oral with or before breakfast.

- Initially1mg daily, adjusted according to response in 1 mg increments at 1 to 2 week intervals.
- Maximum dose of 4 mg daily.
- Preferred in the elderly. **OR**

Glibenclamide, oral, 2.5 mg daily 30 minutes before breakfast.

• Titrate dose slowly depending on HbA1c and/or fasting blood glucose levels to a maximum of 15 mg daily.
• When ≥ 7.5 mg per day is needed, give 2 /3 of the total dose in the morning and 1/3 at night.
• Avoid in the elderly and patients with renal impairment

Both glimepiride and glibenclamide should be avoided in patients with renal impairment i.e. eGFR< 60 mL/minute or use BUN and/or creatinine for monitoring.

Sulphonylureas are contraindicated in:
• Severe hepatic impairment
• Pregnancy

Missing meals while taking Sulphonylureas may lead to hypoglycaemia.

STEP 3
Insulin therapy: Type 1 diabetes mellitus, in adults.

•Insulin is indicated when oral combination therapy fails.
•Continue lifestyle modification.
•Insulin therapy must be initiated and titrated by a doctor, until stabilised.
•Stop sulphonylurea once insulin therapy is initiated **but** continue metformin.

Education for patients on insulin therapy:

- Types of insulin.
- Injection technique and sites of injection.
- Insulin storage.
- Self-monitoring of blood glucose and how to self-adjust insulin doses.

Diet:

Meal frequency, this varies according to the type and frequency of insulin, e.g. Patients may need a snack at night about 3–4 hours after the evening meal.

- Consistent carbohydrate intake for patients receiving fixed meal time doses of insulin.
- Recognition and treatment of acute complications, e.g. hypoglycaemia and hyperglycaemia.

Insulin type	**Starting dose**	**Increment**
Add on therapy: •Intermediate to long-acting	10 units in the evening before bedtime, but not after 22h00.	If 10 units not effective: Increase gradually to 20 units (2–4 units increase each week).

Substitution therapy: •Biphasic	Twice daily.Total daily dose: 15 units divided as follows: •2/3 of total daily dose, i.e. 10 units, 30 minutes Before breakfast •1/3 of the total daily, 5 units, 30 minutes before supper.	4 units weekly. First increment is added to dose before breakfast. Second increment is added to dose before supper.

REFERRAL

Urgent (same day)

- Acidotic breathing.
- Dehydration and hypotension.
- Nausea, vomiting and abdominal pain
- Serious infections.
- Ketonuria (more than 1+).
- Hyperglycaemia > 25 mmol/L.
- Gangrene.
- Sudden deterioration of vision.

Note: Consider IV infusion with sodium chloride 0.9%, before transferring very ill patients.

Non-urgent

- Pregnancy.
- Failure of step 3 to control diabetes.
- eGFR< 30 mL/minute.
- Ischaemic heart disease.

- Cerebrovascular disease.
- Refractory hypertension.
- Progressive loss of vision.
- Hyperglycaemia diabetic ketoacidosis (DKA) or hyperosmolar hyperglycaemic state(HHS), or
- hypoglycaemia

Aid for differentiation of DKA, HHS and Hypoglycemia.

Check blood glucose concentration and test urine for ketones, immediately.

	Hyperglycemia		Hypoglycemia
	DKA	HHS	
Blood glucose	> 11.1 mmol/L		< 4 mmol/L
Urine test for ketones	Usually positive and >1+	Usually positive	Usually negative

If a diagnosis cannot be made, treat as hypoglycaemia and refer urgently. Low blood glucose presents the most immediate danger to life.

7.1.3 Hypoglycemia in Diabetes

Diabetic patients on therapy may experience hypoglycaemia for reasons such as:

- intercurrent illness (e.g. diarrhoea);
- missed meals;
- inadvertent intramuscular injections of insulin or miscalculated doses of insulin or progressive renal failure leading to decreased insulin clearance;

- alcohol ingestion; and,
- exercise without appropriate dietary preparation.

Risk factors include age < 6 years of age, low HbA1c and longer duration of diabetes.

Hypoglycemia in diabetic patients can be graded according to the table below:

Mild/moderate hypoglycaemia	Severe hypoglycaemia
Capable of self-treatment*.	Semi-conscious **OR** Unconscious/comatose
Conscious, but requires help from someone else.	Requires medical help.

*Except children < 6 years of age.

Autonomic symptoms/signs	***Neurological symptoms/signs***
• Palpitations• Hunger • Tremors• Pallor • Sweating• Fatigue	• Headache• Mood changes • Low attentiveness• Slurred speech • Dizziness• Unsteady gait • Depressed level of consciousness/ convulsions

Note:
• Children, particularly < 6 years of age, generally are not capable of self- management and are reliant on supervision from an adult.
• Patients may fail to recognise that they are hypoglycaemic when Neuroglycopenia (impaired thinking, mood changes, irritability, dizziness, tiredness) occurs before autonomic activation.

DIAGNOSIS

• Blood glucose < 4 mmol/L with symptoms in a known diabetic patient.
• Blood glucose concentrations should be measured with a glucometer to confirm hypoglycaemia.

> Hypoglycaemia must be managed as an emergency. If a diabetic patient presents with an altered level of consciousness and a glucometer is not available, treat as hypoglycaemia.

EMERGENCY TREATMENT

Measure blood glucose concentration with glucometer/testing strip, immediately.

1. Conscious patient, able to feed

Breastfeeding child: give breast milk
Older children: • oral sugar solution. Dissolve 3 teaspoons of sugar (15 g) in a 200 mL cup of water – administer 5 mL/kg **OR** sweets, sugar, glucose by mouth
Adults
• Sweets, sugar, glucose by mouth, **OR** oral sugar solution
Dissolve 3 teaspoons of sugar (15 g) in a 200 mL cup of water.

2. Conscious patient, not able to feed without danger of aspiration, administer via nasogastric tube:

•Dextrose 10%, 5 mL/kg, Add 1 part 50% dextrose water to 4 parts water to make a 10% solution.

OR

• ***Milk***

OR

•***sugar solution***, Dissolve 3 teaspoons of sugar (15 g) in a 200 mL cup of water administer 5 mL/kg. repeated

3. Unconscious patient

Children

• Dextrose 10%, IV, 2–5 mL/kg.

To prepare 10% solution:.adds1 part 50% dextrose water to 4 parts water for injection to make 10% solution.

IV administration of dextrose in children with hypoglycaemia:

• Establish an IV line. Do not give excessive volumes of fluid: usually can keep line open with 2mL/kg/hour.

• Take a blood sample for emergency investigations and blood glucose.

• Check blood glucose.

• If low, i.e. < 2.5 mmol/L or if testing strips are not available, administer 2–5 mL/kg of 10% dextrose solution IV rapidly.

In the majority of cases an immediate clinical response can be expected.

- Recheck the blood glucose after infusion.
- If still low, repeat 2 mL/kg of 10% dextrose solution.
- After recovery, maintain with 5–10% dextrose solution until blood glucose is stabilised.
- Feed the child as soon as conscious.

Adults • Dextrose 50%, IV, 50 mL immediately and reassess.
• If there is no clinical response, give a second 50% dextrose bolus.
• Followed with dextrose 10% solution.
• In the majority of cases an immediate clinical response can be expected.
• Maintain with 5% dextrose solution after recovery until blood glucose is stabilised.

4. Alcoholics
• Thiamine, IV/IM, 100mg immediately.

CAUTION: Thiamine should preferably be administered prior to intravenous glucose to prevent permanent neurological damage. Do not delay the dextrose administration in a hypoglycaemic patient.

REFERRAL
Urgent
• All hypoglycaemic patients on oral hypoglycaemic agents.
• Hypoglycaemic patients who do not recover completely after treatment.
• All children with documented hypoglycaemia unless the cause is clearly identified and safe management instituted to prevent recurrence.

7.1.4 Diabetic Ketoacidosis (DKA)

Clinical features of DKA include:
» dehydration » drowsiness, confusion, coma

» abdominal pain » acetone/fruity smelling breath
» vomiting » elevated blood glucose
» deep sighing respiration

Pharmacological treatment

Adults

- Average deficit 6 L, and may be as much as 12 L.
- Be cautious in renal and cardiac disease.
- In the absence of renal or cardiac compromise:

• **Sodium chloride 0.9%,** IV,
15–20 mL/kg in the first ½ hour,
For the next 1hour15–20 mL/kg,
After 2 hours 15–20 mL/kg and
After 4 hours 15–20 mL/kg.
• Do not exceed 50 mL/kg in the first 4 hours.
• Correct estimated deficits over 24 hours.

Refer urgently with drip in place and running at planned rate. When referral will take more than 2 hours and a diagnosis of diabetes with hyperglycaemia is confirmed: give:

• Insulin, short acting, IM, 0.1unit/kg.

When giving insulin IM, do not use insulin needle.

CAUTION: Do not administer IV short-acting insulin if the serum electrolyte status, especially **potassium is not known.**

Continue with IV fluids but delay giving insulin in these cases in consultation with referral facility as this delay should not negatively affect the patient, but hypokalaemia with resultant cardiac dysrhythmias definitely will.

Children

If in shock:

• **Sodium chloride 0.9%,** IV, 20 mL/kg as a bolusover 1 hr.

If shock not corrected, repeat10 ml/kg NS over 1 hr.

If a 3rd bolus is required, consult with paediatrician.

If no shock or aftershock is corrected

• Sodium chloride 0.9%, IV.

Fluid rates of sodium chloride 0.9%, IV (if no shock) in children awaiting transfer		Check regularly for shock or,increasing dehydration
Weight range kg		Rate (mL/hr) (2–10 kg: 6 mL/kg/hr) (>10—20kg:**5** mL/kg/hr)
4	<8	25
6	<10	40
10	<15	80
15	<20	85
20	<30	100
30	<45	150
45	<80	220

Refer urgently with drip in place and running at planned rate.

When referral will take > 2 hours and a diagnosis of diabetes with hyperglycaemia is confirmed and provided glucose is monitored hourly:
• Insulin, short acting, IM, 0.1 units/kg after 1 hour of infusion of saline •When giving insulin IM, do not use insulin needle.

7.1.5 Microvascular Complications of Diabetes

1. **Diabetic Neuropathy**
DESCRIPTION
Neuropathies are a common complication of diabetes. They play an important role in the morbidity and mortality suffered by people with diabetes.
There are ***three major categories***:
Peripheral neuropathy
Autonomic neuropathy

GENERAL MEASURES
• Educate patient regarding appropriate footwear and good foot care.
• Patients with neuropathy should have their feet examined at every visit.
Pharmacological treatment

- Acute onset neuropathies
- Ensure appropriate glycaemic control.
  Exclude or treat other contributory factors e.g.:
- Alcohol excess
- Vitamin B12 deficiency, if suspected,
- Uraemia, and

- HIV infection.

For Pain:
• Amitriptyline**,** oral, 10–25 mg at night increasing to 100 mg, if necessary. **AND/OR**
• Paracetamol, oral, 1 g 6 hourly as needed.
For Gastroparesis:
• Metoclopramid**e**, oral, 10 mg 8 hourly before meals.

REFERRAL
For further treatment if the above measures do not control symptoms adequately.

2. Diabetic Foot Ulcers
Ulcers develop at the tips of the toes and on the plantar surfaces of the metatarsal heads and are often proceeded by callus formation.
If the callus is not removed then haemorrhage and tissue necrosis occurs below the plaque of callus which leads to ulceration. Ulcers can be secondarily infected by staphylococci, streptococci, coliforms, and anaerobic bacteria which can lead to cellulitis, abscess formation, and osteomyelitis.

DIAGNOSIS
The three main factors that lead to tissue necrosis in the diabetic foot are:
• Neuropathy
• Infection and
• Ischaemia.

GENERAL MEASURES

- ✓ Metabolic control.
- ✓ Treat underlying comorbidity.
- ✓ Smoking cessation is essential.
- ✓ Relieve pressure: non-weight bearing is essential.
- ✓ Frequent (e.g. weekly) removal of excess keratin by a health professional (with some knowledge of foot caret) with a scalpel blade to expose the floor of the ulcer and allow efficient drainage of the lesion.
- ✓ Cleanse with sodium chloride 0.9% solution daily and apply non-adherent dressing.

Pharmacological Treatment

• Flucloxacllin 500mg oral every 6 hours for 7 days **or**

• Amoxicillin/clavulanic acid 875/125 mg oral 12 hourly for 10 days.

REFERRAL

Urgent

Threatened limb, i.e. if the ulcer is associated with: cellulitis, abscess, discolouration of surrounding skin, or crepitus.

Non-urgent

- Claudication.
- Ulcers not responding to adequate treatment.

3. Diabetic Nephropathy

Screening

- ✓ Check annually for proteinuria using dipstix.
- ✓ A diagnosis of nephropathy can be made on either a positive dipstix or, if dipstix negative, send urine to laboratory for albumin: creatinine ratio. If ratio>3 mg/mmol, diagnose nephropathy.
- ✓ Measure serum creatinine annually, and estimate eGFR.

Diet and lifestyle

- ✓ Limit protein intake < 0.8 g/kg daily, if proteinuric.
- ✓ Advise smoking cessation.

Pharmacological Treatment

Enalapril, oral, initiate with 5mg 12 hourly. Increase to 20 mg 12 hourly, as tolerated. Monitor potassium, at baseline, within 1 month, and annually.

Persistent proteinuria (kidney and urological disorders).

Hypertension - Target BP: < 140/90 mmHg. See: Hypertension.

Diabetes mellitus

Target HbA1c < 7.5% (7%).

• Intensify other renal and cardiovascular protection measures (not smoking, aspirin therapy, lipid lowering therapy).

REFERRAL

To specialist: When eGFR < 30 mL/minute or earlier if symptomatic.

4. Cardiovascular Risk in Diabetes

The metabolic syndrome is a cluster of risk factors:
•Impaired glucose metabolism
•central obesity
•dyslipidaemia
•hypertension

DIAGNOSIS
There is still some controversy as to whether the metabolic syndrome is a true syndrome or a cluster of risk factors. There are also varying diagnostic criteria around the world. The more components of the syndrome, the higher the risk

Pharmacological Treatment
Aspirin therapy.
• Use aspirin therapy in adult Type 1 and Type 2 diabetic patients with a history of cardiovascular disease i.e.
• Ischaemic heart disease
• Peripheral vascular disease
• Previous thrombotic stroke
Aspirin, orally, 100 mg (½ tablets) daily.

5. Obesity in Diabetes

• Abdominal obesity, i.e. waist circumference > 94 cm in men, and> 80 cm in women.
• BMI: determined by weight in kg/height in m^2.

BMI (kg/m ^{2})	
18.5–24.9	normal
25.0–29.9	overweight
30.0–34.9	mildly obese
35.0–39.9	moderately obese
>40	extremely obese

GENERAL MEASURES
A decrease in food intake together with an increase in physical activity is crucial to losing weight.
Pharmacological Treatment
Treat the metabolic risk factors, i.e. dyslipidaemia, hypertension, and hyperglycaemia.

6. Dyslipidemia in Diabetes

Dyslipidaemia in type 2 diabetes is usually characterised by

- increased fasting plasma triglycerides (> 1.7 mmol/L or 200mg/dl),
- decreased HDL cholesterol (< 1.0 mmol/L in men and < 1.30 mmol/Lin women) and,
- to a lesser extent, increased LDL cholesterol.

In those with type 1 diabetes, triglycerides, and to a lesser extent cholesterol concentrations, are usually increased.
MONITORING -Type 2 diabetes mellitus, in adults.

Pharmacological Treatment
Dyslipidaemia may successfully be treated through lifestyle modifications alone.
• **Simvastatin**, oral, 10 mg at night (HMGCoA reductase inhibitor (**statin**) therapy) should be added to lifestyle modifications, regardless of baseline lipid concentrations, for all type 2 diabetic patients, who:

- are > 40 years of age • have had diabetes for > 10 years
- have existing cardiovascular disease
- have chronic kidney disease (eGFR < 60 mL/minute) e.g

In patients < 40 years of age, risk assess as for dyslipidaemia.
See Section Prevention of ischaemic heart disease and atherosclerosis.

REFERRAL
•Random cholesterol > 7.5 mmol/L.
•Fasting (14 hours) triglycerides > 10 mmol/L.

7. Hypertension in Diabetes

BP lowering in hypertensive patients reduces cardiovascular risk. The diagnosis of hypertension is confirmed if the blood pressure remains > 140/90 mmHg on 2 separate days. See Section: Hypertension.

7.2 Thyroid Disorders

7.2.1 Goitre

Goitre is a swelling of the neck due to enlargement of the thyroid gland. Goitres are usually benign but may occasionally be malignant. They could be associated with normal function of the thyroid gland as well as with abnormalities of thyroid hormone production.
A reduction in production of thyroid hormones results in *hypothyroidism* while an excess results in hyperthyroidism or *thyrotoxicosis*.
Abnormalities of thyroid hormone production may also occur in the absence of goitre.

Treatment of benign and malignant goitres may be surgical or non- surgical. This can be determinedonly byfull clinical assessmentand investigations. Treatment is not necessarily by increasing iodine intake e.g. in iodated salt. Excess iodine intake may actually be harmful.

CAUSES

- Simple nontoxic goitre e.g. from iodine deficiency (endemic goiter, these conditions are entirely preventable. **Iodised salt** is increasingly available throughout Eritrea. Its use should be strongly encouraged by all health workers.)
- Hypothyroidism (see section below)
- Thyrotoxicosis or Hyperthyroidism (see section below)

- Thyroid neoplasm - benign or malignant

SYMPTOMS

- Swelling in the neck
- Breathing and swallowing difficulty, if large
- Symptoms of hypothyroidism (see below)
- Symptoms of hyperthyroidism (see below)

SIGNS

- Irregular or diffuse thyroid swelling
- Slow pulse (< 60 per minute) – associated hypothyroidism is likely; look for other signs
- Fast pulse (> 90 per minute) – associated thyrotoxicosis is likely; look for other signs

INVESTIGATIONS

- Thyroid function tests – free T3, free T4, TSH (TSH is more sensitive)
- Thyroid ultrasound scan
- X-ray of the neck including thoracic inlet view

Treatment objectives

- To assess and correct level of thyroid hormone production
- To reduce or prevent obstructive symptoms
- To identify thyroid neoplasms and manage appropriately

Non-pharmacological Treatrment

- Subtotal thyroidectomy where indicated

Pharmacological treatment
• Appropriate drug treatment of hypothyroidism or thyrotoxicosis (see sections below)
REFER - patients to a physician or surgical specialist where complications or malignancy are suspected.

7.2.2 Hypothyrodism

The body requires thyroid hormone for normal metabolism and growth. Hypothyroidism, which implies reduction in thyroid hormone production, has major consequences on intellectual development and growth in infants and children (cause of cretinism). In adults, it may be the cause of heart disease and dementia. Iodine replacement is not the treatment for hypothyroidism.

CAUSES

- Antibody-related thyroid gland destruction
- Surgical removal of the thyroid
- Congenital
- Pituitary lesions or surgery
- Severe iodine deficiency

SYMPTOMS

- Intolerance to cold environments •Constipation
- Lethargy •Weight gain loss • Dry skin
- Hoarse voice•Memory loss •Goitre may be present
- Abnormal menstrual periods and sub-fertility (in adult females)

- Poor growth, development and poor school performance in children

1. Hypothyrodism in Neonates

Congenital deficiency of thyroid hormone due to aplasia/hypoplasia of the thyroid gland, defects in thyroid hormone biosynthesis or
Intrauterine exposure to antithyroid medicines. Congenital hypothyroidismis one of the common treatable causes of preventable mental retardation in children. Congenital hypothyroidism must be treated as early as possible to avoid intellectual impairment.

DIAGNOSIS
Clinical

- prolonged jaundice
- swollen hands, feet and genitals
- feeding difficulties
- decreased muscle tone
- lethargy
- delayed achievement of stages of growth
- constipation
- enlarged tongue

REFERRAL
All patients for investigation and initiation of therapy

2. Hypothyrodism in Children and Adolescents

Hypothyroidism in children (Cretinism) causes decreased growth, lethargy, cold intolerance and dry skin. Physical signs may include goitre, short stature, bradycardia and delayed deep tendon reflexes. Congenital hypothyroidism may present in childhood. Acquired hypothyroidism in children and adolescents may be caused by:

- Chroniclymphocytic thyroiditis
- radioactive iodine
- Iodine deficiency infiltrations

DIAGNOSIS
Elevated TSH and low T4 concentrations

Pharmacological Treatment

Levothyroxine, oral, 100 mcg/m once daily, preferably on an empty stomach.

REFERRAL
All cases for investigation and initiation of therapy

3. Hypothyrodism in Adults

Hypothyroidism causes general slowing of metabolism, which results in symptoms that include: fatigue, slow movement and speech, hoarse voice, weight gain, constipation, cold intolerance, depression and impairedmemory. Physical signs may include: bradycardia, dry, coarse skin, hair loss and delayed relaxation of deep tendon reflexes.

Common causes of primary hypothyroidism are:

- Thyroiditis
- post surgery,
- amiodarone and radio-active iodine

Secondary hypothyroidism (< 1% of cases) may be due to any cause of anterior hypopituitarism.

DIAGNOSIS

• Check TSH concentration. If elevated, check T4 concentration.

- If TSH is elevated, and T4 is low, diagnose hypothyroidism.
- If TSH alone is elevated can be diagnosed as hypothyroidism.

Pharmacological Treatment

- **Levothyroxine,** oral, 100 mcg daily, preferably on an empty stomach.
- If there is a risk of ischaemic heart disease, start at25 mcgdaily and increase by 25 mcg every 4 weeks.
- In the ***elderly***, start at 50 mcg daily, increased by 25 mcg at 4 week intervals, according to response.
- Check TSH and T4 after 2–3 months and adjust dose if required.
- Once stable, check TSH andT4 annually.

REFERRAL

- Suspected hypopituitarism.
- Hypothyroidism in pregnancy.

7.2.3 Hyperthyrodism

1. Hyperthyrodism in Children and Adolescents

Hyperthyroidism is a pathological syndrome in which tissue is exposed to excessive amounts of circulating thyroid hormones. The most common cause is Grave's disease, although thyroiditis may also present with thyrotoxicosis.

DIAGNOSIS

Clinical

- fatigue
- tachycardia
- anxiety
- warm moist hands
- weight loss
- thyromegaly
- palpitations
- heat insensitivity
- Heart failure
- tremor

Goitre often present but not always

- Smooth and diffuse goitre in Grave's disease
- Irregular goitre in toxic multi-nodular goitre.

REFERRAL
Urgent -All patients.

2. Hyperthyrodism in Adults

Most common cause of hyperthyroidism is Graves' disease, which is an autoimmune condition resulting from the presence of thyroid stimulating autoantibodies. Other common causes are toxic single or multinodular goitre and sub-acute thyroiditis.

DIAGNOSIS
Suppressed TSH and elevated T4
Thyroid ultrasound scan
Note: T4 may be normal in hyperthyroidism.

Treatment objectives

- To reduce thyroid hormone levels to normal
- To prevent or treat complications e.g. heart failure, ophthalmopathy

Non-pharmacological treatment

- Partial thyroidectomy

Pharmacological T treatment

Propylthiouracil, oral, (decrease dose when patient is euthyroid and adjust doses subsequently according to two-monthly thyroid function tests)

Adults :100 mg 8 hourly

Children

12-18 years;	100 mg 8 hourly
5-12 years;	50 mg 8 hourly
1- 5 years;	25 mg 8 hourly
1 month-1 year;	2.5-5 mg/kg 8 hourly
< 1 month;	2.5-5 mg/kg 12 hourly

Adjunct treatment

•**Atenelol oral** 50-100 mg daily

- ***Propranolol***, oral, (avoid in asthmatics)

Adults: 20 - 40 mg 8 hourly

Children: 1 mg/kg (maximum 40 mg) 8 hourly

REFER all cases not responding to conventional treatment to specialists.

7.3 Adrenal Disorders

7.3.1 Adrenal Insufficiency

Adrenal insufficiency arises when the adrenal gland is destroyed by disease, or atrophies following pituitary failure or chronic corticosteroid use or abuse. In these situations the amount of cortisol, a major hormone produced from the adrenal gland, is insufficient to meet the body's needs during periods of stress. The condition is associated with severe fluid and electrolyte imbalance and results in acute circulatory collapse.

Acute adrenal insufficiency is a medical emergency.

CAUSES

- Sudden cessation of corticosteroid therapy after prolonged use
- In patients on oral or topical corticosteroids, such as prednisolone, dexamethasone, hydrocortisone, cortisone, or preparations containing any of these drugs.
- In patients, especially women who abusecorticosteroids for cosmetic reasons e.g. for skin bleaching or weight gain.
- Stress (e.g. infection, severe trauma, surgery, and dental procedures) in a patient with undiagnosed adrenal insufficiency or patients on chronic corticosteroid treatment.
- Pituitary failure from severe postpartum haemorrhage, pituitary surgery or tumour.
- Destruction of the adrenal gland by auto-antibodies (Addison's disease) or severe infections (e.g. tuberculosis, HIV, meningococcus).
- Congenital adrenal hyperplasia, in children

SYMPTOMS

- Nausea
- Vomiting
- Weakness

- Collapse
- Abdominal pain
- Diarrhoea
- Failure of lactation after delivery or post-partum haemorrhage (Sheehan's syndrome)

SIGNS

- Variable states of consciousness
- Dehydration
- Low or unrecordable blood pressure
- Darkening of oral mucosa, gums, skin, palms and soles in some patients
- Evidence of skin bleaching
- In children, ambiguous genitalia, short stature and failure to thrive

INVESTIGATIONS

- FBC
- Blood film for malaria parasites
- Blood urea and electrolytes
- Blood glucose
- Plasma cortisol - morning sample
- Urine and blood cultures, if indicated

Pharmacological treatment

Acute therapy

1. **Intravenous fluid replacement**

Adults: 0.9% Sodium Chloride in 5% Glucose (Dextrose Saline), IV, 1 litre 4-6 hourly

Children: 0.45% Sodium Chloride in 5% Glucose, IV, according to total fluid requirement.

2 .**Hydrocortisone, IV**,

Adults: 200 mg stat, followed by 100 mg, IV, 6 hourly until condition is stable

Children:

6-12 years;	100 mg, IV, 6 hourly
1-5 years;	50 mg, IV, 6 hourly
Up to 1 year;	5 mg, IV, 6 hourly

Adjunct treatment

- Treat infection (e.g. malaria, pneumonia, UTI), if present or suspected, with appropriate medication.

Note -The IV hydrocortisone therapy may be required for several days. Do not rush to change to maintenance therapy. When the patient's condition is stable (i.e. normal BP, cessation of vomiting etc.) go on to maintenance therapy.

Maintenance therapy

For patients with previous or newly diagnosed adrenal or pituitary disease

- **Prednisolone, oral,**

Adults: 5 mg morning and 2.5 mg evening each day

Children:

140 micrograms/kg in 2 divided doses**OR**

For patients requiring steroids for previously diagnosed medical conditions (e.g. asthma)

Adults and Children: restart the previous doses of oral corticosteroids given for the condition.

*For patients **who abuse** corticosteroids*

Adults: Restart oral ***corticosteroids*** (or replace topical corticosteroids with), **Prednisolone**, oral, 20-40 mg daily, and gradually taper off the dose over several months (e.g. reducing by 2.5 mg per month) and eventually discontinue.

Note

- Long-term corticosteroid therapy requires specialist supervision
- Patients on corticosteroids should report to a hospital if they become ill and should tell their doctor, dentist, nurse or pharmacist they are on corticosteroids
- Patients ***SHOULD NOT*** stop treatment if they become ill, have an infection or are undergoing a dental procedure. Rather a doubling of the regular doses of corticosteroids is needed
- Revert tohydrocortisone, IV for even minorsurgical procedures including labour and delivery
- The dose of corticosteroids must be reduced gradually if treatment has been for longer than 3 weeks and is to be stopped
- Discourage the abuse of oral or topical corticosteroids.

REFER - All patients, including children, suspected to have adrenal insufficiency should be referred to a

regional or teaching hospital for further assessment after resuscitation.

7.3.2 Cushing's syndrome

This condition results from high levels of cortisol in the blood and is associated with various changes in the body including the development of obesity, hypertension, diabetes and osteoporosis.The prolonged use or abuseof oral or topical corticosteroids such as prednisolone, dexamethasone, hydrocortisone or cortisone, or preparations containing any of these drugs, is also a cause.

CAUSES

- Pituitary tumour
- Adrenal tumour
- Prolonged and excessive intake or abuse of corticosteroids

Signs and Symptoms

- Weight gain
- Menstrual irregularity and sub-fertility
- Easy bruising of skin
- Excess body hair and acne
- Weakness of the thigh muscles
- Rounded or 'moon' face
- Striae (purplish stretch marks)
- Acne
- Prominent supraclavicular fat pads

- Hypertension
- Truncal obesity
- Excess facial and body hair
- Thin skin from bleaching and steroid abuse
- Easy bruising and bleeding into the skin after venepuncture

INVESTIGATIONS

• Plasma cortisol (commonly elevated in pituitary and adrenal tumours, but low in corticosteroid use or abuse)
• Blood electrolytes (may show low potassium)
• Blood glucose (commonly elevated)
• Abdominal ultrasound scan may show an adrenal tumour
• CT scan (may show evidence of a pituitary or adrenal tumour)

Non-pharmacological treatment

Pituitary or adrenal surgery where tumours in the respective glands have been diagnosed

Pharmacological treatment

Treatment is dependent on the cause and requires specialized investigations. Manage hypertension and diabetes along standard lines (see appropriate sections) and refer patient for definitive treatment

REFER

Refer all suspected cases to regional or tertiary hospital where there are specialists for the appropriate investigations and management.

7.4 Overweight and Obesity

- Excess body weight has adverse effects on health and life expectancy.
- It is associated with conditions that cause early disability and premature death such as type 2 diabetes, high blood pressure (hypertension), heart disease, stroke, gout, breathing problems, gallstones, heartburn, arthritis, skin infections as well as colon, kidney and endometrial cancer.
- Being overweightor obese also increases the risk of developing deep vein thrombosis and pulmonary embolism as well as elevated blood cholesterol which increases the risk for heart attacks and strokes.
- Overweight and obesity that predominantly affects the upper (truncal) part of the body, or results in excessive abdominal fat, is more commonly associated with one or more of the conditionslisted above.

Weight reduction often corrects, or helps to control, these associated conditions.
Slimming medications and herbal preparations are rarely useful and should be discouraged. They may have harmful long-term effects.

CAUSES

- Excess intake of calories

- Lack of regular physical activity

SYMPTOMS

- There are no specific symptoms associated with obesity.

SIGNS

- There are no specific physical signs associated with obesity
- Excess body weight is determined either by assessing:

  - Body Mass Index (BMI), calculated by taking the patient's weight in kilograms and dividing it by the square of the height in metres or
  - Mid-abdominal (waist) girth, taken from a measurement of the abdominal circumference along a horizontal line between the lower curvature of the ribs and the upper curvature of the hip bones

BMI is classified as follows:

- 18.5-24.9 kg/m2 - Ideal weight
- 25.0-29.9 kg/m2 - Overweight
- 30.0-34.9 kg/m2 - Obese
- > 35.0 kg/m2 - Severely obese

Waist circumference is classified as follows:

Adult females:

- < 80 cm or 32 inches Ideal abdominal girth
- > 88 cm or 35 inches abdominal obesity

Adult males:

- < 94 cm or 37 inches Ideal abdominal girth
- > 102 cm or 40 inches abdominal obesity

INVESTIGATIONS

- Blood glucose • Blood lipid profile
- Blood uric acid • ECG

Non-pharmacological treatment

Weight reducing diet, preferably under the supervision of a Dietician

- Regular physical activity comprising 30 minutes brisk walking, or equivalent activity, for a minimum of 3 days per week
- Appropriate management of any associated disorders

Pharmacological treatment

Approved anti-obesity treatments are available but should only be given under specialist guidance

REFER

- Individuals with severe and morbid obesity may require referral to a physician specialist and occasionally psychological counselling.
  Individuals who gain weight rapidly over a short period may have an underlying hormonal disorder and will require referral to a physician or endocrinologist.

7.5 Dyslipidemias

Abnormally high levels of blood fats (lipids) are associatedwith increased morbidity and mortality from

cardiovascular diseases such as strokes and ischaemic heart disease, particularly when associated with other risk factors such as smoking, obesity or overweight, type 2diabetesand hypertension. There is ample clinical trial evidence that treatment of elevated blood lipids with appropriate medications (e.g. statins) is beneficial for preventing cardiovascular complications. Treatment may be life long and requires regular monitoring of liver and muscle enzymes (transaminases and creatine kinase) to forestall side effects. The commonly assessed blood lipid parameters are:

- Total cholesterol,
- HDL cholesterol,
- LDL cholesterol and,
- Ttriglycerides.

The blood lipid profile is considered abnormal (dyslipidaemia) if either total and LDL-cholesterol or triglycerides are above expected levels and/or HDL-cholesterol is lower than expected.

CAUSES

- Lack of physical activity
- Obesity
- Hereditary factors
- Primary hypothyroidism
- Nephrotic syndrome
- Diabetes mellitus, especially if poorly controlled

- Metabolic syndrome (a combination of several disorders including obesity, hypertension, type 2 diabetes, dyslipidaemia)
- High dietary intake of saturated fats (animal fat)

SIGNS and SYMPTOMS

- Usually none
- Abdominal pain due to pancreatitis associated with elevated triglycerides
- Occasionally:
  - Whitish ring around the cornea (corneal arcus)
  - Yellowish skin eruptions around the eyes (xanthelasma)
  - Whitish blood sample (lipaemic blood).

INVESTIGATIONS

- Total cholesterol (TC), does not require a fasting blood sample, and may be requested alone as a screening test.
- A full blood lipid assessment, including TC, HDL cholesterol and triglycerides (TG), is best carried out on a *fasting blood sample*. (The result of LDL cholesterol is often calculated from the results of the 3 other tests).

Note

A full blood lipid profile should be obtained in patients with

- Coronary heart disease (CHD)
- Cerebrovascular disease (stroke and transient ischaemic attacks)
- Peripheral artery disease • Diabetes mellitus
- Hypertension
- A family history of dyslipidaemia
- Other risk factors for CHD e.g. obesity, smoking etc.

TREATMENT

Treatment objectives

- To reduce the risk of cardiovascular events and cardiovascular-related deaths
- To normalise the blood lipid profile to recommended target levels as follows:
  - ✓ For the general population and individuals without CHD or CHD risk equivalents: TC <5.2 mmol/L, , LDL-C <3.4 mmol/L, TG <2.0 mmol/L
  - ✓ Patients with previous or symptomatic CHD or CHD risk equivalents (e.g. type 2 diabetes): TC <4.1 mmol/L, , LDL-C<2.6 mmol/L, TG <1.7 mmol/L

Non-pharmacological treatment

- *Dietary measures* - A low calorie, low saturated fat (animal fat), high polyunsaturated fat (plant fat) diet is recommended under the supervision of a dietician.

- Weight reduction in patients who are overweight or obese.
- Reduction in alcohol consumption, where this is excessive.
- Regular physical activity or exercise tailored to the individual patient.

Pharmacological treatment

All patients who remain outside the target values despite adequate dietaryand exercise therapy and who require medications **should be referred to the appropriate specialist.**

Priorities for pharmacotherapy should be given to those individuals who are at the highest risk e.g. patients with pre-existing CHD, or CHD risk equivalents; namely, diabetes, stroke, transient ischaemic attacks andperipheral artery disease.

- ***Atorvastatin***, oral, Adults, 10-20 mg daily **OR**
- ***Simvastatin***, oral, Adults, 20 mg at night

Regular physical activity or exercise tailored to the individual patient.

REFER

8. EYE CONDITIONS

Early management of eye disease is important. Appropriate care can prevent secondary complication which might lead to blindness.

8.1 Conjunctivitis

Conjunctivitis is an inflammation of the transparent membrane over the white of the eye and inside the lids. There are several types of conjunctivitis with different causes as listed below. Causes of conjunctivitis can be viral, bacterial, allergic or chemical.

In all types of conjunctivitis the following can be found:

- Redness on the inner part of the eyelids and on the eyeball, away from the cornea
- The eyes feel irritated and are watering
- There may be a discharge of pus.

8.1.1 Simple Conjunctivitis (viral)

Conjunctival redness andirritation are the only signs and symptoms. There is no pus. It presents with painless watery eye discharge, there may be photophobia if the cornea is involved. The disease is bilateral though it may be asymmetrical. If *adenovirus* is the cause, it appears in epidemics so there will be history of being in contact with patients with similar eye condition. Patients present with haemorrhages of conjunctival vessels. It is usually self-limiting. Apply antibiotic eye ointment or eye drops if there is secondary infection with other organisms

For management

- *Advise regular eye washing with clean water*
- *Do not use antibiotics!*

Note: Viral Conjunctivitis is very contagious so patientsand members of the family should be alerted

8.1.2 Purulent Conjuctivities (Bacterial)

Purulent conjunctivitis is characterized by a discharge of pus when the eye is closed.Presents with acute onset of painless purulent discharge. The conjunctiva shows a velvety beef- red appearance. Sometimes there is ocular discomfort and it is usually bilateral. The diagnosis is mainly clinical.

Bacterial conjunctivitis patients who are not responding to treatment should have eye swabs for Gram stain and for culture and sensitivity to tailor down treatment.

Treatment

Bacterial and viral conjunctivitis are highly contagious and personal hygiene is important in prevention and treatment. Advice three times daily eye washing with clean water by taking a soft, wet cloth. This cloth is used to wipe the eye from the middle outwards. The same cloth must not be used more than once. The patient or the carers should be advised to use only the patient's own towels, to wash the face and to cleanse the eyes frequently. Hands must be thoroughly washed before applying eye ointment. Conjunctivitis in one eye only should be treated with special care to avoid spread of infection to the other eye.

When there is an eye infection, the eye should not be patched because the patch creates an excellent environment for multiplication of bacteria

Patients or carers should be carefully instructed on the correct application of eye ointment.

Health education should emphasise that purulent conjunctivitis can be prevented by regular washing of the face

Pharmacological Treatment

Apply:

Tetracycline eye ointment1 %, every 8 hours for 7 days, after cleaning the eye

8.1.3 Ophthalmia Neonatorum

The disease is caused by gonococcal bacteria and/or chlamydia and is found in newborns. There is a discharge of pus and swelling of the eyelids. The newborn is infected as it passes through the birth canal. Patients present with massive oedema and redness of eyelids and with purulent and copious discharge from the eyes. There is usually rapid ulceration and perforation of corneawhich eventually leads to blindness if treatment is delayed. It usually presents 3 to 4 days of life. Late presentation may also appear depending on the causative organism.

Pharmacological Treatment

- **Benzylpenicillin** 50,000IU/kg IM every 12 hours for 5-7 days.

- T**tetracycline** or **chloramphenicol** eye drops available (see also note below) as often as possible (preferably every half hour)

8.1.4 Allergic Conjunctivitis

Sneezing and watery discharge are present

•Try to find out from the patient what causes the allergy

- Advise the patient to avoid contact with the allergen if possible

  •Advise the patient to wash hands when eyes become itchy -- the allergen might be on the hands

  •Advise the patient to avoid scratching or rubbing which may increase the allergic reaction and may also result in infection

  •Application of cold water compresses will relieve itching until an antihistamine takes effect. Systemic treatment may be required with**chlorpheniramine** 4 mg orally, every 4 hours, as necessary

8.1.5 Chemical Conjunctivitis

Severe conjunctivitis can be caused when chemicals such as petrol or dishwashing liquid, bleaching agent and many other substances are splashed in the eyes. ***This is an emergency and the most important treatment is immediate irrigation with a lot of water for 20 minutes***. If purulent (bacterial) conjunctivitis develops later, it can be treated as above with tetracycline eye ointment.

Table showing ….

Disease Condition	Visual Acuity	Affected Eye	Cornea	pupil	Pain	Discharge
Allergic/viral Conjunctivitis	Good	Both	Clear	Normal	No	Watery/ mucoid
Bacterial Conjunctivitis	Good	Both	Clear	Normal	No	Purulent
Ophthalmia neonatorum	Poor+/-	One/both	Cloudy +/-	Normal+/-	Yes	Copious purulent
Cornea ulcer	Poor	One/both	Gray spot	Normal	Yes	Watery/purulent
Uveitis	Poor	One/both	Clear or Cloudy	Small & irregular	Yes	Watery
Acute glaucoma	Poor	One		Mild Dilated	Yes	Watery

8.1.6 Trachoma

Trachoma is a chronic conjunctivitis caused by infection with Chlamydia trachomatis. It is one of the commonest causes of blindness worldwide. There is a chronic inflammation of the conjunctiva leading to scarring of the upper eyelid tarsal plate, entropion and in turn of eyelashes.

Note: Trachoma reservoirs are infected children and mothers in hyper endemic areas.The infection is spread

by direct contact through flies, fomites (towels) and fingers (FFF), in poor hand hygienic conditions**.**

Diagnosis

• Patients presents with photophobia in early stages or re- infection

• Follicles in the upper tarsal plate seen as round and white nodules in active diagnostic.

• In late stages, in-turned eyelashes rub on the cornea leading to corneal ulcers

• Loss of vision due to Corneal Scarring.

Clinical Stages according to World Health Organization **Trachomatous Inflammation Follicular (TF)** - Presence of at least 5 follicles on the upper tarsal plate.

Trachomatous Inflammation Intense (TI) – There is intense inflammation, the conjunctival blood vessels cannot be seen. Trachomatous Scarring (TS) – Presence of white scars in the upper tarsal plate

Trachomatous Trichiasis (TT) – Presence of some eye lashes rubbing against the cornea

Corneal Opacity (CO) – Presence of corneal opacity (scar) affecting the central cornea

Treatment and Prevention

World Health Organization recommendedtreatment and prevention strategy for Trachoma known as SAFE.
The components of SAFE strategy are:

• Surgical correction of entropion in TT patients. This procedure can be done at Health Centre at community level by a trained health worker.

Antibiotic treatment of individual cases with TF and TI to prevent transmission as follows:-

• **Tetracyclineointment1%**once a day for 6 weeks
OR
• **Azithromycin 1g** as a single dose for adults- for preventive chemotherapy in mass treatment campaign.

The regimen for children is as shown below:-

Table 1: Dosage of Azithromycin in children

Weight (kg)	1-day Regimen
<15	20mg/kg once daily
15-25	400mg (10 ml) once daily
26-35	600 mg (15 ml) once daily
36-45	800 mg (20 ml) once daily
>45	Dose as per adults

F – Face washing and total body hygiene to prevent transmission of disease from one person to the other.
E – Environmental improvement/hygiene

8.2 Ocular Trauma

There are four types of eye injuries and their management depends on the history.The ***4 types*** of ocular injuries are:

1. Perforating Injury,
2. Blunt Injury,

3. Foreign Bodies and,
4. Burns or chemical injuries

From the history, one will be able to know the type of injury that will guide the management.

1. Perforating eye injury

This is trauma with sharp objects like thorns, needles, iron nails, pens, knives, wire etc.

Diagnosis

- There is a cut on the cornea and or sclera
- A cut behind the globe might not be seen but the eye will be soft and relatively smaller than the fellow eye.
- The pupil may be irregular or not visible
- Part of the intraocular structures like iris or lens may be protruding out with blood into the anterior chamber
- There may be eyelids involvement.

Treatment

- Apply an eye shield
- ***Tetanus Toxoid***0.5 ml intramuscular stat as prophylaxis **Plus**
- ***tetracycline eye*** ointment 8 hourly for 3 days **Plus**
- ***Paracetamol 1 gm*** 8 hourly for 3 days in adults.Children is 10-14 mg/kg

NOTE:

- Eye ointment should be applied very gently and in the lower fornix (behind the lower eyelid).
- Do not apply pressure on the eye in perforating injuries of the eyeball.
- Delay in surgical management of the injury may cause irreversible blindness or may necessitate removal of an eye.

Refer the patient to eye surgeon immediately

Surgery: This is done by a well trained eye specialist within 48 hours of injur

2. Blunt injury

This is trauma from objects such as stones, balls or fist.

Diagnosis

•There may be pain and or poor vision

•There may be blood behind the cornea (hyphaema)

•Pupil may be normal or distorted

•There may be raised intraocular pressure

Guideline on Management

Complicated blunt trauma is best managed by eye specialist as surgery may be required in the management. Refer patients with blunt trauma to eye specialist as indicated below:-

Table 3: Management of Complicated Trauma

Findings	Action to be taken
No hyphema, normal vision	Observe

Hyphema, no pain	Refer
No hyphema, normal vision, pain	Paracetamol, Observe for 2 days, Refer if pain persist
Poor vision and pain	Paracetamol, refer urgently
Hyphema, pain, poor vision	Paracetamol, refer urgently

3. Foreign bodies

This is a condition whereby something like piece of metal, vegetable or animal parts entering into any part of the eye.

Diagnosis

- There may be pain, redness, excessive tearing and photophobia if the foreign body is on the cornea or eye lids
- If the foreign body is superficial, it can be seen
- There may be loss of vision

Treatment

For superficial foreign body •Instill local anaesthetic agents like Tetracaine 0.5%. Wait for 3 minutes and remove it with a cotton wool bud

• If the foreign body is not vegetable matter.

• **Tetracycline eye**1% ointment and pad the eye for 24 hours

If foreign body is vegetative matter give antifungal

• **Miconazole 1**% eye drops hourly or 2 hourly.

For intraocular foreign body

Apply antibiotic ointment and eye shield

Refer to eye Specialist for surgical management.

NOTE:

- Never use needles when removing foreign bodies in the eye.
- Never attempt to remove a foreign body that is firmly embedded in the cornea,
- Refer to the nearest eye specialist for removal
- Never pad an eye that was injured with a vegetable material, apply antibiotic ointment and refer.

4. Burns and chemical injuries

This is a condition that occurs when chemicals such as acid or alkali, snake spit, insect bite, traditional eye medicine, cement or lime enter the eye. It may also be caused by open flame burn to eyelids.

Diagnosis

- Diagnosis relies mostly with patients' history.
- Patients may present with photophobia. • Excessive tearing.
- Cloudiness of cornea. • Loss of conjunctival blood vessels.
- Traces of chemical substance such as cement or herbs and blisters or loss of eyelid skin in open flame injuries.

This is an Ophthalmological emergency. If a patient gives a history of being in contact with the above, the following should be done:

• Irrigate the eye with clean water continually for a minimum of 20 – 30 minutes.
• Test the patients' vision and examine the eye
• Apply eye ointment (**Chloramphenical or Tetracycline**).
• Refer to eye Specialist for more care.
• For open flame injuries, apply eye ointment if the patient can not open or close the eye or if there are signs of involvement of the eyeball.

8.3 Corneal Ulcer

Corneal ulcer is a raw discontinuity to the corneal epithelium leading to a painful red eye. This may be caused byinfection (bacterial, viral e.g Herpes simplex virus and measles), fungal), trauma (physical, chemical) and Nutritional (Vitamin A deficiency)

Diagnosis

• Painful and red eye of acute onset
•Severe photophobia
• It may be accompanied by excessive tearing
• Pupil may be normal
• Poor vision and gray/white spot on the cornea

Treatment

Infectious Corneal Ulcers

• These patients are managed by eye specialists

• Apply eye ointment and shield then refer to eye specialist.

Patient with corneal abrasion complains of pain, gritty sensation and excessive tearing. Apply **antibiotic ointment** and pad. Review after 24 hours. If signs and symptoms persist, refer to the eye specialist

Superficial damage to the cornea can cause visual impairment if it is not treated.

Tetracycline eye ointment must be provided and the patient should be reviewed after one day's treatment to check that the condition has not become worse.If there is no improvement and is continuing pain or more redness, or poor vision, refer to the nearest ophthalmic center. If the condition has improved, continue the treatment

8.4 Vitamin A Deficiency (Xerophthalmia)

VitaminA deficiency is associated with higher infants and childhood mortality rate particularly associated with Measles. The age group at risk of blindness due to Vitamin A deficiency is 6 months to 6 years.

Ocular Manifestations

Xerophthalmia is a term used to describe the ocular symptoms and **signs of Vitamin A Deficiency which are:-**

- **Night Blindness** -Patients presents/complain of poor vision during the night or in dim light

- **Conjunctival Xerosis** - It is a dry appearance of the conjunctiva *Bitot Spots* - This is an advanced stage of Conjunctival xerosis presenting as a localized white foamy appearance most often on the temporal conjunctiva
- **Corneal xerosis** - It is a dry appearance of the cornea
- **Corneal ulceration with Xerosis** – It is an advanced stage of corneal xerosis where you have ulceration of the cornea
- **Corneal Ulceration/Keratomalacia** - It is a corneal melting that is of abrupt onset. It presents in severe Vitamin A Deficiency
- **Corneal Scarring**- It is the end stage of malnutrition in children who survive. Corneal scarring often has a marked effect on vision

This eye disease is most common in children. It is associated particularly with inadequate intake of foods that contain vitamin A. It can also be a complication of measles.

Prevention

- Give mothers Vitamin A 200,000 IU after delivery
- Encourage breastfeeding
- Give Vitamin A supplementation routinely, through Vitamin A campaigns and to children with measles

- Measles Immunization
- Encourage mothers and weaned children to take adequate foods that are rich in Vitamin A
- Weaning foods should be rich in Vitamin A e.g. mangoes, papaya, darky green leafy vegetables

Treatment

Give Vitamin A capsules and emphasize on diet containing dark-green-leafy vegetables

Table 2: Vitamin A Dosage for Children

Vitamin A	Dosage
Age up to 1 year	Age above 1 yearOr 8 Kg or more body wt.
100,000 I.U First day	200,000 I.U First day
100,000 I.U Second day	200,000 I.U Second day
100,000 I.U Third dose after 14 days	200,000I.U Third dose after 14 days

Pharmacological Treatmentof Xerophtalmia

Tetracycline or Chloramphenicol 1% eye ointment 8 hourly and avoid corneal exposure.

Refer to the ophthalmologist urgent.

8.5 Miscellaneous Eye Conditions

Patients may present with other common eye conditions. Examples are pterygium and cataract and less frequently glaucoma. Patients with any unusual eye

conditions must be referred to the nearest ophthalmic center.

8.5.1 Pterygium

Pterygium -This is a triangular sheet of fibro-vascular tissue which invades the cornea. Patients present with adherent conjunctival overgrowth on the cornea.

This condition is common in Eritrea and is caused by exposure to sunlight and dust. It appears as an outgrowth on the conjunctiva which is usually quite harmless.
There is no pharmacological treatment.
Affected patients should be reassured, but if the pterygium extends across the iris towards the pupil, the patient should be referred to an ophthalmic center.

SurgicalTreatment
Treatment for pterygium is surgical excision in advancedstage where the visual axis is involved. The favored method is **excision** that is followed by a **free conjunctival graft**. Surgery should be done by qualified eye care personnel and **antibiotic-steroid combination** drops should be given postoperative.

8.5.2 Cataract

The lens of the eye becomes cloudy and instead of the pupil looking black, it looks bluish or grey. Patients complain of blurred vision.

All patients with cataracts should be referred to the nearest ophthalmic center for assessment and possible lens surgery.

Diagnosis

- Cloudiness in the lens seen as a white mark behind the pupil and iris
- Conjunctiva and cornea are clear and the whole iris can be seen clearly

Referral

Refer all cases to eye surgeon for cataract surgery.

NOTE:

- Cataract may present in all age groups
- Blindness due to cataract is reversible.
- Treatment is only by surgery
- Early treatment in children is mandatory

8.6 Glaucoma

This condition is caused by increased pressure in the eyes and can be very painful. The eyeballs feel hard to touch. If not controlled appropriately, glaucoma can lead to blindness. Pain is a good indicator that the patient needs to be referred but some patients have chronic glaucoma which is not painful. Patients with both types of glaucoma should be referred urgently to health facilities with an ophthalmologist.

There are mainly 4 clinical types of glaucoma.

I. Primary Open angle glaucoma

Diagnosis

• Present as painless loss of peripheral vision

• Cornea and conjunctiva are clear

• The optic nerve is always damaged through fundoscopy
• First degree relatives of glaucoma patients are at risk
• All suspected cases of glaucoma should be referred to qualified eye care personnel.

NOTE: Primary Open Angle Glaucoma does not have symptoms in early stages, hence routine intraocular pressure check-up and fundus examinations should be done in all people of 40 years and above

Treatment

Treatment of Primary Open Angle Glaucoma may be surgical or pharmacological.l Treatment is given to patients with good compliance
(targeted intraocular pressure level reached). If medical treatment is given, it should belife long unless there are conditions necessitating other interventions. Surgical treatment is usually preceded by medical treatment.

Pharmacological Treatment

Timolol. It is the first line of treatment and it should be used with caution in patients with asthma, COPD and cardiac diseases. **OR**

Pilocarpine hydrochloride 2 or 4%

Instil one drop in the affected eye given at an interval of 6 hourly. This medicine causes long-standing pupil constriction so it should not be used unless a patient is prepared for glaucoma surgery or as an alternative topical treatment for patients who are contraindicated for Timolol use. **Or**

Acetazolamide 250 mg 6 hourly for one or two days or until the intraocular pressure is lower than 40 mmHg.

Surgical Treatment

- It is done in all patients with poor compliance or when prescribed topical medicines are unavailable or unaffordable.
- Surgical treatment is encouraged as a primary treatment in all glaucoma cases in developing countries due to poor compliance to medical treatment.

2. Primary Angle Closure Glaucoma

This is also known as Congestive Glaucoma and commonly affect people aged 40 years and above.

Diagnosis

- Patients present with acute painful red eye in the affected eye
- Severe headache and cloudiness of the cornea
- There is usually dramatic visual impairment and vomiting may be present

NOTE:

- ***Primary Angle Closure Glaucoma is an Ophthalmological Emergency!***

- Refer all patients with Congestive Glaucoma to eye specialist after initial treatment

Pharmacological Treatment

First Line Treatment

- Mannitol IV 1-2mg/kg body weight to run slowly over 30 -45 minutes

Mannitol has diuretic effects soit is only used as a single dose. It is also used in emergencies to prepare patients with high intraocular pressure for surgery as they lower intraocular pressure rapidly.

Second Line Treatment
As for Primary Open Glaucoma.

3. Congenital Glaucoma
- Presents from birth to 5 years.
- It is a syndrome where by the intraocular pressure is raised and cause abnormality of the eyeball and visual disturbances even blindness.

Diagnosis
- Patients present with bigger eyes than normal for age (buphthalmos)
- Photophobia
- Tearing
- Cloudy cornea
- Redconjunctiva though not severe.

Treatment
Treatment is usually surgery, which is done by pediatric ophthalmologist.

Referral
Refer any child who have the above mentioned signs and you suspect that he/she is having congenital glaucoma to a specialist at a Paediatric Eye Tertiary centre.

4. Secondary Glaucoma
This presents as a complication of other eye diseases such as uveitis, hyper mature cataract, trauma and retinal diseases. It may also be due to prolonged use of steroids

Diagnosis
- Poor vision in the affected eye
- High intraocular pressure

• New vessels on the iris if the cause is retinal diseases

Treatment

Management of these patients is (if available):

- Retro-bulbar alcohol injection 99% in the affected eye **OR**
- laser photocoagulation treatment (Cyclophotocoagulation) in thrombotic glaucoma.

Treatment of the pre-existing eye disease is highly recommended.

Referral

Refer all patients suspected to have secondary glaucoma to a qualified specialist

8.7 Dry Eyes

Older patients, particularly, complain of discomfort in the eyes which often feels as though there is some abrasion on the conjunctiva. There may be mild redness. Patients may be referred to the nearest ophthalmic center to exclude injury or foreign body. The cause is often dryness in the eye which can be treated with

Methyl cellulose eye drops 0.5 %, instilled as often as required.

9. GASTRO-INTESTINAL DISORDERS

9.1 Diarrhea

9.1.1 Acute Diarrhea

Diarrhoea means passing frequent, loose, watery stools 3 or more times in a day.Diarrheal episodes are classically distinguished into acute and chronic (or persistent) based on their duration.

Acute diarrhea is thus defined as an episode that has an acute onset and lasts no longer than 14 days;

Chronic or persistent diarrhea is defined as an episode that lasts longer than 14 days. This distinction is supported by the World Health Organization (WHO).

Fourclinical types of diarrhea can be recognized, each reflecting the basic underlying pathology and altered pathology:

1. **Acute Watery Diarrhoea** (including Cholera): whichlasts several hours or days. The main danger is dehydration and malnutrition if feeding is not continued
2. **Bloody Diarrhoea** (Dysentery): the main dangers are damage of intestinal mucosa, sepsis, and malnutrition. Other complications including dehydration may also occur

3. **Persistent (Chronic) Diarrhoea**: Last for 14 days or longer, the main danger is malnutrition and serious non-intestinal infections, dehydration may also occur
4. **Diarrhoea with Severe Malnutrition** (Marasmus or Kwashiorkor): the main dangers are severe systemic infection, dehydration, heart failure, vitamin and mineral deficiency.

Note: The basis for the management of each type of dirrhoea is to prevent or treat dangers that present.

CAUSES

- Viral e.g. Rotavirus
- Protozoal e.g. Amoebae
- Bacterial e.g. Shigella
- Side effects of some medications. e.g. Penicillins

SYMPTOMS

- Frequent watery stools
- Presence of fever
- Blood or mucus in the stool
- Reduced urine output
- Associated vomiting

Other signs which may be useful in assessing severe dehydration and influence management include:

- Weight loss over a short period

- Signs of hypovolemic shock: fast weak pulses, cold extremities, oliguria or anuria
- Hyperventilation, deep and fast breathing indicating acidosis
- Signs of severe malnutrition

I. Management of diarrhea in children

Over 90% of deaths from diarrhea in under-fives would be prevented by:

- Continuing breast feeding and other feeding throughout the attack of diarrhea (prevent malnutrition)
- Making sure mothers know when to take the child to a health facility
- Correct assessment, treatment and continued feeding at the health facility level (See IMNCI)
- Treatment of diarrhea

  - Treating or preventing dehydration and electrolyte imbalance with ORS (New osmolarity ORS) or parenteral fluid therapy
  - Reduce the duration and severity of diarrhea and occurrence of future episodes by giving **supplemental Zinc**
  - If blood diarrhea /invasive diarrhea , give antibiotics

The following table can be used to assess the degree of dehydration in children with diarrhoea.

Assessment of the Degree of Dehydration in Children with Diarrhoea			
1. LOOK AT			
Condition	Lethargic or unconscious, floppy		Well, alert
Eyes	Very sunken and dry	Sunken	Normal
Tears	Absent	Absent	Present
Mouth andTongue	Very dry	Dry	Moist
Thirst	Drinks poorly or not able to drink	Thirsty, drinks eagerly	Drinks normally, not thirsty
2. FEEL			
Skin	Goes back very slowly after pinching	Goes back slowly after pinching	Goes back quickly after pinching
3. DECIDE	If the patient has two or more signs, including at least one underlined sign, there is severe dehydration	If the patient has two or more signs including at least one underlined sign, there is some dehydration	The patient has no signs of dehydration

4. TREATMENT PLAN	Weigh patient and use Plan C (see Table 2-4)	Weigh patient and use Plan B (see Table 2-3)	Plan A(see Table 2-2)
5. % DEHYDRATION	> 10% (Severe)	5– 10% (Mild to moderate)	<5% (Nil)

Note - In adults and children older than five (5) years of age, other signs of severe dehydration that may be present are absent radial pulse and low blood pressure.
The skin pinch may be less useful in patients with marasmus (severe wasting) or kwashiorkor (severe malnutrition with oedema) or obese patients. Tears are a relevant sign only for infants and young children.

Investigations

- CBC
- Stool routine examination
- Stool for culture and sensitivity
- Blood film for malaria parasite
- Blood urea and creatinine

Note
If diarrhoea present WITH vomiting, low grade fever with no mucus in stools think of viral infection
If diarrhoea present WITH vomiting, abdominal cramps, blood and mucus in stools WITH fever, think of bacterial infection
If diarrhoea present WITH blood and mucus in stool WITH no fever, think of amoebiasis

If profuse diarrhoea present (rice water stools) WITH vomiting, think of cholera

If diarrhoea present WITH excessive vomiting (especially if in more than one member of the household or group) think of food poisoning

Treatment

Treatment objectives

- **To prevent dehydration**: this is very important since so much of the child's body fluid is being lost through the stools and vomiting
- **To replace lost fluid**: as much fluid as goes into the stools should be given to the child to drink for replacement
- **To maintain nutrition**: mothers tend not to give a child who has diarrhoea anything or very little to eat, at a time when he needs all the food he can get! Continue to feed as much as can be tolerated
- **To maintain personal hygiene**: or else you end up taking the germs from the stools, back into the mouth, continuing the diarrhoea you are trying to stop
- **To eliminate infecting organisms** where appropriate

Non-pharmacological treatment

- Keep surroundings clean
- Improve personal hygiene e.g. hand washing after toilet

- Home-based fluid intake
- Maintain diet

Pharmacological treatment
Fluid therapy:
Child with no dehydration (<5%), gets treatment **Plan A**.
Child with some dehydration (5-10%) gets treatment **Plan B**.
Child with severe dehydration (>10%), gets treatment **Plan C.**

Treatment Plan A – ***No dehydration***

- Child can be treated safely at home
- Instruct mother to give, recommended home-based fluids like rice water, soup, water, and Oral Rehydration Salt (ORS).
- Breastfed babies should be given breast milk and ORS
- Give as much as the child wants of all the fluids
- Give Zinc supplementation

  Adults: Not required

  Children

> 6 months;	20 mg/day for 10-14 days
< 6 months;	10 mg/day for 10-14 days

Table 2-2: Treatment by Fluid Therapy - Plan A		
Age	***ORS Basic Amount***	***ORS for every extra stool passed***
<2 years	500 ml or more	50–100 ml
2–10 years	1000 ml or more	100–200 ml
>10 years	2000 ml or more	100–200 ml

- Child should continue to feed.
- Ask the mother to return to the health facility if the child gets worse, passes more watery stools, vomits repeatedly, becomes very thirsty, eats or drinks poorly or is not better in 2 days.
- Instruct mother on how to prevent diarrhoea.

Treatment Plan B – ***some dehydration***
For the child with mild-moderate dehydration, use treatment Plan B.

- Child to be treated in the health facility
- Give ORS over the first 4 hours as shown in the table 2-3 below.
- If child vomits, wait 10 minutes and start again.
- Continue with other fluids the child will accept. Instruct mother to continue breast feeding if child is breast fed.
- Observe stools passed and record quantity.
- Check for signs of worsening dehydration.

- If eyes become puffy, too much fluid is being given so stop ORS and continues with breast milk or water, or other fluids if child is not breastfed.
- Reassess state of dehydration after 4 hours
- If clinical state has improved with no dehydration - go to plan A If there is still mild-moderate dehydration repeat plan B
- If condition is worsening – go to plan C

Table 2-3: Treatment by Fluid Therapy - Plan B				
Weight	<6 kg	6 <10 kg	10-<12 kg	12–19 kg
Age*	Up to 4 months	4 months up to 12 months	12 months to 2 years up	2 years up to 5 years
Amount of ORS	200–400 ml	400–700 ml	700–900 ml	900–1400 ml
**Use the child's age only when you do not know the weight. The approximate amount of ORS required (in ml) cans alsobe calculatedby multiplying the child's weight (in kg) by 75.*				

Treatment Plan C – *Severe dehydration*

- A child with severe dehydration requires treatment with IV fluids in hospital.
- Start IV fluids immediately.Give 100 ml/kg Ringer's lactate solution or, if not available, normal saline or cholera replacement fluid (5:4:1),

divided as shown in the Table for Plan C below: If you cannot give this and cannot pass a nasogastric tube refer to a health facility that can do so. In the interim start ORS sips.

- If the child can drink, give ORS by mouth while the drip is set up.

Treat severe dehydration quickly

Table 2-4: Treatment by Fluid Therapy - Plan C		
Age	First give 30 ml/kg in:	Then give 70 ml/kg in:
Infants (< 12 months)	1 hour*	5 hours
Children(12 months up to 5 years)	30 minutes*	2½ hours
**Repeat once if radial pulse is still very weak or not detectable.*		

- Reassess the child every 1-2 hours. If hydration status is not improving, give the IV fluid more rapidly than as stated in the table above.
- Also give ORS (about 5 ml/kg body weight/hour) as soon as the child can drink: usually after 3-4 hours (infants) or 1–2 hours (children).
- Reassess an infant after 6 hours and a child after 3 hours. Classify dehydration. Then choose the appropriate plan (A, B, or C) to continue treatment
- Start ORS as soon as patients can drink at 5 ml/kg body weight/hour.
- Assess child hourly. If not improving or dehydration is worse, increase drip rate.

- Do not stop the IV fluids until the child has been observed to retain the ORS for at least 1 hour and there is improvement in the clinical condition.
- Continue ORS on treatment plan B and continue to observe child until child has no signs of dehydration, then move to Plan A.

Note
ORS currently recommended for use in mild to moderate diarrhoea has a reduced sodium and glucose concentration (low osmolarity).

Severe diarrhoea may be complicated by marked fluid loss accompanied by loss of potassium (hypokalaemia) or on the other hand, impaired renal function leading to acidosis and elevated blood potassium (hyperkalemia).
When the patient is passing adequate amounts of urine, probably indicating good renal function, start potassium containing foods such as fresh fruitsand bananas.

If there is clinical and /or laboratory evidence **of severe hypokalaemia**, intravenous potassium chloride replacement may be given in the form of half strength **Darrow's solution** or **Ringer's lactate** , but only in a hospital.
If possible infants and children should continue to breastfeed or eat during the period of diarrhoea.

1 Viral diarrhoea

No antibiotic treatment required. Give oral rehydration therapy alone as above.

2 Bacterial diarrhoea

Co-trimoxazole, oral, (avoid in patients with G6PD deficiency)

ReferIMNCI chart booklet ciprofloxacillin dosage

Adults: 960 mg 12 hourly for 7 days

Children:

6-12 years;	480 mg 12 hourly for 7 days
6 months-5 years;	240 mg 12 hourly for 7 days

3 Amoebic diarrhoea

- Metronidazole, oral,

Adults: 800 mg 8 hourly for 5 days;

Children

8-12 years;	400 mg 8 hourly for 5 days
4-7 years;	200 mg 8 hourly for 5 days
0-3 years;	100 mg 8 hourly for 5 days

4 Giardiasis

- *Metronidazole*, oral, Adults: 400 mg 8 hourly for 5 days

Children

8-12 years;	400 mg 8 hourly for 5 days
4-7 years;	200 mg 8 hourly for 5 days
0-3 years;	100 mg 8 hourly for 5 days

Note -Anti-diarrhoeal medicines like Mist Kaolin, co-phenotrope, codeine and loperamide have no place in the treatment of diarrhoea in children and are likely to do more harm than good.

REFERpatient if condition does not improve or gets worse

4 **Persistent diarrhoea in children**

Persistent diarrhoea in children is defined as liquid stools for more than 14 days. Its management is more complicated than that of acute diarrhoea in children and also different from management of chronic diarrhoea in adults. Important treatment measures are:

- Correct any dehydration and maintain hydration, see for assessment and treatment of dehydration. *If dehydration is present along with diarrhoea lasting more than 14 days, the child should be referred to hospital for specialized dietary treatment.*
- If there is no dehydration, teach the mother how to feed the child with persistent diarrhoea:
- if breastfeeding, give more frequent and longer feeds, day and night;
- If taking other milk, replace it with more breastfeeding, OR with fermented milk products, such as yogurt, OR replace half of the milk with nutrient-rich sem-isolid foods (DMK, shiro fitfut, and tahini with added oil).

• Give vitamin A: 6 months to 1 year, 100,000 units; 1 year and over 200,000 units. Repeat these doses the next day.
Mothers should be advised to give their children vitamin A-rich foods if possible, e.g., papaya, mangos, carrots, margarine, egg yolk.

• Zinc (elemental), oral for 14 days: If < 10 kg, give 10 mg/day. If > 10 kg, give 20 mg/day.

Give an additional dose of Vitamin A:Vitamin A (retinol), oral.

Age range	Dose units	Cap. 100 000 u	Cap. 200 000 u
Infants 6–11 months old	100 000	1 capsule	–
Children 12 months to 5yrs	200 000	2 capsule	1 capsule

REFERRAL

• Child < 2 months of age.
• Signs of severe dehydration when IV fliud cannot be given
• Malnutrition or weight loss.
• Diarrhoea that persists for > 5 days with treatment.
• Diarrhoea present for > 14 days.

II. Management of diarrhea in adults

The principles of management of diarrhea in adult are the same as in children in correction of fluid deficit. As much as possible the cause for diarrhea in adult should be established. Special care should be taken for patients who are immunodeficient e.g. in cases of HIV/AIDS;

and/or thosewithassociatedchronicdisease condition including malignancy.However,the most common cause for diarrhea in adult is food poisoning which is normally self-limiting.

ACUTE DIARRHOEA, WITHOUT BLOOD, IN ADULTS

DESCRIPTION

Acute diarrhoea is usually self-limiting and is managed by fluid replacement.

Pharmacological Treatment

- Oral rehydration solution (ORS). **OR**
- Homemade sugar and salt solution (SSS).
- Loperamide, oral, 4 mg immediately and 2 mg as required after each loose stool up to 6 hourly. Not more than 12 mg daily
-

REFERRAL –

•Suspected acute surgical abdomen.

• Dehydration not corrected with rehydration.

CHRONIC DIARRHOEA, IN ADULTS

DESCRIPTION

Diarrhoea lasting > 2 weeks.

Send a stool sample for microscopy for ova, cysts and parasites.

Encourage HIV testing.

Pharmacological Treatment

Giardiasis

•Metronidazole, oral, 250 mg daily for 5 days.

•Avoid alcohol.

Chronic diarrhoea in HIV/AIDS section

9.1.2 Dysentery

Dysentery, or diarrhoeal stool with blood or mucus, is usually due to bacteria and should be treated as bacillary dysentery. If there is no clinical response within three days manage as amoebic dysentery or refer for formal assessment.
Commonly encountered infectious conditions include Shigella, Salmonella, E. coli, and Campylobacter.

REFERRAL

- No response to treatment.
- Abdominal distension.
- Intussusception.

Dysentery Bacillary

Acute infection of the bowel usually caused by Shigella, Salmonella or Campylobacter
There is sudden onset diarrhoea with:

- blood (not due to haemorrhoids or anal fissure) or mucous in the stools
- convulsions (in children)
- fever
- tenesmus

GENERAL MEASURES

Prevent spread of micro-organism by:

- good sanitation to prevent contamination of food and water
- washing hands thoroughly before handling food

- washing soiled garments and bed clothes

Pharmacological Treatment
Treat dehydration vigorously.

Children
Treat dehydration according to : Diarrhoea, acute in children.
Adults
Oral rehydrationtreatment:

- **Oral rehydration solution (ORS**) and Recommended home made fluids.
- Oral rehydration volume will depend on the severity of the dehydration.

IV treatment:
•Sodium chloride 0.9%, IV.
Antibiotic therapy
•Ciprofloxacin, oral, 500 mg 12 hourly for 3 days.
Note:

- Check for complications such as intestinal perforation or peritonitis.
- Ensure adequate urine output to exclude haemolytic uraemic syndrome.

REFERRAL

- Severe illness.
- Persistent blood in urine on dipstix or macroscopically.
- Acute abdominal signs (severe pain, acute tenderness, persistent or bilious vomiting).
- Bloody mucous passed in absence of diarrhoea.
- Failure to respond within 3 days.

9.1.3 Cholera

- Cholera is a form of acute, watery diarrhoea. It is an acute gastrointestinal infection caused by Vibrio cholera organisms (El Tor and Classical biotypes).
- The majority of cholera cases are mild to moderate and do not come to a health facility.
- A small number of patients develop moderate to severe diarrhoea with rice water stools and vomiting.
- Mortality from dehydration can be high in this group, if not managed appropriately. Fever is mild or absent.
- Infection occurs through ingestion of contaminated water or food by human feces.
- Hygienic measures are of prime importance.
- Strict isolation of patients must be arranged and caretakers must wash hands with soap and water thoroughly after attending patients.
- All raw foods must be washed before eating. Cooperation with sanitation workers is vital and water sources must be investigated

Diagnosis

- After a 24 to 48 hours incubation period, cholera begins with the sudden onset of painless watery diarrhea that may quickly become severe with profuse watery stools (rice water), vomiting, severe dehydration and muscular cramps leading to hypovolemic shock and death

- The stool has a characteristic “rice water” appearance (non bilious, gray, slightly cloudy fluid with flecks of mucus, no blood and inoffensive odor)

Laboratory Diagnosis
Dark field microscopy on a wet mount of fresh stool for identification of motile curved bacillus. Isolation through stool cultureis best done through TCBS agar.Vibrio serotype can be discerned by immobilization with specific antiserum.

Treatment
Rehydration, electrolytes and base correction is the most important step.

1. Administer intravenous (I.V) fluid immediately to replace fluid deficit; Use**lactated** Ringer **solution** or, if that is not available, isotonic sodium chloride solution.

- For patients older than 1 year, give 100 mls/kg I.V in 3 hours—30 mls/kg as rapidly as possible (within 30 min) then 70 mls/kg in the next 2 hours.
- For patients younger than 1 year, administer 100 mls/kg IV in 6 hours—30 mls/kg in the first hour then 70 mls/kg in the next 5 hours. Monitor the patient frequently.
- After the initial 30 mls/kg has been administered, the radial pulse should be strong and blood pressure

should be normal. If the pulse is not yet strong, continue to give I.V fluid rapidly.

- Administer ORS solution (about5 mls/kg/h) as soon as the patient can drink, in addition to I.V fluid.

2. If the patient can drink, begin giving **ORS** by mouth while the drip is being set up; ORS can provide the potassium, bicarbonate, and glucose that saline solution lacks.

- Reassess the hydration status after 3 hours (infants after 6 hrs), in the rare case that the patient still exhibits signs of severe dehydration, repeat the I.V therapy protocol. If signsof some dehydration arepresent, continueas indicated below for somedehydration. If no signs of dehydration exist, maintain hydration by replacing ongoing fluid losses.

3 Start antibiotics (see regimen below) after the patient is rehydrated and vomiting has stopped usually after 4-6 hours. Although the disease is self limiting, an effective antibiotic will reduce the volume of diarrhea and shorten the period during which Vibrio cholera is excreted. Antibiotic prophylaxis may be given to all close contacts in the same dosage as for treatment.
4 Start feeding 3-4 hours after oral rehydration begins.

Drugs of choice

- *Doxycycline*: Adult and child above 12 years; 300 mg as a single dose or 5mg/kg single dose OR

- Erythromycin :
  Adult: 500mg 8 hourly for 5 days
  Children: 40mg/kg/day given in 3 divided doses for 5 days OR
- *Ciprofloxacin* : Adult: 30mg/kg single dose (not to exceed 1g) or 15mg/kg 12 hourly for 3 days

NOTE *• A homemade ORS equivalent is 6 teaspoons of sugar and one half teaspoon of salt in a liter of water; a half cup of orange juice or some mashed banana can provide potassium.*

• Urine output decreases as dehydration develops and may cease. It usually resumes within 6-8 hours after starting rehydration. Regular urinary output (i.e., every 3-4 h) is a good sign that enough fluid is being given.

• In all suspected case notify Ministry of Health immediately.

For confirmation at the beginning of an outbreak, take rectal swab or stool specimen, handle properly and transport carefully to laboratory.

• Treat on site without referral wherever possible.

CAUTION: Doxycycline should not be used in pregnancy and children below 12 years

9.2 Typhoid and paratyphoid

This is a notifiable disease

Typhoid fever (enteric fever) is an acute systemic disease caused by Salmonela typhi and S. paratyphi, sreo group A and B respectvily.

It is a severe bacterial illness which occurs where sanitary conditions are poor permitting contamination of food or water with faeces.
Public education on good personal hygiene, hand washing and appropriate disposal of solid wastewould oftenprevent thedisease.
Screening of food handlers by carrying out stool cultures to exclude carrier status and safe handlingof food, fruits andvegetables are also helpful preventive measures.

Symptoms

- High fever with a relatively slow pulse rate (occasionally pulse is fast especially with myocarditis or intestinal perforation)
- Abdominal tenderness
- Hepato-splenomegaly (tender)
- Mental confusion• Signs of chest infection (pneumonitis)

INVESTIGATIONS

- FBC, differential, blood film (to exclude malaria)
- Blood culture• Stool culture
- Urine culture • Widal test -usually unreliable

Note:

•Diagnosis of typhoid fever is based on a strong clinical suspicion backed by **blood cultures**, positive during first 10 days of fever.

- **Stool cultures**, positive after tenth day up to 4th or 5^{th}week
- Urine **cultures,** positive during second and third week

The above tests are superior to the Widal test, which is unreliable and rarely useful in confirming a diagnosis of typhoid fever

TREATMENT

Treatment objectives

- To eradicate the infection
- To treat the disease in the patient
- To prevent transmission of infection to other people.
- Sponging to reduce body temperature if required

Pharmacological treatment

- **Ciprofloxacin, oral,**

Adults: 500 mg 12 hourly for 10-14 days
Children: 10 mg/kg 12 hourly for 10- 14 days

Or

Ciprofloxacin, IV, may be given in severely ill patients who cannot take oral medication. Revert to oral medication as soon as clinically indicated.

Adults: 200 mg 12 hourly
Children: 10 mg/kg 12 hourly

Note: Ciprofloxacin should be used with caution in children. Ciprofloxacin may rarely cause tendinitis. At the first sign of pain or inflammation, patients must discontinue treatment and alternative treatment (e.g. Azithromycin/Ceftriaxone) started.

Failing that, and in the absence of resistance:
Amoxicillin oral for 14 days
Children: 75 to 100 mg/kg/day in 3 divided doses
Adults: 3 g/day in 3 divided doses

OR

Chloramphenicol oralfor 10 to 14 days depending on severity

Children from 1 year to less than 13 years: 100 mg/kg/day in 3 divided doses

Children ≥ 13 years and adults: 3 g/day in 3 divided doses

- S. Typhiis rapidly developing resistance to quinolones. In this event, use:

Ceftriaxone, IM or slow IV (3 minutes) or infusion (30 minutes) for 10 to 14 daysdepending on severity

Children: 75 mg/kg once daily, Adults: 2 to 4 g once daily

• Antibiotic treatment in pregnant or breast-feeding women

In pregnant women, typhoid carries a major risk of maternal complications (intestinalperforation, peritonitis, septicaemia) and fetal complications (miscarriage, prematuredelivery, intra-uterine death).

- In the absence of resistance: amoxicillin oral: 3 g/day in 3 divided doses for 14 days
- If resistance: ceftriaxone as above for 10 to 14 days

Failing that, use ciprofloxacin (usually not recommended for pregnant or breast-feeding women. However, the life-threatening risk of typhoid outweighs the risk ofadverse effects). For dosage, see above.

Note 1: fever persists for 4 to 5 days after the start of treatment, even if the antibiotic iseffective. It is essential to treat the fever and to check for possible maternal or fetal complications.

Note 2

Treatment of healthy carriers:

- May require treatment with one or even two different medications over a period of 4-6 weeks
- Amoxicillin, oral,

Adults:

1 g 8 hourly

Children:

6-12 years;	500 mg 8 hourly
1-5 years;	250 mg 8 hourly

REFER

- Very ill patient with intestinal perforation or intravascular haemolysis
- If peritonitis is suspected give IV fluids, IV antibiotics,before transfer patient to a hospital where surgery can be performed
- If situationremainsunchanged afteradequate course of treatment

9.3 Shigellosis

Shigella organisms are a group of gram-negative, facultative intracellular bacteria pathogens.
They are grouped into 4 species: Shigella dysenteriae, Shigella flexneri, Shigella boydii, and Shigella sonnei, also known as groups A, B, C, and D, respectively. Shigellosis isspread by means of fecal-oral, ingestion of contaminated food or water.

Diagnosis:
Sudden onset of severe abdominal cramping, high-grade fever, emesis, anorexia, and large-volume watery diarrhea; seizures may be an early manifestation.
•Abdominal pain, tenesmus, urgency, fecal incontinence, and small-volume mucoid diarrhea with frank blood (fractional stools) may subsequently occur.
• Extra intestinal manifestations associated with S dysenteriae may include the following: Severe headache, lethargy, meningismus, delirium, and convulsions involving the CNS; hemolytic uremic syndrome (HUS), Microangiopathic hemolytic anemia, thrombocytopenia, and renal failure, profound dehydration and hypoglycemia.

Laboratory diagnosis
Perform microscopic stool examination isolation of Shigella from feces or rectal swab specimen.
Stool culture for suspected cases; the yield is greatest early in the course of disease. An enzyme immunoassay (ELISA) for shiga toxin is used to detect S dysenteriae type 1 in the stool.

Pharmacological Treatment
First Choice
Ciprofloxacin (the onlyeffective treatment) oral:
Adult, 500mg 12 hourly for 5 days
Children (where the benefit outweighs the risk); 5-10mg/kg/dosemaximum dose 500mg, 12 hourly for 5 days

OR

Erythomycin: Adult, 250mg 6 hourly for 5 days

Children, 10mg/kg/dose 6 hourly for 5 days.

9.4 Parasitic infections of the Gastrointestinal Tract

9.4.1 Amebiasis

Amebiasisis an infection caused by the protozoa organism E histolytica, which can cause colitisand other extra intestinal manifestations, including liverabscess (most common) and pleuropulmonary, cardiac, and cerebral dissemination. This can be through hematogenous spread as septic emboli from the gut wall or sub diaphragmatic abscess rapture into the pleural space or pericardium.

E. histolyticais transmitted primarily through the fecal-oral route. Infective cysts can be found in fecally contaminated food and water supplies and contaminated hands of food handlers. Sexual transmission is possible, especially in the setting of oral-anal practices.

Diagnosis of Amebic colitis

• Gradual onset of bloody diarrhea • Abdominal pain
• Fever spanning several weeks' duration
• Rectal bleeding without diarrhea can occur, especially in children
• Fulminant or necrotizing colitis usually manifests as severe bloody diarrhea and diffuse abdominal pain with evidence of peritonitis and fever.

Pharmacological Treatment

- **Metronidazole, oral,**

Adults: 750 mg 8 hourly for 5 days;

Children

8-12 years;	400 mg 8 hourly for 5 – 10 days
4-7 years;	200 mg 8 hourly for 5 – 10 days
0-3 years;	100 mg 8 hourly for 5– 10 days

Second choice

• **Tinidazole***)*: Adult 2g daily as a single dose for 3 consecutive days. Children 60 mg/kg as a single dose for 3 consecutive days.

Diagnosis of Amoebic liver abscess

• Fever, right upper quadrant pain, and tenderness of less than 10 days' duration.

• Sub-acute presentation can be seen, with concomitant weight loss and anorexia.

• 60% to 70% of patients with amebic liver abscess do not have concomitantcolitis, although a history of dysentery within the previous year may be obtained.

Pharmacological Treatment

• **Metronidazole**; Adult 500-750mg 8 hourly for 10 days. Repeat course after 2 weeks if necessary.

Children: 1-3 years 100-200mg 8 hourly for10 days;

Children 3-7 years 100- 200mg 6 hourly, for 10 days;

Children, 7-10 years 200-400mg 8 hourly, for 10 days

Second Choice

• **Tinidazole**: Adult 2g daily single dose for 5 consecutive days. Children 50-75mg/kg single dose for 5 Consecutive days

NOTE:

Metronidazole should be taken with food.

Aspiration of the abscess may be necessary if there is evidence of impending rapture or a possibility of pyogenic abscess.

9.4.2 Giardiasis

It is the infection of the upper small intestine caused by the flagellate protozoan Giardia Lamblia (or G. intestinalis)

Diagnosis

Infection is mainly asymptomatic

However when symptoms occur, they include acute and/or chronic diarrhea, without blood or pus.In few cases malabsorption syndrome may occur

Extra intestinal manifestations are rare and includeallergic manifestations such as urticaria, erythema multiform, bronchospasm, reactive arthritis, and biliary tract disease

Investigation: Microscopic stool examination of Giardia intestinalstrophozoites or cysts of infected patient, sensitivity increases on serial 3 samples examination.

More specific tests include Stool antigen ELISA or Duodenal biopsy.

Pharmacological Treatment

Metronidazole, oral, Adults: 500 mg 8 hourly for 5 days

Children

8-12 years;	400 mg 8 hourly for 5 days
4-7 years;	200 mg 8 hourly for 5 days
0-3 years;	100 mg 8 hourly for 5 days

Second choice

• **Tinidazole:** Adult 2g orally as a single dose during or after meal. Children 50-75mg/kg body weight as a single dose; Repeat once if necessary.

CAUTION

• Patients on Metronidazole and Tinidazole should not be taken with alcohol. They should also be avoided the first trimester of pregnancy.
• Reduce dosing to 50% in significant liver disease.

9.4.3 Ascariasis

It is an intestinal infection caused by Ascaris lumbricoides;

which predominates in areas of poor sanitation and is associated with malnutrition, iron-deficiency anemia, and impairments of growth and cognition.

Diagnosis

• Most patients are asymptomatic

• When symptoms occur, they are divided into 2 categories: early (larval migration) and late (mechanical effects)

• **In the early phase** (4-16 days after egg ingestion): Fever, Non-productivecough, Dyspnea, Wheezing.

• **In the late phase** (6-8 weeks after egg ingestion): Passage of worms (from mouth, nares, anus); diffuse or epigastric abdominal pain, nausea, vomiting; pharyngeal globus, "tingling throat" frequent throat clearing, dry cough; complications - biliary and intestinal obstruction, appendicitis, pancreatitis and malnutrition.

Pharmacological Treatment

• Mebendazole (PO): Adult and Children above 2 years 100mg 12 hourly for 3 days OR 500mg as a single dose Second chice

• **Albendazole**400mg as a single dose

9.4.4 Ancylostomiasis

It is a hookworm disease caused by infestation of the small intestine with Ancylostoma duodenale or Necator

americanus. It is one of the main causes of anaemia in the tropics which is also the major clinical feature.

Diagnosis

• The majority of patients are asymptomatic

• The major clinical manifestations are iron deficiency anemia and hypoalbuminaemia.

Pharmacological Treatment

Mebendazole: Adult and Children over 2 years 100mg (O) 12 hourly for 3 days Or 500mg as a single dose

Second choice:

Albendazole 400mg as a single dose

Note:

• Both Albendazole and Mebendazole must be chewed. If ova persist, give second course after 3 – 4 weeks.

• Iron replacement and nutritional supplementation (protein and vitamins) should be part of the management strategy.

CAUTION

Albendazole is contraindicated in the first trimester of pregnancy and children below 2 years

9.4.5 Strongyloidiasis

Intestinal infection caused by two species of the parasitic nematode Strongyloides.The most common and clinically important pathogenic species in humans is S stercoralis. Distinctive characteristic of this parasite is its ability to persist and replicate within a host for decades while producing minimal or no symptoms in individuals with an intact immune system and its potential to cause life-threatening infection (hyperinfection syndrome,

disseminated strongyloidiasis) in an immune-compromised host associated with high mortality rates.

Diagnosis

- The symptoms related to strongyloidiasis may reflect the nematode's systemic passage, its local cutaneous involvement or both.
- During chronic uncomplicated infections, the larvae may migrate to the skin, where they can cause cutaneous strongyloidiasis, known as **larva currens** because of the quick migratory rate of the larva.
- The intestinal infection is usually asymptomatic but patients may have vague symptoms such as abdominal pain, nausea, flatulence, vomiting, diarrhea and even epigastric pain.
- In malnourished children, strongyloidiasisremains an important cause of chronic diarrhea, cachexia, and failure to thrive.
- Strongyloidiasis can lead to gastrointestinal (GI), pulmonary, dermatologic, neurologic, gram negative bacteremia and othercomplications especially in patients with hyperinfection.

Pharmacological Treatment

• **Albendazole:** Adults 400mg , 12 hourly for 3 days, the medicines may be repeated after 3weeks. For disseminated infection give 7-10 days.

Children over 2 years give 15mg/kg/day in 2 divided doses for 3 days (7-10 days for disseminated infection)

Note:

- Provide antibiotic therapy directed toward enteric pathogens if bacteremia or meningitis is present or suspected
- Provide supportive treatment as indicated (eg, intravenous fluids if volumedepletion; blood transfusion , if gastrointestinal or alveolar hemorrhage, mechanical ventilation if respiratory failure)
- Symptomatic treatment should be initiated
- Pruritic dermatologic manifestations should be treated with antihistamines
- Inhaled beta-agonists may improve wheezing

9.4.6 Cestodiasis

Cestodiasis (Tapeworms disease) is acquired from eating raw orundercooked beefinfected with cysticercus bovis,the larval stageof Taenia saginata (beef tapeworm) or undercooked food containing **Cystercercuscellulosae**, the larval stage of Taeniasolium (porktapeworm).

Lesscommonly Hymenolepsis nana (fecal oral contamination by both human and animals especially dogs).

Diagnosis

• Most tape worm infections are symptomless
• The commonest way of presentation is the appearance of proglottides or segments in the stool
• There may be mild epigastric discomfort, nausea, weight loss and diarrhea
• More specific features depend on the type of the parasite

Laboratory Diagnosis:

Macro and Microscopic stool examination for ova and parasites. It is indicated for some of the cestodes that release eggs or worm segments directly into the stool. Collecting 2-3 stool samples increases the sensitivity.

Treatment

For Taenia solium, Taenia saginata and Diphyllobothriumlatum
Drug of choice

Adults and children over 6 years:

• **Niclosamide** 2g, as a single dose after a light breakfast, followed by a purgative (e.g. magnesium sulphate) after 2 hours.

Children 2-6 years, 1g as a single dose after a light meal, followed by a purgative after 2 hours;
Children under 2 years, 500mg as a single dose after a light meal, followed by a purgative after 2 hours

For Hymenolepsis nana
Adult and children over 6 years
•**Niclosamide** 2g as a single dose on the first day, then 1g daily for 6 days.
Children 2-6 years: • Niclosamide 1g on the first day as a single dose, then 500mg once daily for 6 days.
Children under 2 years, 500mg on the first day as a single dose, then 250mg daily for 6 days **OR**
• **Praziquantel**40mg/kg body weight as a single dose

For H. nana
Adults and children over 2years,
• **Niclosamide** 25mg/kg as a single dose.
For Hepatic Echinococcosis - Echinococcosisis treated with Albendazole and surgery or Albendazole and PAIR (puncture aspiration, injection, and re-aspiration).
•Albendazole 400mg every 12 hours is recommended for 1-3 months before surgical intervention.

Note:
• Administer parenteral vitamin B-12 if evidence of vitamin B-12 deficiency occurs with Diphyllobothrium infections
• Tablets should be chewed thoroughly before washing down with water.
CAUTION: Avoid Niclosamide during the first trimester of pregnancy.

9.4.7 Schistosomiasis

Schistosomiasis is a paracitic disease cased by blood flukes (trematodes) of the genus Schistosoma. This

disease is presentin some of the the southern region and western lowlands of Eritrea at certain times of the year.

Diagnosis

Schistosoma mansoni

• There may be abdominal pain and frequent blood stained stool

• In chronic form of Schistosoma mansoni; abdominal distention, and vomiting of blood and liver fibrosis (Portal hypertension)

• People co-infected with either hepatitis B or C and S mansoni have been shown to have rapid progression of liver disease.

Schistosoma hematobium

• The main clinical feature is painless terminal hematuria

• In chronic and complicated situations can lead to renal failure due to obstructive uropathy, pyelonephritis, or bladder carcinoma (10-20 years after the initial infection)

Pharmacological Treatment

Praziquantel: 40mg/kg (O) as a single dose or in 2 divided doses.

NOTE:

• High doses (20mg/kg) as single dose for 2 days for heavy S. Mansoni infections will usually arrest progression of clinical features, but will not reverse them

• Surgical interventions may be necessary.

9.5 Gastro Esophageal Reflux Disease. (GERD)

Gastro esophageal reflux disease (GERD) is caused by backflow of gastric or duodenal contents or both past the lower oesophageal sphincter into the oesophagus without belching or vomitingdue to incompetent barriers at the gastro esophageal junction.
Disease is classified as **mild**, if endoscopy reveals no or minimal oesophageal mucosalinflammation and**moderate-to-severe**, if there are ulcers with or without stricture formationin distal oesophagus.

Diagnosis

- Heartburn and regurgitation of sour material into the mouth worsens with vigorous exercise, bending forward, lying; relieved by antacids and sitting upright are specific symptoms
- Symptoms for persistent disease may include odynophagia, dysphagia, weight loss and bleeding
- Early satiety
- Retrosternal and epigastric pain: mimics angina pectoris radiating to •Nocturnal regurgitation: wakes patients up with coughing, choking and filling of the mouth with saliva
- Nocturnal asthma

In children:

- Failure to thrive
- Forceful regurgitation which may lead to aspiration pneumonia
- Iron deficiency anaemia

SIGNS

- Epigastric tenderness occasionally
- Extra esophageal manifestation are due to reflux of gastric contents into the pharynx,larynx, trachealbrochial tree, nose and mouth causing chronic cough, laryngitis, pharyngitis.
- It may also cause or aggravation of chronic bronchitis, asthma, COPD, pneumonia, chronic sinusitis and dental decay.

Diagnosis

- History,
- Upper GI endoscopy.
- 24-h ph monitoring required in difficult cases.

Treatment

Treatment objectives

- To relieve symptoms (heal erosive esophagitis)
- To prevent complications

Non-pharmacological treatment

Lifestyle changes are very important in the treatment of GERD in all patients.

- Elevate head of bed by about 30 degrees or sleep on pillows
- Avoid sleeping within 3 hours after eating
- Avoid over-eating and heavy meals before bedtime
- Avoid foods that aggravate symptoms e.g. fatty and spicy food
- Avoid smoking and alcohol

- Avoid non-steroidal anti-inflammatory drugs (NSAIDs)
- Do moderate exercise
- Weight reduction in overweight and obese individuals

Pharmacological treatment
Mild
Antacid (aluminium and magnesium combination) 2-3 tablets
(Chewed) taken 4-6 times a day 30-60 minutes after meals; may be given for a long time depending uponpatients symptoms.
If antiacids are insufficient:

- **Omeperazole** 20 mg tablet once daily in the morning for three days. If not Available;or:
- **Famotidine** 20 mg tablet at bed time for three days

Children: no drug treatment, advise to rest and sleep on an incline (30-45%)

Severe or Erosive GERD
- Omeprazole, oral,

Adults:20-40 mg daily bid for 8 weeks
Children:
> 20 kg; 40 mg daily
10-20 kg; 20 mg daily **OR:**
Famotidine20mg adults and children >40 kg, 12 hourly for 14 days;
Children les than 40kg, 1mg/kg12 hourly for 14 days.

Metoclopramideshould be added to the above in severe disease with bloating.
Metoclopramide, oral, 10-20 mg 6-8 hourly

Referral
Refer to specialized centers for all cases with persistent symptoms and/or new complications despite appropriate treatment above.

9.6 Gastritis and Peptic Ulcer Disease

9.6.1 Peptic Ulcer Diseases

The term peptic ulceration refers to an ulcer in the lower esophagus; stomach and duodenum.
Peptic ulcer may present in many different ways, the commonest is chronic, episodic pain present in many different ways, and may persist for months or years. However, the ulcer may come to attention as an acute episode with bleeding or perforation, with little or no previous history. As with duodenal ulcer, epigastric pain is the commonest symptom of gastric ulcer.

9.6.2 Non-ulcer Dyspepsia (Functional Dyspepsia)

Meal related non-specific abdominal discomfort and pain/burning, fullness.Most patient follow a benign course, but small number of patients with H.Pylori infection or those taking aspirin, ibuprofen and other NSAIDs progress to ulcer formation. It is the cause of symptoms in more than 60% of patients with dyspepsia.

General measures

- Advise patient to avoid hot spices, slcohol, tobacco and carbonated drinks
- Encourage regular meals

Diagnosis

Diagnosis clinically as above, plus endoscopic exclusion of esophagitis, peptic ulceration, or malignancy

Treatment

- Antiacids (aluminium hydroxide + magnesium hydroxide gel tablet. Chew every 6 hours or more frequently as required for seven days, preferably before meals, take the last dose at night.

- •Eradicate H.Pylori if present, if symptoms continue or recurs use omeprazole or ranitidine on per demand basis to control symptoms.

Indications for prompt esophago-gastro-duodenoscopy (EGD)

- Dyspeptic patients over 55 years of age
- Unexplained weight loss (>10% body weight),
- Anorexia, early satiety,
- Vomiting,
- Progressive dysphagia, odynophagia,
- Bleeding, anaemia,
- Jaundice,

- An abdominal mass,family history of upper gastrointestinal tract cancer
- Lymphadenopathy
- History of peptic ulcer,
- Previous gastric surgery or malignancy

9.6.3 Gastritis

Acute gastritis is a disease that induces inflammatory changes in the gastric mucosa.
The inflammation may involve the entire stomach (e.g., pan gastritis) or a region of the stomach (e.g., antral gastritis).
Acute gastritis can be broken down into **2categories**:

- ***erosive***(e.g., superficial erosions, deep erosions, hemorrhagic erosions) and ,
- ***non- erosive*** (generally caused by Helicobacter pylori).

Common causes include certain drugs, alcohol, bacterial, viral, and fungal infections; acute stress, radiation, allergy and food poisoning, bile, ischemia, and direct trauma.

Diagnosis
•Symptoms may include nausea, vomiting, loss of appetite, belching, and bloating
•Occasionally, acute abdominal pain can be a presenting symptom
•Fever, chills, and hiccups also may be present

Note: •The diagnosis of acute gastritis may be suspected from the patient's history and can be confirmed histologically by biopsy specimens taken at endoscopy

Treatment

•Administer medical therapy as needed, depending on the cause and the pathological findings
•No specific therapy exists for acute gastritis, except for cases caused by H pylori
•Administer fluids and electrolytes as required, particularly if the patient is vomiting
•Discontinue the use of drugs known to cause gastritis (e.g., aspirin, ibuprofen, indomethacin and other NSAIDs, alcohol)

•Consider short course use of Antacids, H2RB (famotidine) or PPI (omeprazole) for relief of symptoms

9.7 Gastro-duodenal Ulcers (PUD)

Peptic ulcer may be duodenal or gastric. Duodenal ulcers are more common and occur more often in younger adults. Gastric ulcers usually occur after middle age.

CAUSES

- Excessive secretion of gastric acid
- Inadequate protection of the lining of the stomach and duodenum against digestion by acid and pepsin
- Helicobacter pylori (H. pylori) infection
- Medicines e.g. Non-steroidal anti-inflammatory drugs (NSAIDs), corticosteroids

SYMPTOMS

• Abdominal pain; may be a minor discomfort, gnawing, burning, dull ache or very severe pain typically in the epigastrium or right hypochondrium , occasionally high up behind the sternum or low down around the umbilicus

- In duodenal ulcer, pain typically comes on when the patient is hungry and may wake the patient up in the middle of the night.
- In gastric ulcer, it is typically worsened by food
- Is relieved by alkalis and food in duodenal ulcer,
- Vomiting may occur in both duodenal and gastric ulcers,

- Tenderness in the epigastrium, right hypochondrium or umbilical region during an attack

95% of duodenal ulcers and 60% of gastric ulcers are related to *H. pylori* infection and remainingrelated to NSAID intake.

Diagnosis

- Upper GI endoscopy.
- *H. Pylori* infection may be diagnosed by serology, rapid urease test, histopathology ofantral mucosa or C13 breath test.
- Oesophago-gastro-duodenoscopy to exclude malignancy in all refractory cases is mandatory
- Stool examination to exclude intestinal parasites.
- Barium meal in the absence of endoscopy

TREATMENT

Treatment objectives

- To relieve pain and reduce gastric acid secretion
- To promote healing of the ulcer
- To eradicate H. pylori if present
- To prevent recurrence of the ulcer
- To avoid complications

Non-pharmacological treatment

- Avoid smoking and alcohol intake
- Avoid foods that aggravate the pain
- Allay anxiety and stress

Pharmacological treatment

1 Symptomatic treatment

Omeprazole 20 mg single dose 30 minutes before breakfast for 6 weeks

Most peptic ulcers are caused by Helicobacter pylori infection. If a diagnosis of ulcer is probable, and the patient has frequent attacks requiring repeated treatment with antiulcerdrugs or, in cases of complicated ulcers (perforation or gastrointestinal bleeding) treatment toeradicate H. pylori should be considered to prevent relapses.

1. For eradication of *H. pylori* is

Patients who are **not** allergic to penicillin and have not previously received a macrolide	Standard dose **omeprazole 20 mg** before meal* twice daily plus **clarithromycin 500 mg** twice daily, and **amoxicillin 1000** mg twice daily after meals for 10-14 days

Patients who are allergic to penicillin, and who have not previously received a macrolide or metronidazole	Standard dose **omeprazole 20** mg before meal* twice daily plus **clarithromycin 500 m**g twice daily, and metronidazol400mg twice daily after meals for 10-14 days

OR
(Squential therapy) i.e
Omeprazole 20mg twice daily **PlusAmoxicillin 1g** twice daily for 5 days, **then**
Omeprazole 20mg twice daily +Clarithromycin 500mg twice+ Tinidazole 500mg twice daily for 5 days

In NSAID induced ulcers, discontinue NSAIDs or switch to NSAID with less gastric side effects,
Give: Omeprazole, oral, Adults: 20 mg daily for 4 weeks. Repeat course if ulcer is not fully healed.

Refer:
- Chronicity - crippling periodic attacks
- Complications
- Perforation
- Gastric outlet obstruction
- Haemorrhage that does not respond to conservative measures

9.8 Management of Gastrointestinal Bleeding

Acute gastro intestinal (GI) bleeding is common medical emergency resulting in significant morbidity

and mortality. It can occur anywhere from mouth to anus; it is therefore subdivided into **upper gastrointestinal bleeding(UGIB)**, and **lower gastrointestinal bleeding(LGIB)**, which is further sub-divided to small bowel bleeding(middle GIB) and Colonic bleeding.

Causes for UGIB include:

- Erosive ulcerative disease,
- esophagitis,
- Esophageal varices and,
- gastropathy,
- vascular ectasias,
- Mallory weiss tear and tumours.

Causes for LGIB include:

- Diverticular disease,
- hemorrhoids,
- anal fissures,
- infectious and radiation colitis,
- inflammatory bowel disease,
- polyps,
- tumours,
- vascular ectasias and,
- Intussusceptions especially in children.

Diagnostic guide

Begin with an assessment of patient's hemodynamic status (normal, orthostatic hypotension, or shock), while trying to localize the acute GIB through focused history and examination. Include the following in history, descriptionof bleeding and duration and frequency;

prior bleeding, cormorbidities; medications;; previous surgery; recent polypectomy or prior radiation.
Asses for the vital sign, stigmata of liver disease, abdominal tenderness, stool colour by rectal examination, nasogastric aspiration may show a positive gastric aspiration.

Diagnastic pocedures:

Do baseline investigation, full hemogram, Coaglopathy profile, liver and renal functions. Specifically, upper lower endoscopy is appropratly indicated. While tagged red cell scan and Angiography would be indicated or obscure bleeding patients.

Treatement guide

Non-pharmacological

Endoscopy done within 24 hours could diagnose and provide sustained hemosstsis control. Theraputic modalities include varicial band ligation, thermocoagulation and angiographic embilization.

Pharmacological Treatment

Intavascular volume replacement should be restored with either ringer lactate or isotonic saline though large bore IV line.

Blood tranfussion with packed red cell should immeditellyy follow.

Institute **(IV) proton pump inhibitor** e.g. Omeprazole 40 mg 12 hourly. For 3-5 days, then oral therapy up to 6 weeks.

Add **antibiotics IV** specifically for varecial bleeding.

Surgical managment
TIPS or shunt therapy is indicated in patients with esophagial varices who have failed pharmalogical or endoscopy therapy or these with bleeding gastric fundal ulcer.

Note: Refer stabilized patients with GIB to specialized centers for expertise management.

9.9 Inflammatory Bowel Diseases

Inflammatory bowel disease (IBD) is an idiopathic disease, probably involving an immune reaction of the body to its own intestinal tract. The 2 major types of IBD are:1. Ulcerative colitis (UC) and, 2 Crohn's Dseases(CD). As the name suggests, ulcerative colitis is limited to the colon. Crohn disease can involve any segment of the gastrointestinal tract from the mouth to the anus

1. Ulcerative Colitis

Ulcerative Colitis is an inflammatory condition that affects the rectum extends proximally to affect a variable amount of the colon. Smoking appears to worsen the disease condition.

Diagnosis
•Active disease is associated with diarrhea, rectal bleeding, tenesmus, passage of mucus, and crampy abdominal pain
•Severity of symptoms correlates with the extent of disease

•occasionally, diarrhea and bleeding is intermittent and mildthat the patient may not seek medical attention, thus though UC can present acutely, symptoms usually have been present for weeks to month
•Complication may present as, Massive hemorrhage (<1%); toxic megacolon, Perforation with features of peritonitis, stricture.

Note
Diagnosis relies upon the patient's history; clinical symptoms; negative stool examination for bacteria, C.difficile toxin, ova and parasites; sigmoidoscopic appearance; and histology of rectal or colonic biopsy specimen. Single contrast barium enema alternative to sigmoidoscopy but is limited by biopsy access.
Supportive laboratory test: CBC for anemia; Thrombocytosis, leukocytosis may reflect active disease.

Treatment and Referral
•Refer patients to specialized centers once disease is suspected for expertise management
•Cure is not available, goals of therapy are to induce and maintain remission
Pharmacological Treatment
Sulphasalazine: Adults, 1gram four times a day for acute disease, reducing to 500mg four times a day for maintenance; Children over 2 years for acute attack use 40-60mg/kg body weight daily.
Maintenance dose 20-30mg/kg body weight daily.
Plus

Prednisolone oral 30-60mg once daily for severe, acute and extensive disease; reduces gradually according to disease severity.

Note

- Correction of fluid deficit and/or blood is important in acute severe forms which may necessitates hospitalization
- Nutritional therapy should target to replenish specific nutrient deficits
- Life long surveillance is required due to risk of bowel cancer
- Use steroids only when the disease is confirmed, to avoid exacerbation of existing illness.

2. **Crohn's Disease(CD)**

Crohn's disease is an idiopathic, chronic, transmural inflammatory process of the bowel that often leads to fibrosis and obstructive symptoms and can affect any part of the gastrointestinal tract from the mouth to the anus.

Diagnosis

- Mainly abdominal pain and diarrhea; weight loss, anorexia, and fever may be seen
- Growth retardation in children
- Gross rectal bleeding or acute hemorrhage is uncommon
- Anemia is a common complication due to illeal disease involvement
- Small bowel obstruction, due to stricturing
- Perianal disease associated with fistulization

•Gastro duodenal involvement may be mistaken for H.Pylori negative PUD

Diagnostic consideration

- Endoscopy gold standard for diagnosing colonic and terminal illeal disease and readily permits mucosal biopsy and balloon dilatation of any stricture
- Barium follow through is still standard method for evaluating the small bowel, though capsule enterescopy is superior
- Discriminating features that favours Crohn's from Ulcerative colitis include small bowel disease, mainly right sided colonic disease, rectal sparing, fistulization, and granulomas.
- Supportive laboratory tests: CBC for anemia; thrombocytosis, leucocytosis, as surrogate sign of inflammation,iron and folate studies, liver functionstest,electrolytes/micronutrient deficiency assessment (calcium, magnesium, zinc).

Treatment

•Refer suspected cases to specialized centers for expertise management

•Baseline management as for Ulcerative Colitis above

3. **Pseudomembranenous Colitis**

Clostridium difficile is organism responsible for an infectious colitis.. Increasingly implicated as a significant cause of morbidity and mortality among hospitalized patients, C difficile colitis should also be recognized among outpatient populations.
Prior antibiotic exposure remains the most significant risk factor for development of disease. Antibiotics first seen with clindamycin, but amoxicylin and the cephalosporins are now most frequently implicated. Extreme ages, recent GI surgery, malignancy, prolonged hospital stay areother risk factors.

Diagnosis

- Diarrhea and abdominal cramps occurs during first week, but can be delayed up to six weeks
- Nausea, fever, dehydration can accompany severe colitis
- Abdominal examination may reveal distension and tenderness.

Note

•Stool examination is sensitive on anaerobic culture facilities which reveal toxigenic and non toxigenic strains
•Sigmoidoscopy is highly specific if lesion is seen but insensitive compared to the above.

Pharmacological Treatment

Metronidazole oral::Adults, 400mg 8hourly for 5-days

Children 1 month-12 years: 7.5 mg/kg (max. 400mg) every 8 hours
If no improvement, refer

4. Irritable Bowel syndrome (IBS)

Irritable bowel syndrome (IBS) is a functional GI disorder characterized by abdominal pain and altered bowel habits in the absence of specific and unique organic pathology.

Diagnosis

- Abdominal discomfort of at least 3 months duration
- Bloating or feeling of distension
- Altered bowel habits (constipation and/or diarrhea)
- Exacerbations triggered by life events.
- Coexistance of anxiety and depression.

Diagnostic Considerations

- Hematology and biochemistry studies
- Stool microscopy
- Colonoscopy with biopsy

Treatment

- Refer patients to specialized centers for proper evaluation and **Management.**
- Supportive therapies;
  - Reassurance and explanation are essential.
  - High fibre diet and eating a healthy diet.
- Relief of pain due to abdominal cramps

Pharmacological Treatment

Hyoscine butyl bromide 20mg oral four times a day
- Relief of anxiety that may be making symptoms worse

Diazepam 5-10 mg oral 8 hourly
Give short and infrequent courses only, in order to avoid dependance.

•If constipation is predominant in IBS encourage high fiber diet.

•If diarrhea predominant in IBS
Loperamide 4mg (O) stat, followed by 2mg after each unformed stool until diarrhoea is controlled.
• Explore psycho-social factors in resistant cases and counseling.

5. Malabsorption Syndromes

Malabsorption is a clinical term that encompasses defects occurring during the digestion and absorption of food nutrients by infections of the gastrointestinal tract. Although presenting symptoms, such as diarrhea and weight loss may be common, the specific causesof malabsorption are usually established based on physiologic evaluations.
The treatment often depends on the establishment of a definitive etiology for malabsorption. Etiologic examples include:

- pancreatic insufficiency,
- bacterial overgrowth,
- celiac disease,
- tropical sprue,
- lactase deficiency,
- diabetic enteropathy,
- thyroid disease,

- radiation enteritis,
- gastrectomy and extensive small bowel resection.

Diagnosis

- Depending on etiology, presentation may collectively include:
- Diarrhoea a commonest symptom which is frequently watery
- Steatorrhea due to fat malabsorption; characterized, by the passage of pale, bulky, and malodorous stools. Stools often float on top of the toilet water and are difficult to flush
- Weight loss and fatigue
- Flatulence and abdominal distention
- Edema due to hypoalbuminemia and with severe protein depletion ascites may develop
- Anemias which can either be microcytic iron deficiency (celiac disease) or macrocytic vitamin B-12 deficiency (chrohn's disease or illeal resection).
- Bleeding disorders (Ecchymosis, melena, and hematuria) due to vitamin K malabsorption and subsequent hypoprothrombinemia.
- Metabolic defects of bones (osteopenia or osteomalacia) due to vitamin D deficiency. Bone pain and pathologic fractures may be observed.

Malabsorption of calcium can lead to secondary hyperparathyroidism.

- Neurologicmanifestations: Electrolyte disturbances, suchas hypocalcaemia and hypomagnesaemia,can lead to tetany.Vitaminmalabsorption can cause generalized motor weakness (pantothenic acid, vitamin D) or peripheral neuropathy(thiamine), a sense of loss for vibration and position (cobalamin), night blindness (vitamin A), and seizures (biotin).

Treatment

•**<u>Patients should be referred to specialized centers for proper evaluation and definitive management</u>**

•Two basic principles underlie the management of patients with malabsorption, as follows:

1. The correction of nutritional deficiencies
2. When possible, the treatment of causative diseases

Nutritional support

- Supplementing various minerals, suchas calcium, magnesium, ironand vitamins, which may be deficient in malabsorption, is important
- Caloric and protein replacement also is essential
- Medium-chain triglycerides can be used as fat substitutes because they do not require micelle formation for absorption and their route of transport is portal rather than lymphatic

- In severe intestinal disease, such as massive resection and extensive regional enteritis, parenteral nutrition may become necessary.

Treatment of causative diseases

- A gluten-free diet helps treat celiac disease.
- Lactose-free diet helps correct lactose intolerance; supplementing the first bite of milk-containing food products with Lactaid also helps
- Protease and lipase supplements are the therapy for pancreatic insufficiency.
- Antibiotics are the therapy for bacterial overgrowth. Corticosteroids, anti-inflammatoryagents, such as mesalamine, and other therapies are used to treat regional enteritis.

9.10 Pancreatitis

Pancreatitis is an inflammatory process in which pancreatic enzymes auto digest the gland. It may present as acute pancreatitis, in which the pancreas can sometimes heal without any impairment of function or any morphologic changes, or as chronic pancreatitis, in which individuals suffer recurrent, intermittent attacks that contribute to the functional and morphologic loss of the gland.

1 Acute Pancreatitis

It is due to sudden inflammation of the pancreas due to pancreatic enzymes auto digestion. Common risk factors

which trigger the acute episode are presence of gallstones and alcohol intake.

Diagnosis

● Severe, unremitting epigastric pain, radiating to the back

● Nausea and vomiting

● Signs of shock may be present

● Ileus is also common

● Local complications: inflammatory mass, obstructive jaundice, gastric outlet obstruction

● Systemic complication: sepsis, acute respiratory distress syndrome, acute renal failure

Diagnostic considerations

- Serum amylase, in counts over 1000U/L, but poor correlates with disease severity.Serum Lipase twice the normal limit has superior sensitivity and specificity.
- Complete blood counts, Urea and electrolytes, bicarbonate levels, liver transaminases and albumin, LDH, glucose, calcium, CRP, and lipid profile for modified Glasgow criteria to disease severity and outcomes.
- Abdominal ultrasound, Plain abdominal X-ray, Chest X-ray, CT Abdomen.

Treatment

- Prompt referral to specialized centers with intensive care facilities is recommended
- Principles of management include expertise supportive therapy:
- Nil per oral regimen for few days up to weeks is indicated depending on severity.
- Intravascular volume expansion (colloids/crystalloid)
- Opiates analgesia and antiemetics usually required.
- Prophylactic antibiotics in severe state, useful when there is evidence of sepsis
- (IV) Ceftriaxone 1g 12hrly + Metronidazole 500mg 8hrly or ERCP + Sphincterotomy when gallstones are present in the CBD.

2 Chronic Pancreatitis

Chronic pancreatitis is long-term (chronic) inflammation of the pancreas that leads to permanent damage. The most common cause for such a condition is long-term excessive alcohol consumption.

Diagnosis

- The most common symptom is upper abdominal pain that may be accompanied by nausea, vomiting and loss of appetite
- As the disease gets worse and more of the pancreas is destroyed, pain may actually become less severe

- During an attack, the pain often is made worse by drinking alcohol or eating a large meal high in fats.
- Because a damaged pancreas can't produce important digestive enzymes, people with chronic pancreatitis may develop problems with digesting and absorbing food and nutrients. This can lead to weight loss, vitamin deficiencies, diarrhea and greasy, foul- smelling stools.
- Over time, a damaged pancreas also can fail to produce enough insulin, which results in Diabetes.

Diagnostic Consideration:

- Abdominal X-ray, for evidence of pancreatic calcifications
- CT, and Endoscopic ultrasound are complementary
- Biochemical; Glucose tolerance test, serum vitamins (ADEK), hemoglobin and calcium levels,
- Pancreatic function tests: Secretin /CCK – secretory test, fecal elastese1 concentrations

Treatment –
Referral is recommended for expertise evaluation and management in specialized centers.

- Because chronic pancreatitis cannot be cured, direct the treatment towards:

- Relieving pain with pain-killers- In rare cases, surgery/ ERCP to open blocked ducts or remove part of the pancreas may be done to relieve pain.
- Improving food absorption - The patient should be recommended to follow a low-carbohydrate, high-protein diet that alsorestricts some typesof fats.Once digestive problems is treated, patient will usually gain back weight and diarrhea improves.
  Another way is by giving the patient pancreatic supplements containing digestive enzymes.
- Treating diabetes - Treat diabetes with careful attention to diet to help keep blood sugar levels stable. In some people, insulin injections and other diabetic medications are needed.

9.11 Peritonitis

Refers to inflammation of the peritoneum; it may be localized or diffuse in location, acute or chronic in natural history, infectious or aseptic in pathogenesis.

Acute peritonitis is most often infectious usually related to a perforated viscus (secondary peritonitis); primary or spontaneous peritonitis refers to when no intraabdominal source is identified. Acute peritonitis is associated with decreased intestinal motility, resulting in distention of the intestinal lumen with gas and fluid. The accumulation of fluid in the bowel together with the lack of oral intake leads to rapid intravascular depletion with effects on cardiac, renal, and other systems.

Chronic peritonitis refers to longstanding inflammation of the peritoneum. Causes include repeated attacks of infection such as from pelvic inflammatory disease (PID), Metastatic lesions or foreign substances that induce inflammation, and chronic infections within the abdomen such as Tuberculosis.

Diagnosis

- Acute peritonitis is usually characterized by acute abdominal pain and tenderness, dehydration, fever, hypotension, nausea and vomiting and tachycardia.
- Complications include abscess formation, oliguria and shock.
- Similar features may be seen in spontaneous bacterial peritonitis (SBP), which occurs in cirrhotic patients with ascites. Bacterial translocation, bacteraemia and impaired antimicrobial activity contribute toits development. Gram negativebacilli (E. Coli) commonly are a causative microbe.

Diagnostic considerations: (specific)

- Peritoneal fluid analysis for microscopy, microbiology, culture and sensitivity
- Macroscopic evaluation of the peritoneal fluid will exclude hemoperitoneum in traumacases
- Blood cultures due to bacterimia

- Scanning procedures (ultrasound and/or CT scan) facilitates the diagnosis, Abdominal having the highest diagnostic yield.

Treatment considerations

Surgery remains a cornerstone of peritonitis treatment. Antimicrobial therapy is adjunctive to surgical correction of underlying lesion or process and treatment will depend on causative agent. Where cause is not known antibiotics of choice are:

Ampicillin (I.V) 1g every 6hours for 5-10 days **Plus**

Gentamicin (I.V) 4 mg/kg/24 hours in 3 divided doses for 5-10 days **Plus**

Metronidazole (I.V)/oral 400-600mg every 8 hours for 5-10 days.

Referral - Patient needs referral to centers where surgical intervention is adequate (i.e. expertise and medical facility). Refer to TB section for TB peritonitis management.

9.12 Constipation

- According to the Rome III criteria for constipation, a patient must have experienced at least 2 of the following symptoms over the preceding 3 months:
- Fewer than 3 bowel movements per week;
- straining;lumpyorhardstools;

- sensation anorectalobstruction; sensationofincomplete defecation,
- Manual maneuvering required defecating.

Constipation is a symptom, not a disease. Contributory factors may include inactivity, low fiber diet and inadequate water intake. Specific causes may include, conditions associated with neurologic dysfunction, scleroderma, drugs, hypothyroidismhypokalemia, hypercalcemia, Cushing's syndrome, colonic tumours, anorectal pain, and psychological factors.

Specific Causes

'Medical' Causes

- Diet deficient in roughage
- Ignoring the urge to defaecate e.g. due to immobility
- Myxoedema
- Irritable bowel syndrome
- Hypercalcaemia
- Drugs e.g. Atropine, codeine phosphate, morphine, tricyclic antidepressants, disopyramide
- Lazy bowel from chronic laxative use including 'herbal' preparations should be ascertained
- Lack of exercise

'Surgical' Causes

- Anal fissure and other painful perianal lesions
- Carcinoma of the rectum and sigmoid colon
- Foreign body in the gut

- Pelvic mass e.g. fibroid, foetus
- Any gastrointestinal obstruction
- Aganglionic and acquired megacol

Diagnosis

Fewer than three bowel movements per week, small, hard, dry stools that is difficult or painful to pass, need to strain excessively to have a bowel movement, frequent use of enemas, laxatives or suppositories are characteristic.

Other features may include; abdominal bloating, rectal bleeding, spurious diarrhea, low back pain, feeling of incomplete evacuation, and tenesmus.

Diagnostic guides:

An extensive work up of the constipated patient is performed on an outpatient basis and usually occurs after approximately 3-6 months of failed medical management. It is advised to refer the patient at this juncture to specialized centers.

Laboratory evaluation may include a complete blood count (CBC), fecal occult blood especially in middle-aged or elderly adults; Thyroid function tests, serum chemistry to exclude metabolic causes of constipation.

Imaging studies are used to rule out acute processes that may be causing colonic ileus or to evaluate causes of chronic constipation. Lower gastrointestinal (GI) endoscopy, colonic transit study, defecography, anorectal manometry, surface anal electromyography (EMG), and balloon expulsion may be used in the evaluation of constipation.

In theacute situation with a patient at low risk who usually is not constipated, no further evaluation is necessary. Consider sigmoidoscopy, colonoscopy, or barium enema for colorectal cancer screening in patients older than 50 years. Colonoscopy represents the current criterion standard.

Investigations

- Stool routine examination
- Stool for occult blood
- Sigmoidoscopy/Colonoscopy

Treatment

Treatment objectives

- To identify possible cause of constipation
- To relieve constipation

Non-pharmacological treatment

Adherence to an appropriate diet and regular exercise: Diet should include adequate amounts of fibre and fluid (four to six 250 ml glasses of fluid per day).

Pharmacological treatment

•**Bisacodyl,** oral, Adults,10-20 mg at night Or*Senna* tablets, oral, Adults, 2-4 tablets at bedtime Or *Liquid paraffin*, oral,10-30 ml at night **OR**

Glycerol suppositories,Adults4 mg at night

Children

1-2 years; 2 mg at night

< 1 year; 1 mg at night **OR**

Bisacodyl suppository

Adults

10 mg in the morning

Children

> 10 years;	5 mg in the morning
< 10 years;	on medical advice only

In acute illness or for hospitalised patients, the following agents are preferred:

- **Lactulose liquid, oral,**

Adults

15-30 ml orally daily until response then 10-20 ml daily

Children

10-18 years;	15 ml 12 hourly
5-10 years;	10 ml 12 hourly
1-5 years;	5 ml 12 hourly
< 1 year;	2.5 ml 12 hourly

Alternative treatment

- **Magnesium sulphate, oral,**

Adults

5-10 g in a glass of water, once or twice daily

Note - Do not use magnesium salts in patients with impaired renal function.

The following signs and symptoms, if present, are grounds for urgent evaluation or referral:

•Rectal bleeding •Vomiting
•Abdominal pain •Inability to pass flatus
•Unexplained weight loss.

9.13 Hemorrhoids

Hemorrhoid disease is due to enlargement or thrombosis of the veins in the external or internal hemorrhoidal plexus.
Haemorrhoids are enlarged, displaced anal cushions derived from engorged veins.
Always do a digital rectal examination to exclude carcinoma.
Haemorrhoids developing during pregnancy should be managed conservatively as most will resolve after delivery. No treatment is required for haemorrhoids that are asymptomatic. Avoid the use of purgatives.

The internal hemorrhoids are graded into **four groups**:

1. Bleeding with defecation
2. Prolapses with defecation but return naturally to their normal position
3. Prolapses any time especially with defecation and can be replaced manually
4. Permanently prolapsed.

Causes

- Increased intra-abdominal pressure e.g. chronic cough, pregnancy, intra-abdominal or pelvic tumours
- Familial predisposition
- Anorectal tumours (secondary haemorrhoids)

Symptoms

- Passage of bright red blood at defaecation
- Mucoid discharge • Swelling at anus
- Perianal irritation or itch (pruritus ani)
- Discomfort after opening bowels
- Pain occurs only during an acute attack of prolapse with thrombosis, congestion and oedema

Signs

- Inspection of the anus may be normal
- Redundant folds of skin (skin tags) may be seen in the position of the haemorrhoids and straining may show the haemorrhoids. In third degree haemorrhoids, there is a swelling at the anus
- Internal haemorrhoids are not palpableinside the rectumunless thrombosed
- The patient may present with a complication of the haemorrhoids e.g. profuse bleeding, prolapse, strangulation, thrombosis, infection or ulceration or severe anaemia

Diagnostic considerations

- FBC
- Proctoscopy (the gold standard for diagnosis)

- Anoscopy is mandatory for viewing internal hemorrhoids
- Flexible sigmoidoscopy is performed to exclude proximal disease (to exclude carcinoma of rectum)

Treatment

The following is a quick summary of treatment for internal hemorrhoids by grade:

- Grade I hemorrhoids are treated with conservative medical therapy and avoidance of non steroidal anti-inflammatory drugs (NSAIDs) and spicy or fatty foods
- Grade II or III hemorrhoids are initially treated with nonsurgical procedures (sclerotherapy, band ligation)
- Very symptomatic grade III and grade IV hemorrhoids are best treated with surgical hemorrhoidectomy
  •Treatment of grade I.V internal hemorrhoids or any incarcerated or gangrenous tissue requires prompt surgical consultation

External hemorrhoid symptoms are generally divided into problems with acute thrombosis and hygiene/skin tag complaints. The former respond well to office excision (not enucleation), while operative resection is reserved for the latter. Therapy is directed solely at the symptoms, not at aesthetics.

Supportive management

• Treat any identified causative condition

• Encourage high fibre diet
• Careful anal hygiene
• Saline baths
• Avoid constipation by using stool softener.

Drugs of choice

Steroids and local anesthetics aims to reduce inflammation and provide relief during painful defecation.

When associated with constipation:

• **Liquid paraffin**, oral, Adults,10-30 ml at night
Or

Senna granules, oral, Adults-1 sachet with water after supper

When associated with local itching or discomfort:

• Ointments or suppositories (with or without steroids), applied or inserted anally, Adults

One suppository 12 hourly for 7-10 days

When associated with local itching or discomfort:

• Ointments or suppositories (with or without steroids), applied or inserted anally, Adults

One suppository 12 hourly for 7-10 days

If haemorrhoids infected:

• **Gentamicin,** IV, Adults, 40-80 mg 8 hourly for 5 to 7 days

Plus

• **Metronidazole**, oral, Adults, 400 mg 8 hourly for 5 to 7 days

Alternative treatment

- **Ciprofloxacin,** oral, Adults, 500 mg 12 hourly **Plus** Metronidazole, oral, Adults, 400 mg 8 hourly for 5 to7 days **OR**

Amoxicillin, oral, Adults, 500 mg 8 hourly **Plus** **Metronidazole**, oral, Adults, 400 mg 8 hourly for 5 to 7 days

When associated with anaemia:

- Iron preparation (ferrous sulphate/fumarate) **Or** Blood transfusion as indicated (see section on Anaemia)

Refer

The patient should be referred to a facility with resources for injection sclerotherapy, rubber band ligation or operative treatment if indicated.

9.14 Anal Fissures

These are painful linear ulcers in the anal canal. Young and middle aged adults most commonly affected. Primary fissure occur in the posterior midline. Itcan also be secondary to Crohn's disease, anal cancer, or infection such as syphilis, TB in which case they occur more lateral.

Passage of hard stools is a common predisposition to primary fissures.

Diagnosis

The hall mark is severe sharp pain during and after defecation with/out bright red bleeding.

Diagnostic consideration

Perform digital rectal examination or protoscopy, which must be done with topical anesthesia.

Treatment Guide

- Stools must be made soft and easy to pass; ensure high fluid intake, use osmotic laxatives such as Lactulose 20 mls 12 hrlyoral
- Topical anesthetics (Lidocaine jelly 2% - applied 12 to 8 hrly anal area with frequent seat baths reduces sphincter spasm.
- If the fissure in few weeks surgical sphicterotomyis indicated to lower the sphincter tone.

9.15 Pruritis Ani

Also known as anusitis is the irritation of the skin within perianal region, the intensity of anal itching increases from moisture, pressure, and rubbing caused by clothing and sitting. At worst, anal itching causes intolerable discomfort that often is accompanied by burning and soreness.

Causes include:

- Benign anorectal condition such as hemorrhoids or anal fissure
- Neoplasia such as anal cancer, pagets disease
- Dermatological disease e.g. dermatitis, lichen sclerosis
- Infection: Candida, thread worm
- Some dietary components e.g coffee

Treatment guides

• Treat underling condition

• Proper hygiene and to wear cotton under wear
• Avoid hot and spicy foods.

9.16 Vomiting

Vomiting may occur in connection with many disease conditions. Look for causes in and outside the gastrointestinal tract and treat them accordingly. Consider pregnancy in all women of child bearing age. Correct dehydration where necessary. Symptomatic treatment is not encouraged!
When absolutely necessary, vomiting can be controlled with**metoclopramide** 10 mg orally, every 8 hours. No more than 6 tablets should be supplied.

If vomiting persists, the patient must be referred to higher level facilities.

10. LIVER & BILLIARY TRACT DISORDERS

10.1 Hepatitis

This is a medical condition defined by the inflammation of the liver and characterized by the presence of inflammatory cells in the tissue of the organ. The condition can be self-limiting or can progress to fibrosis and cirrhosis. Hepatitis may occur with limited or no symptoms, but often leads to jaundice, anorexia and malaise. Hepatitis is acute when it lasts less than six months and chronic when it persists longer.

10.1.1 Acute Viral Hepatitis

It is a systemic infection affecting the liver predominantly. Almost all cases of acute viral hepatitis are caused by one of five hepatotropic viral agents: Hepatitis A virus (HAV), Hepatitis B virus (HBV), HBV– associated delta agent or Hepatitis D virus (HDV), and Hepatitis E virus (HEV).

Diagnosis Acute infection with a hepatitis virus may result in conditions ranging from subclinical disease to self-limited symptomatic disease to fulminant hepatic failure.

Collectively patients may develop fever, anorexia, malaise, jaundice, abdominal pain after specific incubation periods; and in severe forms signs of acute liver failure including altered consciousness may be present.

Diagnostic guides
Quantitative analysis for presence of specific antibodies and/or antigenemia is mandatory for establishing a specific causative viral agent.
The severity of liver injury is determined by transaminases levels (ALT) in particular, and more precisely by liver biopsy. The viremia is determined through PCR method and for some viral subtypes through genotyping.

Treatment guides
Acute infection is usually self limiting, especially for HAV, HEV, and only 80% of HBV, and 20% of HCV cases. Supportive management is all that is required during acute illness, except in fulminant cases where specific antiviral medication may be required.

Note: Refer all cases of suspected Hepatitis to referral centers for expertise management.

10.1.2 Chronic Viral Hepatitis

There is an on going inflammatory reaction in the liver for at least 6 months with persistently elevated liver function tests. The most common causative hepatropic viral agents are HBV, HCV, and HDV.Non viral cause may include, drugs (methyldopa, Isoniazid), autoimmune hepatitis, Wilson's disease, hemochromatosis, α- antitrypsin deficiency. Notably disease chronicity can progress intoliver cirrhosisand hepatocellular cancer in span of years if no early treatment is initiated.

Diagnosis

- Common symptoms include:
- fatigue, malaise, anorexia, low grade fever;
- jaundiceis frequent in severe disease.
- Some patients may present with complications of cirrhosis: ascites, variceal bleeding, encephalopathy, coagulopathy, and hypersplenism. Some extra hepatic features may alsopredominate. (Urticaria, arthritis, vasculitis, polyneuropathy, glomerulonephritis, thyroditis)

Diagnostic guides:
In addition to the above guides, surveillancestudies for development of cirrhosis and its complications or HCC include utrasonography, CT scan, serum α - feto protein.

Pharmacological Treatment

- **Lamuvidine** 150mg (O) once daily.
    - **OR**
- **Tenofovi**r 300mg (O) once daily

Treatment is long term (48- 96 weeks)
Note: Referral of these patients to specialized centers for expertise management is highly recommended.

10.2 Liver Cirrhosis

This is a common end point of many causes of liver diseases; commonly caused by chronic hepatitis B & C and alcoholic liver disease.

Other causes include autoimmune hepatitis and metaboloic liver disease. It is a histological diagnosis characterized by hepatic fibrosis and nodule formation. Depending on etiologic process the progression of liver injury to cirrhosis may occur over months to years.

Diagnostic features

•Include jaundice, hepatomegaly, ascites, features of increased estrogen levels in men, while in women there are features of increased androgen levels. Loss of libido, testicular atrophy and impotence are common among male cirrhotic.

• In women predominant features are breast atrophy, menstrual disturbances including amenorrhea. Features of portal hypertensionlike splenomegaly, ascites, distended abdominal wall vessels and variceal bleeding are common.

•Hepatic encephalopathy and renal dysfunction is a sequel of associated complications.

Diagnostic guides

To include, complete blood count, liver functions, serum electrolytes, viral hepatitis panel (B, C, and D), autoimmune markers (AMA,ANA), and makers for associated metabolic disease (ceruloplasmin, ferritin), alpha fetoprotein, Imaging (ultrasonography with Doppler studies, CT, MRI) and Liver biopsy.

Treatment Guide

In compensated cirrhosis:

- Treat the cause and associated complications.
- Encourage high calorie diet and protein intake.

In decompensate cirrhosis:

●Treat specifically the manifestation of hepatic decomposition.e.g.Ascites, hepatic encephalopathy, hepatorenal syndrome, GI bleeding, spontaneous bacterial peritonitis.
● Liver transplantation is definitive treatment once an episode of decompansation has occurred.
Note: It is advisable to refer patients with this condition to specialized centers for proper evaluation and treatment. A planned supportive management can then be continued at the referring centers

10.3 Ascites of Chronic Liver Disease

There is accumulation of fluid into peritonealcavity; contributing factors includes portal hypertension, hypoalbuminemia, hepatic lymph, hepatorenal syndrome.

Diagnosis

May be asymptomatic if small amounts
Abdominal distension and discomfort in increasing amounts, anorexia, nausea, early satiety, heartburn, flank pain, and respiratory distress.

INVESTIGATIONS

A diagnostic paracentesis for:

- Appearance and colour
- Biochemistry
- Acid fast bacilli
- Culture and sensitivity
- Cytology
- Abdominal and pelvic ultrasound scan
- Appropriate investigations for specific causes

Treatment

Non-pharmacological treatment

- Bed rest

- Salt restriction <2 g/day
- Fluid restriction to ≤1.5 L/day

•**Spironolactone** 100- 200mg/ day oral; increase dose up to 400mg if fluid not mobilized despite low sodium diet – This is the first line therapy.

•**Furosemide 40mg/day** (O) is added to spironolactone at ratio**2.5:1**up to maximum dose 160mg/day.

Note: Dose of each medication can be increased every 1-2 weeks to the maximum doses indicated.

Monitor weight reduction (targeted at 0.5 and 1kg/day if peripheral edema is present), urinary Na and K, serum electrolytes and creatinine.

• If ascites still present despite the above measures, manage the condition as refractory ascites where large volume parecentensis is indicated with concurrent infusions of albumin (10g/L of ascites removed)

Refer

10.4 Hepatic Encephalopathy

A clinical state associated with alteration in mental status and cognitive function occurring in the presence of liver failure; it may be acute and reversible or chronic and progressive. Precipitants of the condition include, GI bleeding, azotemia, constipation, high protein meal, hypokalemic alkalosis, CNS depressant drugs (benzodiazepines and barbiturates.), hypoxia, hypercarbia,sepsis, Increased gastrointestinal tract (GIT) protein load e.g. heavy GIT bleeding,Alcoholic binge

Symptoms
Jaundice, fever, confusion, slurred speech, flapping tremors, changein personality that can include being violent and hard to manage to being sleepy and difficult to arouse, Fetor hepaticus.

Neurological abnormalities:

- Asterixis (a flapping tremor) indicates precoma and strongly supports the diagnosis of encephalopathy
- Inability to draw or construct objects e.g. a 5-pointed star
- Incoordination • Impaired handwriting

Encephalopathy:

- **Grade 1**: Mild confusion, irritable, tremor, restless
- **Grade2**: Lethargic responses, decreased inhibitions, disorientation, agitation, and asterixis
- **Grade 3**: Stuporous but arousable, aggressive bursts, inarticulate speech and marked confusion
- **Grade 4**: Coma

Diagnostic guides

- Evaluation for extent and cause of liver injury need to be established especially for patients in whom the diagnosis of liver disease has not been previously made

- Investigate to include: liver functions, complete blood count, Prothrombin time, INR, serum electrolytes, blood sugar
- Seek the precipitants including septic screen (culture of blood, urine, sputum, ascites); exclude GI bleed (↓HB, history of melena), or evidence of renal impairement (↑↑urea, ↑creatinine)
- Abdominal U/S or CT scan may show evidence of portal hypertension.

Treatment
General measures

- Identify and if possible eliminate the cause (e.g drugs, viral hepatitis, and septicaemia
- Maintain fluid and electrolyte balance.
- Monitor temperature, pulse and respiratory rate, blood pressure, pupils, urine output and blood glucose regularly , alcohol or upper G.I bleeding)
- Avoid use of all unnecessary drugs including diuretics and sedatives
- Provide non protein containing high calorie food (2000kCal/day)

Pharmacological Treatment
Antibiotic treatment of choice:

- **Metronidazole** 400-500mg (PO)/ (IV) 8 hourly

Give laxatives to provoke diarrhea:

- **Magnesium sulphate** (oral 4g with water twice daily **OR**
- **Lactulose** solution 60 mls/day in 2-3 divided doses to ensure 2-4 soft stoolspassed daily and carry out high bowel washout.
- **Dextrose** 10% (I.V infusion) 3 litres/day with 2g (26mmol)
- **Potassium chloride**added to every litre bag (if renal function is satisfatory).

Check for any infection and treat immediately
If signs of bleeding are present give

- **Vitamin K** (I.V) 10mg **Plus**
- **Fresh Frozen Plasma** initially **Add**
- **Platelets** if count <20 x 10g/l and patient is still bleeding

Treat stress ulceration with:

- **Omeprazole, IV**, Adults : 40 mg dailyor oral, 20 mg daily , **OR**
- **Ranitidine, IV**, Adults : 50 mg 8 hourly or oral 150 mg 12 hourly

If ethanol etiology is suspected give:

- **Thiamine** (I.V) 10mg before dextrose infusion and continue daily for 3 days.

Note: Hepatic encephalopathy is a medical emergency and requires referral to specialized and equipped centers for proper evaluation and management.

10.5 Cholestatic Jaundice

Cholestasis is a symptom of many diseases. It is defined as a pathologic state of reduced bile formation or flow. The mechanisms of cholestasis can be broadly classified into:

- **hepatocellular (Intrahepatic)**, where an impairment of bile formation occurs, and,
- **Obstructive (extra hepatic)**, where impedance to bile flow occurs after it is formed.

Intrahepatic causes of cholestasis include:

- viral hepatitis,
- alcohol,
- primary biliary cirrhosis,
- drug toxicity,
- Hodgkin's lymphoma and,
- Pregnancy.

Extra hepatic causes which may be amenable to surgical correction include choledocholithiasis and carcinoma of thebiliary tree. Parasitic infections such as ascariasis may also cause cholestatic jaundice

Diagnosis

The prominent features include jaundice, dark urine, pale stools, and itching/pruritis.

Diagnostic considerations

- Liver functions; for elevated serum levels of total bilirubin, direct bilirubin, alkaline phosphatase, gamma-glutamyl transferase, bile salt concetration
- Elevated serum cholesterol
- Elevated fecal fat levels.
- Imaging and endoscopic studies. (USS, MRI, MRCP, ERCP, PTC)
- Liver biopsy.

Pharmacological Treatment

•Identify and treat specific cause

Surgery is indicated for extrahepatic cholestasis.

Note - Refer patiets cholestatic liver disease to specialized centres, particularly if it is severe or prolonged.

11. INFECTIOUS DISEASES

11.1 Viral Infections

11.1.1 Measles

Note: this is a notifiable condition.
Measles is caused by a paramyxovirus which is spread by droplet infection. The main clinical features include: fever and generalized maculopapular (Red rash appearing first behind the ears and spreading to rest of body) plus any of the following:

- Cough runny nose or conjunctivitis.
- Lacrimation, photophobia, and copious nasal discharge,, tearing and eyelid oedema.

It is rare at the age of less than 6 months.
It is recommended that all children should be vaccinated at the age of 9 months.
Inform the local EPI co-ordinator about all cases of suspected measles/ (i.e whch fulfil the case definition criteria).
Measles is dangerous in malnutruted children or in children who have other diseases such as TB or HIV/AIDS.
General Measures
All children < 5 years of age with measles should be given an extera dose of vitamine A unless the last dose was received with in a month:
Vitamine A (retinol) oral as a single dose

Age range	Dose units	Capsule 100 000 u	Capsule 200 000 u
Infants 6-11 months	100 000 u	1 capsule	-
Children 12 months-5years	200 000 u	2capsule	1 capsule

Pharmacological Treatment

Adults:

- **Paracetamol tablets** 1g every 8 hours for 5 days ***Plus***
- **Vitamin A 200,000 IU** orally ***Plus***
- **Tetracycline eye ointment** 1% apply once daily for 7 days.

Children:

- Give **Paracetamol** 10-15mg/kg body weight every 8 hours for 5 days Plus
- **Vitamin A** if less than 1 year give 100,000 IU stat and if over 1 year give 200,000 IU

Note: Give extra fluid and food

Children with diarrhoea:

Treat according to Section in: Acute diarrhoea in children.

Children with pneumonia:

- For treatment refer to the section of pneumonia in children: **Amoxicillin,** oral, 40 mg/kg/dose 8 hourly for 5 days.

Children with otitis media:

- Children ≤ 3 years of age: **Amoxicillin**, oral, 40 mg/kg/dose 12 hourly for 5 days.

Complications are more frequent and severe in malnourished children and measles itself may lead to malnutrition. Pneumonia and airway obstruction are the main causes of death in measles.

Referral

All adults.

- Children< 6 months of age.Children who are malnourished or immunocompromised, or who have TB.
- Where serious complications are present. These include:

– Stridor/croup
– Pneumonia
– Neurological complications,– dehydration
– Severe mouth and eye complications,
– A black (haemorrhagic) rash– great difficulty in eating or drinking

Provide emergency treatment, if needed, before referral. Treatment with antibiotics is not recommended, except if pneumonia or otitis media is present.

11.1.2 Poliomyelitis

It is a rare cause of hypotonia with abrupt onset of weakness (often asymmetrical) in association with a febrile illness. It is caused by one of the three related polio viruses; types 1, 2 and3which comprise a subdivision of the groups of enteroviruses.

Clinical features of the disease can be divided into three group's i.e.

1. Non-specific febrile illness of 2-3 days duration without CNS involvement
2. Aseptic meningitis include features mentioned above
3. Paralytic poliomylitis – which is the major possible outcome of the infection but occurs in less than 10% of those infected.

Treatment guidelines

Give supportive therapy

Prevention

- This disease is preventable by immunization with polio vaccine starting at birth. Give 4 doses at intervals of 4 weeks.
- Parents should be told about the World program to eliminate Polio and the importance of actively participating.

11.1.3 Rabies

Rabies is a zoonotic (transmitted from animals) viral neuro-invasive disease. It causes acute encephalitis (inflammation of the brain) in warm-blooded animals. It is transmitted most commonly to human by a bite from an infected animal but occasionally by other forms of contact. Rabies is almost invariably fatal if post-exposure prophylaxis is not administered prior to the onset of severe symptoms.

The incubation period of the disease depends on how far the virus must travel to reach the central nervous system. It may take one week to six months.
Once the infection reaches the central nervous system and symptoms begin to show, the infection is practically untreatable and usually fatal within days.

Diagnosis

- Early or prodromal clinical features of the disease include apprehensiveness, restlessness, fever, malaise and headache
- The late features of the disease are excessive motor activity and agitation, confusion, hallucinations, excessive salivation, convulsions and hydrophobia

Note: Death is considered as invariable outcome.
In unvaccinated humans, rabies is almost always fatal after neurological symptoms have developed, *but prompt post-exposure vaccination may prevent the virus from progressing.*

General management

Local wound therapy -wash wound thoroughly with water and soap and repeat process with 2.5%**iodine**solution (topically) to prevent secondary bacterial infection

Pharmacological Treatment

For *prophylactic wound therapy* that has lasted less than 8 hours

- **Amoxicillin-clavulanate 500mg/125mg**, 8hourly for 3-5 days
- Infected wounds and wounds older than 24 hours
- **Cotrimoxazole** (children) 120-480mg every 12 hours for 3-5 days

Active immunization

- **Human Diploid Cell Vaccine** (HDCV) 1ml I.M on days 0, 3, 7, 14, 28.

Passive immunization

- **Anti-rabies human immunoglobulin** 20 IU/kg half the dose given parenterally and the other half injected into and around the wound. In addition, patients should receive **rabies immune globulin** with the first dose (day 0)
- **Tetanus toxoid** vaccine see section on Tetanus
- **Antirabies vacci**ne therapy (with or without rabies immunoglobulin) for contacts of category II and III.

A summary of management of rabies exposed individuals is as indicated below:

CATEGORY I touching or feeding animals, licks on the skin	No treatment

CATEGORY II nibbling of uncovered skin, minor scratches or abrasions without bleeding, licks broken skin	Wash wound with running water and soap for 15 minutes. • Administer antirabies vaccines: - 0.2ml (ID) in divided doses of 0.1 ml on deltoid on one hand and another 0.1ml on the deltoid of the second hand on days 0, 3, 14 and 28 OR - 1 ml (IM) on deltoid muscle for days 0, 3,7,14, and 28 Note: Children are given the same doses but vaccine should be administered on the lateral part of the thigh.
CATEGORY-III single or multiple transdermal bites or scratches with bleeding, membrane saliva from licks; exposure to bat bites or scratches	Wash wound with running water and soap for 15 minutes. •AdministerRabies Immunoglobulin (RIG) on day 0 •40 IU/kg body weight for Equine (ERIG) • 20 IU/kg body weight for Human (HRIG) **Administer antirabies vaccines** - 0.2ml (ID) in divided doses of 0.1 ml on deltoid on one hand and another 0.1ml on the deltoid of the second hand on days 0, 3, 14 and 28 OR- 1 ml (IM) on deltoid muscle for days 0, 3,7,14, and28 **Note** 1: Children are given the same doses but vaccine should beadministered on the lateral part of the thigh. **Note 2**: The World Health Organization recommends ID route of vaccination administration because it is cost effective.

For rabies-exposed patients who have previously undergone complete pre-exposure vaccination or post-exposure treatment with cell-derived rabies vaccines, antirabies vaccines are given at days 0 and 3 regardless

of route of administration i.e ID or IM. Rabies immune globulin treatment is not necessary in such cases. The same rules apply to persons vaccinated against rabies who have demonstrated neutralizing antibody titres of at least 0.5 IU/ml.

11.1.4 Yellow fever

Yellow fever is an acute viral infection that is transmitted to human through a bite of infected mosquito-predominantly Aedes mosquitoes.
Though many cases of yellow fever are mild and self-limiting, the disease can also be a life threatening causing hemorrhagic fever and hepatitis. It is endemic in equatorial Africa and South America, with estimated 200,000 cases and 30,000 deaths annually.
Overall case-fatality rate in Africa is 23%.

Incubation period of 2-6 days and human becomes viremic - capable of infecting mosquitoes, shortly before onset of fever and for the first 3–5 days of illness. Once infected, mosquitoes remain so for life.

Treatment, prevention and control

No specific anti-viral treatment, supportive therapies are recommended.
Prevention and Control involve mosquito control and provision of yellow fever vaccine.

Indication for Yellow fever vaccine:

- Persons ≥ 9 months of age

– Planning travel to or residence in an endemic area
– Planning travel to a country with an entry requirement

• Needs to be given ≥ 10 days prior to arrival in endemic area
• Re-vaccination at 10 year intervals

11.1.5 Dengue

- Dengue is a febrile illness that is caused by any one of four serotypes of this flavivirus.
- Mild dengue disease and dengue fever contributes more than half of the total public health burden of dengue-associated illness, the more serious manifestations of dengue hemorrhagic fever and dengue shock syndrome (DHF/DSS) provide the major impetus for efforts to prevent infection.
- Severe disease occurs primarily in patients who reside in hyperendemic areas where multiple serotypes circulate simultaneously.

For further information refer to the latest Eritrea MOH guidelines on prevention and othe aspects.

Treatment
Treatment for dengue fever is mainly supportive and palliative.
Patients with dengue fever should be cautioned to maintain their intake of oral fluid to avoid dehydration.
Give **Paracetamol**for fever and myalgias. Use doses for adults and children as for fever.
Dengue hemorrhagic fever (DHF) — Plasma leakage is important to manage with aggressive intravascular

volume repletion to prevent or reverse hypovolemic shock.

For patients with hypotensive shock, an initial bolus of five percent **dextrose in normal saline** or **Ringer's lactate** (20 mL per kg of body weight) infused over 15 minutes is recommended, followed by continuous infusion (10 to 20 mL/kg per hour depending on the clinical response) until vital signs and urine output normalize.
Discharge from the hospital is appropriate when patients have been afebrile for at least 24 hours and have normal oral intake, urine output, and hematocrit.

Encephalopathy and liver failure are uncommon manifestations of DHF, which are associated with a high mortality rate. Seizures or jaundice should always be regarded as indicative of severe disease
The following clinical features are helpful in this determination:

- **Duration of illness** – The period of maximum risk for shock is between the third and seventh day of illness. This tends to coincide with resolution of fever. Plasma leakage generally first becomes evident between 24 hours before and 24 hours after defervescence.
- "Alarm signs" – Revised WHO guidelines recommend attention to clinical warning signs for severe dengue, including severe abdominal pain or

tenderness, persistent vomiting, abrupt change from fever to hypothermia, mucosal bleeding, liver enlargement on physical exam, or abnormal mental status, such as disorientation.

- **Hematocrit** – An elevation of the hematocrit is an indication that plasma leakage has already occurred and that fluid repletion is urgently required.
- **Platelet count** – Severe thrombocytopenia (<100,000/mm3) is one of the clinical criteria for DHF and usually precedes overt plasma leakage.
- **Serum aspartate transaminase (AST)** –levels are significantly higher in patients with DHF.
- Other Coexisting medical conditions may increase the risk of severe dengue and/or complicate management. Referral for hospitalization is recommended for such patients regardless of other findings.

Daily outpatient visits and referral for hospitalization is needed for one of the following signs:

- Hematocrit >50 percent
- Platelet count <50,000/mm3
- Evidence of bleeding other than petechiae

11.2 Bacterial infections

11.2.1 Whooping Cough (Pertussis)

It is a highly infectious childhood disease caused by Bordetella pertussis. It is most severe in young infants who have not yet been immunized.

Diagnosis

- After an incubation period of 7 –10 days, the child develops fever, usually with a cough and nasal discharge which are clinically indistinguishable from a common cough and cold;
- In the second week, there is paroxysmal coughing which can be recognized as pertussis;
- The episodes of coughing can continue for 3 months or longer;
- The child is infectious for a period of 2 weeks up to 3 months after the onset of illness;
- The main clinical feature is paroxysmal cough associated with a whoop.

General management

- During paroxysms of coughing, place the child head down and prone, or on the side, to prevent any inhaling of vomitus and to aid expectoration of secretions.
- Care for the airway but avoid, as far as possible, any procedure that could trigger coughing, such as application of suction, throat examination

- Do not give cough suppressants, sedatives, mucolytic agents or anti-histamines.
- If the child has fever (>38.5^0 C) give paracetamol.
- Encourage breastfeeding or oral fluids
- Whooping cough is preventable by immunization with pertussis vaccine contained in DPT triple vaccine.
- Admit infants aged less than 6 months to hospital; also admit any child with pneumonia, convulsions, dehydration, severe malnutrition, or prolonged apneoic spells or cyanosis after coughing.

Pharmacological Treatment

- **Erythromycin**12.5 mg/kg (PO) every 6 hours for 10 days.This does not shorten the illness but reduces the period of infectiousness.

If there is fever or if erythromycin is not available

- **Chloramphenico**l 25 mg/kg (PO) every 8 hours for 5 days
- Give **oxygen** to children who have spells of apnea or cyanosis, or severe paroxysms of coughing.

Note: Use nasal prongs, not a nasopharyngeal catheter or nasal catheter which can provoke coughing.

11.2.2 Anthrax

Anthrax is a disease of animals. However, man is infected directly through contact with infected hides or inhalation of spores in the lungs or ingestion of infected meat. Hence it can be cutaneous, pulmonary and/or intestinal.
The main clinical features are itching, a malignant pustule, pyrexia and rarely pulmonary and gastrointestinal signs.

Diagnosis
Occupational and exposure history is important.Patients should have cultures and Gram stains including cutaneous lesions, pleural fluid, CSF or stool.

Pharmacological Treatment

- **Benzylpenicillin**. Adult0.6 MU I.V every 6 hours until local oedema subsides then continue with
- **Phenoxymethylpenicillin** 250 mg 6 hourly for 7 days.

Children Premature infant and neonate:
benzylpenicillin 6mg/kg body weight every 6 hours until local oedema subsides then continues with phenoxymethylpenicillin 62.5 mg 6 hourly for 7 days.
Infants (1-12 months): benzylpenicillin 75 mg/kg body weight daily 8 hourly until local oedema subsides then continues with
Phenoxymethylpenicillin62.5 mg 6 hourly for 7 days.

Children (1-12 years) benzylpenicillin100 mg/kg body weight daily 6 hourly until 1 local oedema subsides. Then give
Phenoxymethylpencillin125-250mg6 hourly for 7 days

Second choice
Erythromycin (O) 500 mg 8 hourly orally for 10 days
Children:10 mg/kg body weight 8 hourly for 10 days

11.2.3 Relapsing Fever

1. Louse-Borne Relapsing Fever (LBRF)
Louse-borne relapsing fever (LBRF) is caused by *Borrelia recurrentis* and tick-borne relapsing fever (TBRF) by various other *Borrelia* species eg. Borrelia duttoni.
LBRF is often described as 'epidemic', and TBRF as 'endemic'.Relapsing fevers remain common infections in some tropical areas.
The condition causes a septicaemia-like illness, but a variety ofcomplications can occur complications are more common with LBRF, and include meningitis, neuropathies, arthritis, parotitis, iritis and myocarditis. Antibiotic treatment (e.g. doxycycline or penicillin) is effective, but a Jarisch-Herxheimer reaction (JHR) can occur.

2 Tick Borne Relapsing Fevers

Tick Borne relapsing fever is a bacterial infection caused by spirochetes known as Borrelia duttoni.

It is transmitted to humans by a bite of soft tick infected by spirochetes known as ornithrodrous moubata. The incubation period is within 2 weeks.
It is characterized by recurring febrile episodes that last for 3days and are separated by afebrile periods of 7 days duration. Along with fever, patients may experience a wide range of nonspecific symptoms. Each febrile episode ends with a sequence of symptoms collectively known as a "crisis."
During the "chill phase" of the crisis, patients develop very high fever (up to 106.7°F or 41.5°C) and may become delirious, agitated, tachycardic and tachypneic. Duration is 10 to 30 minutes.
This phase is followed by the "flush phase", characterized by drenching sweats and a rapid decrease in body temperature. During the flush phase, patients may become transiently hypotensive. Overall, patients who are not treated will experience 1 to 4 episodes of fever before illness resolves.

Pharmacological Treatment

Treatment involves antibiotics often tetracycline, doxycline erythromycin and penicillin.
Procaine penicillin G should be used when oral therapy is not tolerated. It is administered at 600,000 IU daily for 7 days

•In children younger than 8 years and in pregnant or nursing women erythromycin is preferred.

11.2.4 Tetanus

It is an acute, often fatal disease caused by an exotoxin produced by the anaerobic bacterium Clostridium tetani. It is acquired through wounds contaminated with spores of the bacteria and in the case of neonates, through the umbilical stump, resulting in neaonatal tetanus.

Diagnosis •Generalized spasms and rigidity of skeletal muscles

Patients are usually fully conscious and aware.

General management

- Nurse in dark, quiet room to avoid unnecessary external stimuli which can trigger spasms
- Protect the airway (patient may need to be referred)
- Immediate (preferably after administration of antitetanus immunoglobulin) thorough cleaning of the site of entry (wound/umbilicus), leaving it exposed without dressing
- Pain management with paracetamol (via NGT) as the spasms can be very painful
- Maintenance of fluid balance and nutrition (via NGT)
- Avoid giving medications via IV/IM route as injections can trigger spasms
- Sedation (see below) and care as for unconscious patient

Prevention:

Preexposure:

- Routine according to EPI schedule all children and all childbearing mothers.

- Tetanus (toxoid) vaccine 0.5 ml IM; repeat after 4 weeks and after 6-12 months, then boost every 10 years thereafter.

Post exposure:

- Depending on pre exposure vaccination status and state of contamination of wound, tetanus vaccine and Human tetanus immunoglobulin should be given.

Pharmacological Treatment

1. **Human tetanus immunoglobulin**;
   Adults & children give 100 – 300 IU/kg IM stat **OR**
2. **Tetanus Antitoxin (equine)Plus**
   Amoxycillin 500-1000mg via Nasal Gastric Tubes every 8 hours (Neonates and Infants: ≤3 months: 20-30 mg/kg/day; Infants >3 months and Children: 25-50 mg/kg/day for 14 days) **Plus**
3. **Metronidazole: Adults:** 500mg every 8 hours

Children

Neonates I.V.0-4 weeks, <1200g: 7.5 mg/kg every 48 hours.

- For ***postnatal age≤7 days***: 1200-2000 g: 7.5 mg/kg/day given every 24 hours
- >2000 g: 15 mg/kg/day in divided doses every 12 hours.

Postnatal age >7 days: 1200-2000 g: 15 mg/kg/day in divided doses every 12 hours >2000 g: 30mg/kg/day in divided doses every 12 hours.

Control of spasms
Give a sedative cocktail of ALL the following through NGT:
Adult:

- õ Diazepam10-30 mg every 6 hours, Children 0.5 mg/kg body every 6 hours **Plus**
- õ Chlorpromazine100 mg every 8 hours, Children 2 mg/kg body every 6 hours **Plus**
- õ Phenobarbitone 50 – 100 mg every 12 hours, Children 6 mg/kg every 12 hours

11.2.5 Brucellosis

Brucellosis is a zoonotic infection caused by Brucella sp, transmitted to humans by contact with fluids from infected animals (sheep, cattle, goats, pigs, or other animals) or derived food products such as unpasteurized milk and cheese. Brucellosis is also known as undulant fever, Malta fever, Gibraltar fever, or Mediterranean fever.

Signs and Symptoms
Uunexplained chronic fever and nonspecific complaints
Progress to chronic stage with relapse of fever, weaknes, sweats and vague aches and pains

Complications: rare but include the following:

- Osteoarticular disease (sacroileitis — 20 to 30%) and vertebral spondylitis. Large joints are affected most commonly in children.

- Genitourinary disease (epididymo-orchitis — 2 to 40 %)
- Neurobrucellosis, as meningitis — (1 to 2%).
- Endocarditis — 1 %.
- Hepatic abscess — 1 percent.

About 10 % of patients relapse after therapy.

Diagnosis

The history should include details regarding possible sources of exposure to Brucella, including contact with animal tissues or ingestion of unpasteurized milk or cheese.

Serologic tests — most serological studies for diagnosis of Brucellosis are based on antibody detection.

Pharmacological Treatment

Major regimens — there are two major regimens for treatment of adult brucellosis in the absence of osteoarticular disease, neurobrucellosis, or endocarditis:

- **Doxycycline 100 mg** orally twice daily for 6 weeks (or 42 days), plus streptomycin 1 gram intramuscularly once daily for the first 14 to 21 days Gentamycin may be substituted for streptomycin.
- **Osteoarticular disease** — Patients with Brucella spondylitis appear to respond better to **doxycycline - streptomycin** or a three-drug regimen (**doxycycline-streptomycin-rifampicin**).

- **Neurobrucellosis** — most experts favor administration of two or three drugs which cross the blood-brain-CSF barrier (such as **doxycycline, rifampicin, and cotrimoxazole**) for treatment of neurobrucellosis.

Relapse — Relapse should prompt assessment for a focal lesion, especially hepatosplenic abscess.

Pregnant or breast-feeding women

- **Cotrimoxazole** 1600 mg:320 mg /day in 2 divided doses for 6 weeks, **PLUS, Rifampicin** : 600 mg once daily for 6 weeks

Note:
In pregnant women, the combination of cotrimoxazole + rifampicin can be administeredregardless of the stage of pregnancy if treatment is indispensable.
Children — Treatment recommendations for children
The American Academy of Pediatrics (AAP) suggests that children who do not have osteoarticular disease, neurobrucellosis, or endocarditis be treated as follows:

- ***<8 years of age*** — Oral**Cotrimoxazole**plus Rifampcin for four to six weeks
- ***≥8 years of age*** — Oral doxycycline plus rifampicin for six weeks

Children with osteoarticular disease, neurobrucellosis, or endocarditis should be treated for at least six weeks (and up to six months for life-threatening infection) as follows :

- <8 years of age — Oral **Cotrimoxazole**for at least six weeks plus parenteral aminoglycoside (gentamycin or streptomycin) for the first 14 days of therapy
- ≥8 years of age — Oral **doxycycline** plus **rifampicin** for six weeks plus parenteral aminoglycoside (gentamycin or streptomycin) for the first 14 days of therapy

Rifampcin may be added to the regimens above to decrease the risk of relapse

12. HIV/AIDS & OPPORTUNISTIC INFECTIONS

12.1 HIV/AIDS

- Human Immunodeficiency Virus (HIV) and Acquired Immunodeficiency Syndrome (AIDS) like all viruses, HIV must enter other cells in order to replicate
- HIV is a retrovirus and its genetic material, RNA, must be converted in to DNA during replication
- The human body is made up of millions of different cells. Each body cell often makes new cell parts in order to stay alive and reproduce.
- Viruses hide their own material inside human cells, and then, when the body cells try to make new parts, they by accident make new viruses as well. HIV mostly enters cells of the immune system - CD4 cells.
- The main target is the T4 - lymphocyte (CD4): a kind of white blood cell that is responsible for warning your immune system that there are invaders (diseases) in the body In general, adults with good immune systems have CD4 counts of between 450 and 1500 cells/mm

HIV can therefore be transmitted through:

- Unprotected sexuol intercourse
- Transfusion with contaminated blood or blood products;
- From infected mother to their baby through;
  A during pregnancy 17%
  B. during delivery 50%

C. during breast milk 33%

The World Health Organization (WHO) has categorized HIV infection in four clinical stages. The clinical stages of a patient indicate the progression of HIV infection in a person**.**

WHO clinical stage 1

- With out any body weihgt losschronic swelling of the lymph nodes in at least two areas of the body for three months or longer (Persistent generalized lymphadenopathy, or PGL)

WHO clinical stage 2

- Weight loss of less than 10 per cent
- Sores or cracks around lips (angular cheilitis): small lesions at the corners of the Seborrhoea: scaly skin eruption on the border between face and hair and side of the nose
- Prurigo: itchy skin eruption on the arms and legs
- Herpes zoster: painful blisters on a region of one side of the body, face or extremities
- Recurrent upper respiratory infections: repeated throat infections, sinusitis or ear infections
- Recurrent mouth ulcers:
- Fungal nail infections

WHO clinical stage 3

- Weight loss of more than 10%
- Oral thrush: white patches covering areas in the mouth

- Oral hairy leukoplakia: non-painful, white vertical lines on the side of the tongue, which cannot be scraped off
- Diarrhoea: Unexplained fever More than one month (Even if sometimes intermittently)
- •Severe bacterial infections: pneumonia, muscleinfection, etc.
- Pulmonary TB
- TB lymphadenopathy
- Acute necrotizing ulcerative gingivitis/periodontitis

WHO clinical stage 4

- **HIV wasting syndrome**: extremely thin (body weight loss of > 10%) with chronic fever (> 1 month) and/or chronic diarrhoea (> 1 month).
- **Oesophageal thrush**: severe pain when swallowing
- **Herpes simplex ulcerations**: More than one month of duration, large and chronic painful wounds on the genitals and/or anus **Lymphoma**
- **Kaposi's sarcoma:** dark (purple) lesions on the skin and/or mouth, eye, lungs, intestines, often a hard oedema
- **Invasive cervical cancer***:
- **Pneumocystis pneumonia***: severe pneumonia with shortness of breath on exertion and dry cough
- **Extrapulmonary TB***: for example, in the bone or brain or meninges

- **Cryptococcal meningitis***: meningitis which can present without neck stiffness
- **Toxoplasma brain abscess***
- **Visceral leishmaniasis***
- **HIV encephalopathy***: significant neurological impairment interfering with independent functioning and not due to other cause; will sometimes improve on **ART**

(ANTIRETROVIRAL DRUGS)

- HIV is a retrovirus. So drugs against HIV are called anti-retroviral drugs:
- AntiRetroViral drugs - shortened to ARV drugs.
- Giving ARV drugs in the correct way, with adherence support, is called ARV Therapy - shortened to ART.

There are **six big groups of antiretroviral drugs** available:

- the NRTI: this stands for 'Nucleoside and Nucleotide Reverse Transcriptase Inhibitors' (divided into NsRTI and NtRTI)
- the NNRTI: this stands for 'Non-Nucleoside Reverse Transcriptase Inhibitors'
- the PI: stands for Protease Inhibitors
- Entry inhibitors / fusion inhibitors
- Integrase inhibitors
- CCR5 receptor inhibitors

1. Principles of ART

- Initiate Anti-retroviral therapy (ART) as early as possible regardless of CD4 cell count and clinical stage to improve clinical outcomes for people living with HIV.
- At present antiretroviral drugs (ARVs) come in *seven classes*, each of them attacks a different site or stage of the HIV life cycle thereby interfering with its replication.
- Currently, three classes (NRTIs, NNRTs, PIs,) are the only ARVs approved for use in Eritrea and included in Eritrean National List of Medicines (See Table 1).

Table 1: Available ARVs in Eritrea

1	Nucleos/(t)tide reverse transcriptase inhibitors (Ns/tRTIs)(NRTI)
	Zidovudine(ZDV), Lamivudine (3TC) Emtricitabine (FTC) (available as combination with tenofovir) Tenofovir(TDF) , Abacavir (ABC)
2	Non-nucleoside reverse transcriptase inhibitors (NNRTIs)
	Nevirapine (NVP) ,Efavirenz (EFV) andEtravirine (ETV)
3	Protease inhibitors (PIs)
	Lopinavir/ritonavir (LPV/r) Atazanavir/ritonavir (ATV/r) Darunavir/ritonavir (DRV/r)

2. HIV Assessments

- **Clinical Aassessment**
  - Clinical staging will be used where HIV infection has been confirmed by HIV antibody testing in adults and children above 18 months of age and by PCR in children below the age of 18 months.
  - It should form part of the baseline assessment.
- **Immunological assessment**
  - Although the role of CD4 cell counts is important in the initial decisions around ART initiation and clinical management, particularly for patients presenting late to care,
  - ART should be initiated in all adults living with HIV, regardless ***of*** WHO clinical stage and at any CD4 cell count.
- **Virological assessment**
  - Viral load, in combination with clinical and immunological parameters, will be used to monitor the success of ART, and make a decision when to shift to second line.
  - viral load testing should be performed early after initiating ART (within 6 months), at 12 months and then at least every 12 months to detect treatment failure.
  - Viral load testing during pregnancy is a useful tool for clinical decision-making, which should be prioritized for pregnant and breastfeeding women.

- All HIV positive women of reproductive age group should be offered viral load testing prior to becoming pregnant in order to improve the outcome of the pregnancy.

Clinical and Laboratory Monitoring of patients are important to

- õ Clinically stage the HIV disease,
- õ to rule outthe existence of opportunistic infections (OIs) and co-morbidities
- õ Assess overall health
- õ Assess effectiveness of ART
- õ Identify and manage adverse effects and treatment failure
- õ Assess and support adherence

Before initiating therapy

The following baseline laboratory tests are recommended:

- Urinalysis,
- Renal Function Tests (Creatinine, Blood Urea Nitrogen (BUN)),
- A complete blood count (If not available do Hgb),
- Chemistry profile for liver (serum alanine aminotransferase, ALT).
- Tests to rule out active TB where indicated (sputum AFB, CXR) in case of indication from the screening questionnaire
- Serum creatinine and lipids,
- Hepatitis B and C serology

- Viral load,
- CD 4 T- lymphocyte count for immunological monitoring
- Urine for pregnancy (To women of reproductive age)

Patient's readiness to start and adhere to lifelong treatment is an important additional social criterion. Disclosure to either partners or family members should be encouraged at all visits and levels of care.

3. ART Complications

ART Complications are common in people with:

- advanced HIV disease, existing co-infections and/or comorbidities,
- severely low haemoglobin,
- Very low CD4 counts and severely malnourished individuals.

Poor adherence in this period is associated with the risk of earlier treatment failure and rapid development of drug resistance.

4. First line regimens in pregnant women use ARTguid line

5. Preventing HIV infection in infants–

- To achieve the goal of eliminating HIV infection in infants, all pregnant women must be started on

lifelong treatment irrespective of the gestational age, WHO clinical stage and CD4 count.

- Infants born to mothers with HIV who are at high risk of acquiring HIV should receive dual prophylaxis with AZT (twice daily) and NVP (once daily) for the first 6 weeks of life whether they are breastfed or formula fed.
- Breastfed infants who are at high risk of acquiring HIV including those first identified as exposed to HIVduring the postpartum period, should continue infant prophylaxis for an additional 6 weeks (total of 12 weeks of infant prophylaxis) using either AZT (twice daily) and NVP (once daily) or NVP alone.
- Infants of mothers who are receiving ART and are breastfeeding should receive 6 weeks of infant prophylaxis with daily NVP. If infants are receiving replacement feeding,
  they should be given 4–6 weeks of infant prophylaxis with daily NVP (or twice-daily AZT).

Newborn: give ARV prophylaxis as soon after birth as possible. Duration depends on breastfeeding status and ARV regimen of the mother during pregnanc

NVP daily or AZT twice daily until 6 weeks of age

Simplified AZT and NVP prophylaxis infant dose

Drug	Birth weight	Daily dose
Drug	**Birth weight**	**Daily dose**
NVP	2000-2499 gm	1ml daily
NVP	> 2500 gm	1.5 ml daily
AZT	2000-2499 gm	1 ml BID daily
AZT	> 2500 gm	1.5 ml BID daily

ARV drugs formulation for the newborn

AZT 10 mg/ml
NVP 10 mg/ml

Infant breast-feeding in HIV infected Mothers –

- To minimize the risk of HIV transmission to infants during breastfeeding while at the same time not increasing their risks of Exposure to other causes of morbidity and mortality:
- Mothers on ART and whose infants are HIV uninfected or of unknown HIVstatus should exclusively breastfeed for the first 6months of life, introducing appropriate complementary foods there after while continuing breastfeeding until 12 months.
- For mothers who opt for replacement feeding, ensure that it is acceptable, feasible, affordable, sustainable and safe (AFASS).
- If infant is HIV positive as confirmed by viral testing, breast feeding should continue for at least 2 years in line with the recommendation for the general population.

Establishing diagnosis of HIV infection –

- Children born to HIV infected mothers receive maternal HIV antibody during pregnancy and it persists up to 12-18 months of life making it difficult to use antibody tests to confirm infection in children younger than 18 months of age.
- All HIV exposed infants must be screened with DNA PCR testing by 6 weeks of age.

Children > 18 months of age:
The testing strategies are the same as in adults. Achild is considered HIV positive if positive by two different simple/rapid tests.

Children < 18 months of age:

- Definitive laboratory diagnosis of HIV infection in children less than 18 months of age should be confirmed by virology test using viral DNA PCR assay.
- The child can always get infected after performing the diagnostic test because of breastfeeding.
- All children identified as negative by 6 weeks, who are breastfed, should have repeat HIVtesting 6 weeks after cessation of breastfeeding (if <18 months use DNA PCR-DBS, if > 18months use rapid tests).
- ART should be initiated in all children living with HIV regardless of WHO clinical stage or at any CD4 cell count.

- Follow the latest MOH ART guidelines

PREVENTION OF OPPORTUNISTIC INFECTIONS (OI)

- It is possible to decrease the risks of HIV-positive patients developing certain potentially-fatal opportunistic infections by giving them specific tablets on a daily basis. This is called prophylaxis.
- If prophylaxis is initiated to prevent the disease before it appears, it is called primary prophylaxis.
- If prophylaxis is given in order to prevent recurrence of a disease it is called secondary prophylaxis.
- A good prophylaxis is neither expensive nor complicated, and can improve the patient's health and quality of life. The most commonly-used OI prophylaxis for HIV-positiv patients is;

1. **Cotrimoxazole (Bactrim)**
2. **Cryptococcal infection prevention**
3. **Isoniazid prevention therapy**

CO-TRIMOXAZOLE PROPHYLAXIS THERAPY (CPT):

- Co-trimoxazole preventive therapy (CPT) should be an integral component of a package of HIV-related services.

- These should be instituted among all categories of patients (adults, adolescents, pregnant women and children) for prevention of a variety of medical conditions.

These include;

- *Pneumocystis* pneumonia (PCP) (this used to be called *Pneumocystis carinii*, now called *Pneumocystis Jiroveci*): it is a type of pneumonia typical among people with low immunity. It presents with shortness of breath on exertion, dry cough, fever and hypoxemia (decreased level of oxygen in the blood). The prognosis of this type of pneumonia is often poor.
- *Toxoplasma* brain abscess: this disease can cause weakness or lack of movement on one side of the body (hemiparesis) often as well as headache and fever.
- Pneumonia from *S. pneumoniae.*
- *Isospora belli*: this type of microorganism is responsible for some cases of chronic diarrhoea with weight loss.
- *Salmonella* species: gastro-intestinal symptoms and fever.
- *Benefits for malaria prophylaxis*

Read about cotrimoxazole prophylaxis in section 7.2 in the *Chronic HIV Care with ARV Therapy and Prevention* guideline module.

Criteria for Starting Cotrimoxazole Prophylaxis in Adults

All HIV-positive patients in WHO clinical stages 2, 3 or 4 or whose CD4 counts are below 350 cells/mm³ should start cotrimoxazole prophylaxis.
But first ask them if they have a history of sulpha allergy, as these patients should not be given cotrimoxazole.

ADULT DRUG REGIMEN FOR CPT
Cotrimoxazole (Bactrim) 480 mg: 2 tablets daily OR Cotrimoxazole 960 mg: tablet daily

Duration of Primary Cotrimoxazole prophylaxis

If the patient has access to antiretroviral therapy, cotrimoxazole prophylaxis can be stopped when the CD4 count has reached 350 cells/mm³, and stays above that level for at least six months.

Monitoring Patients on Cotrimoxazole

1. Continue follow-up every month. Later, if no problems occur and if the patient takes the drugs correctly, the follow-up can be done every three months.

2. Follow-up visits should include monitoring in search of any side-effects and educating the patient on the importance of taking the drug correctly.
3. Use the 5 A's to prepare the patient for taking cotrimoxazole properly and to ensure proper follow-up. Going to the clinic regularly for scheduled visits

(adherence to care) and adhering to daily cotrimoxazole prophylaxis help the patient prepare for taking ART.
These visits also provide the opportunity to monitor the patient's clinical stage and his or her medical eligibility for ART.
4. If the patient is on ART, you need to continue cotrimoxazole until the CD4 count is more than 350 cells/mm^3 for six months. When the CD4 count is this high, the patient no longer needs the protection from OI's that cotrimoxazole provides. That is why you can stop the cotrimoxazole prophylaxis. Unfortunately, there are no clinical criteria for determining when to stop cotrimoxazole, which is difficult to judge because the CD4 count can rise at varying speeds from one patient to another.

Fluconazole

- Prophylaxis for cyptococcal meningitis
- Cryptococcal meningitis is one of the most important opportunistic infections and a major contributor to high mortality before and after ART is initiated.
- Key interventions regarding screening and prophylaxis include;

1. Patient not on ART, Give after full treatment for ***cryptococcal meningitis*** (secondary prophylaxis) – fluconazole 200mg/day for the rest of life or until immune status reconstituted after ARV therapy. When on ART, stop fluconazole prophylaxis when CD4 has been greater than 100 for six months, after at least six

months treatment (NB; Discuss risks and benefits if pregnant or planning pregnancy)

2. Use of routine serum or plasma cryptococcal neoformans antigen (CrAg) screening for patient not on ART adults, followed by pre-emptive antifungal therapy if CrAg – positive and asymptomatic, to reduce the development of cryptococcal disease may be considered prior to ART initiations in patients with CD4 of less than 100 cell/mm3 and where population also has high prevalence of cryptococcal antigeneamia

3. Routine use of antifungal primary prophylaxis for cryptococcal disease in people living with a CD4 less than 100cells/mm3 and who is CrAg negative or where CrAg status unknown is not recommended prior to ART initiation.

Isoniazid preventive therapy within the framework of the Three I'S strategy

- Among people living with HIV, TB is the most frequent life-threatening opportunistic infection and leading cause of death.
- ART should be provided to all people with HIV with active TB. Furthermore, HIV care settings should implement the WHO Three I's strategy; Intensified TB-case finding, Isoniazid preventive therapy (IPT), Infection control at all clinical counters.

The key actions to undertaken in implementing these strategies are summarized below;

1. ***Intensified case- finding and anti-tuberculosis treatment***

Tuberculosis case- finding forms part of the 3 broader strategies to be implemented in the health facility. The key implementation facility-based approaches include;

1. Health providers ***should screen*** all adults and adolescents living with HIV for TB with a Clinical algorithm (presented in diagram below); those who report any one of the symptoms of current; Cough, fever, weight loss or night sweats may have active TB and should be evaluated for TB and other diseases

2. Children living with HIV ***who have any*** of the following symptoms of; poor Weight gain, fever or current cough or contact history with a TB case may have TB and should be evaluated for TB and other conditions. If the evaluation shows no TB, children should be offered isoniazid preventive therapy regardless of their age

3. TB patients with known positive HIV status and TB patients living in HIV-prevalent settings ***should receive*** at least six months of rifampicin treatment regimen. The optimal dosing frequency is daily during the intensive and continuation phases

4. Xpert MTB/RIF ***should be used*** as the initial diagnostic test in individuals suspected of having HIV-associated TB or multidrug-resistant TB

2. Isoniazid preventive therapy (IPT)

- As part of the 3 strategies for TB infection control, IPT aims at reducing infection especially in the HIV population.
- The key interventions that are expected to be carried out include;

a) Adults and adolescents living with HIV should be screened with a clinical algorithm; those who do not report any one of the symptoms of current cough, fever, weight loss or night sweats are unlikely to have active TB and should be offered IPT

b). Duration of IPT
Adults and adolescents who are living with HIV, have unknown or positive tuberculin skin test (TST) status and are unlikely to have active TB should receive at least six months of IPT as part of a comprehensive package of HIV care. IPT should be given to such individuals irrespective of the degree of immune-suppression, and also to those on ART, those who have previously been treated for TB and pregnant women
c). Providing IPT to people living with HIV does not increase the risk of developing isoniazid-resistant TB. Therefore, concerns regarding the development of INH resistance should not be a barrier to providing IPT

d). Children living with HIV who are more than 12 months of age and who are unlikely to have active TB on symptom-based screening and have no contact with a TB case should receive six months of IPT

(10 mg/kg/day) as part of a comprehensive package of HIV prevention and care services

e). In children living with HIV who are less than 12 months of age, only those who have contact with a TB case and who are evaluated for TB (using investigations) should receive six months of IPT if the evaluation shows no TB disease

f). All children living with HIV, after successful completion of tfreatment for TB disease, should receive isoniazid for an additional six months

People with HIV with suspected drug-resistant TB should be tested using Xpert MTB/RIF where possible, since this test is more sensitive for detecting TB among people with HIV and rapidly detects rifampcin resistance, thus greatly shortening the time to diagnosing and treating MDR-TB

Malaria

People living with HIV who develop malaria should receive prompt treatment effective antimalarial regimens. The drugs used to treat malaria and ARV drugs may share toxicities (particularly the sulfa-based drugs) and may have clinically important pharmacokinetic interactions (especially artemesinins, lumefantrine, NNRTIs

- The key actions recommended in all areas of stable malaria transmission include ensuring that insecticide – treated bednets or access to indoor

residual spraying to reduce their exposure to malaria infection

- Treatment or intermittent preventive treatment with sulfadoxine-pyrimethamine should not be given with HIV receiving co-trimoxazole prophylaxis

6. Third line ARV Therapy

- Some patients may develop resistant viruses to the second line treatment above regimen. Therefore, third-line regimens are included in the **National ARVGuideline** with new drugs that have minimal risk of cross-resistance to previously used regimens.
- The new additions are-Etravirine (ETV) (second-generation NNRTIs), Darunavir (Protease inhibitor) and Raltegravir (integrase inhibitor).
- A PI that was not used frequentl in Eritrea Atazanavir/ritonavir is also included in this group.
- Third line therapy should be started only in the National Referral Hospitals. **(*Refer to the National ARV Guideline for Third Line ARV therapy*)**

Prevention of HIV Exposure

Prevention of exposure remains the most effective measureto reduce the risk of HIV transmission to health workers and to those who are sexually assaulted. In Eritrea Prevention Exposure Prophylaxis (PEP) is indicated for accidental exposure in health care settings (occupational) and for rape victims (non-occupational).

12.1.1 Occupational Exposure

Viral Post-Exposure transmission due to percutaneous exposure to blood in health care settings occurs in three ways:

- Exposure of health workers to blood of patients,
- Exposure of patients to blood of health workers and
- Exposure of patients to blood of other patients.

The risk of percutaneous exposure (PE) for HIV is relatively low compared to the risk of transmission of other infectious agents such as hepatitis B&C viruses,

Table 18: Risk of Transmission for Some Infectious Agents

Infectious Agents	Risk of Infection
Hepatitis B	9-30%
Hepatitis C	1-10%
HIV mucocutaneous	0.003%
HIV sexual	0.03%

Immediate management of exposure sites

Body fluids that carry a high risk of HIV infection are blood, blood stained saliva, breast milk, genital secretions, and CSF, amniotic, peritoneal, synovial, pericardial or pleural fluid. The site of exposure should be cleaned and managed as follows:

- Wound, punctures and other skin sites that are exposed should be squeezed to encourage the free flow of blood – NEVER suck a wound by mouth
- Wound and skin sites should be washed with free-flowing water
- Mucous membranes should be flushed copiously with water
- Eyes should be irrigated with copious amounts of clean water, saline or other sterile solutions

Eligibility Criteria for PEP

Post-exposure prophylaxis should be offered, and initiated as early as possible (within 2-3 hours), to all health workers with exposure that has the potential for HIV transmission, and ideally within 72 hours. PEP is indicated in the following ***two conditions:***

1. Paranteral or mucous membrane exposure (splashes to the eye, nose or oral cavity);
2. Exposure to blood, blood-stained cerebrospinal, amniotic, peritoneal, synovial, pericardial or pleural fluids.

Assessment for eligibility should be based on the HIV status of the source whenever possible.

12.1.2 Non-occupational prophylaxis

PEP for non-occupational purpose is indicated only for individuals sexually assaulted. Every health worker

examining a rape victimshould refer the person to a counsellor to be counselled on the potential risks of post-rape HIV transmission. If the survivor presents within 72 hours of being raped, post-exposure prophylaxis (PEP) should be offered to prevent HIV transmission. Issues that need to be addressed during non-occupational PEP include:

- For each rape survivor, blood and urine should be taken routinely to screen for HIV and existing pregnancy.
- To prevent unintended pregnancy, emergency contraceptives should be offered.
- Survivors who are on PEP should be counselled on the following issues:
    - To observe precautions to prevent possible secondary transmission (for example to their sexual partner or from mother to child) until they are found to be HIV- negative 3 months following the exposure.
    - All women who choose to use PEP should undergo pregnancy testing to ensure that pregnant women are identified and then receive appropriate antenatal care.

Table 19: Type of Exposure & recommended PEP

Exposure	**HIV status of source patient**	
	Unknown	**Positive**
Intact skin	No PEP	
Mucosal splash/non-intact skin	TDF 300mg +3TC 300mg For 28 Days	
Percutaneous (sharps)		
Percutaneous (needle in vessel or deep injury)		
Sexual assault		

Survivors should be given seven days supply of PEP at point of care and referral to the ARV clinic for reassessment, counselling andcontinuation of PEP.

- AZT + 3TC is recommended as a preferred backbone regimen for HIV post exposure prophylaxis for children aged 10 years and younger. ABC +3TC or TDF + 3TC or (FTC) can be considered as alternative regimen.

- NVP should not be used in children above the age of 2

Follow up after exposure.

- An HIV test should be performed as soon as possible after occupational or non-occupational exposure (baseline) and periodically for at least 3months after the exposure (6 weeks, 12 weeks, 6 months), See Table

Table 20: Baseline and monitoring laboratory tests for PEP

Time Period from Exposure	Recommended Test
Baseline	Full blood count Pregnancy test HIV test
Two weeks	Full blood count
Six weeks	HIV test
Three months	HIV test

- For the first 3 months after the exposure event, the individual should follow recommendations for preventing transmission of HIV
  i.e. *do not donate blood and do not have sexual intercourse* unless using condoms consistently and correctly.
- In addition, women should consider not breast-feeding their babies during the follow-up period to prevent exposing their children to HIV in breast milk.
- Confidentiality of persons who have been exposed to AEB or rapemust always be ensured.

12.2 Opprtunistic Diseases

12.2.1 Tuberculosis in Adults andAdolescents

- Tuberculosis is a common OI in HIV patients. In Eritrea, the prevalence of HIV in TB patients is around 6%.

- Adults and adolescents and children older than 12 months living with HIV should be screened for TB symptoms at every visit.
- In all individuals-suspected of having HIV-associated TB or multidrug-resistant TB, Gene/Xpert should be used as the initial diagnostic test.
- ART should be started in all HIV positiveTB patients, including those with drug-resistant TB, irrespective of CD4 count. Anti-tuberculosis treatment should be initiated first, followed by ART as soon as possible within the first 8 weeks of treatment
- HIV-positive TB patients with profound immunosuppression (e.g. CD4 counts less than 50 cells/mm3) should receive ART within the first two weeks of initiating TB treatment.

Drug interaction between rifampicin and NNRTI, especially NVP and PI class should be seriously considered.

<u>EFV is preferred whenever rifampicin is in the treatment regimen.</u>

12.2.2 Tuberculosis in Children

- Children living with HIV may have TB and should be assessed for TB and other conditions at every visit.
- ART should be started in any child with active TB disease as soon as possible and within eight weeks following the initiation of anti-tuberculosis treatment irrespective of the CD4 count and clinical stage.
- In infants and children infected with HIV younger than three years, ABC + 3TC + AZT is recommended as an option for children who develop TB while on an ART regimen containing NVP or containing NVP or LPV/r. See Table

Table 16: Regimens for ART in children with TB-co infection

Children &adolescents initiating ART while on TB treatmentand initiating TB treatment while receiving ART (Ensure NVP dose is200mg/$m^{2)}$	Children <3 years	Children >3 years
	AZT + 3TC + ABC	AZT+3TC + EFV **or** AZT + 3TC + ABC
	AZT + 3TC + ABC	Substitute NVP with EFV **Or** AZT + 3TC + ABC

Triple NRTI is only recommended for the duration of TB treatment; an age-appropriate PI- or NNRTI-based regimen should be restarted When rifampicin-based therapy ends.

Treatment of HBV

- Start ART in all individuals *regardless of CD4 cell count* in the presence of chronic HBV infection. Start 3TC/FTC and TDF containing antiretroviral regimens in HIV/HBV co-infected individuals who require treatment for HBV. EFV is the preferred NNRTI for people with HIV and HBV co-infection (less risk of hepatic toxicity).
- In HBV/HIV co-infection taking ART, hepatitis flare-ups may be seen as part of IRIS.
- Flare-up of hepatitis is also common when drugs active against HBV are stopped.
- In chronic HBV infection, 3TC should be continued as part of second line ART, even if it had been used in the first line treatment.

Treatment of HCV

- HIV/HCV coinfection increases the risk of hepatotoxicity of ART. Start ART in all HCV/HIV coinfected individuals irrespective of CD4 count. . (Refer to currently updated ARV treatment Guideline.)

13. TUBERCLOSIS AND LEPROSY

13.1 Tuberculosis

Tuberculosis is chronic airborne infection caused by mycobacterium tuberculosis also known as acid fast baccili; less frequently it can be caused by mycobacterium avium and mycobacterium africanus.

Note: **TB is a notifiable disease**

- It is exacerbated and complicated by HIV/ AIDS and multi drug-resistant mycobacteria.
- Among those who become infected, about 90-95% never develops TB disease and their infection heals but the bacilli remain dormant within the body for a long time.
- About 5-10% of infected persons, whose immunity decreases due to any reason, develop Tuberculosis disease. Most persons develop TB within months following infection, but the risk remains throughout the life.

For detailed information on the control and management of TB refer to the National Tuberculosis Control Program manual (MOH 2016).

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Types of Tuberculosis by site of disease

- **Pulmonary Tuberculosis** refers to a case of TB involving the lung parenchyma.
  It is the most frequent form of disease, usually comprising over 80% of TB cases which is transmitable.
- **Extra-pulmonary Tuberculosis** refers to a case of TB involving organs other than the lungs, e.g. pleura, lymph nodes, abdomen, genitourinary tract, skin, joint and bones, meninges etc.

Symptoms of Pulmonary Tuberculosis

- Productive cough for more than 2 weeks (commonest symptom) accompanied by other respiratory symptoms like, shortness of breath, chest pain, haemoptysis, **and/ or**
- Constitutional symptoms like, loss of appetite, weight loss, fever, night sweats and fatigue.

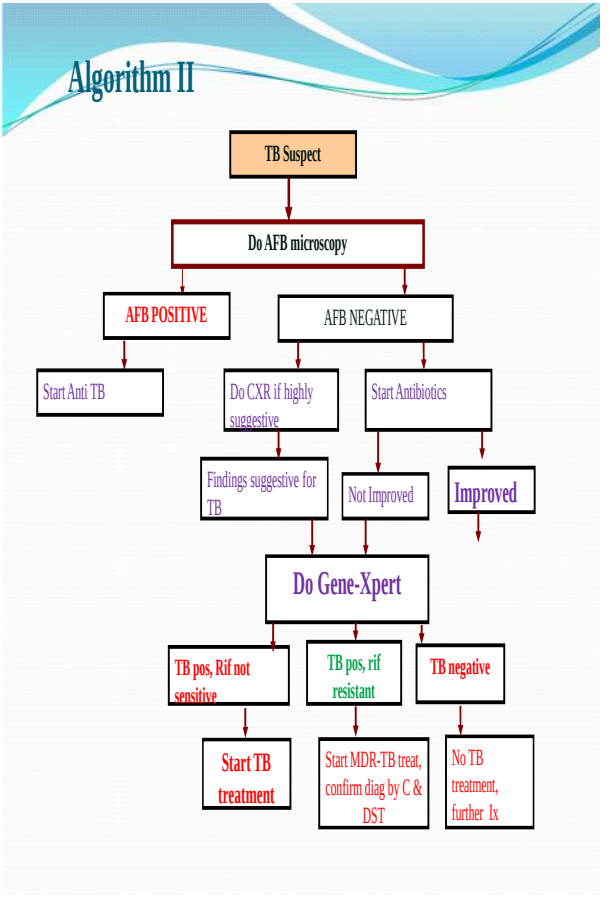
Symptoms of Extra-pulmonary Tuberculosis

- Constitutional symptoms and Sypmtoms specific to the organ involved

Diagnosis

Indications for expert examination

- MDR-TB suspects (re-treatment cases before the start of treatment in Cat II, symptomatic contacts of MDR-TB case)
- Sputum positive at 3 months in Cat I and cat II
- HIV positive Tb patients
- Symptomatic HIV positive cases
- Sputum smear negative with persistent symptoms after a course of antibiotics & /or with abnormal X-ray, attending the Xpert sites
- Extrapulmonary TB cases
- All diabetes patients


Algorithm II
TB Suspect
Do AFB microscopy
AFB POSITIVE
AFB NEGATIVE
Start Anti TB
Do CXR if highly suggestive
Start Antibiotics
Findings suggestive for TB
Not Improved
Improved
Do Gene-Xpert
TB pos, Rif not sensitive
TB pos, rif resistant
TB negative
Start TB treatment
Start MDR-TB treat, confirm diag by C & DST
No TB treatment, further Ix

Routinely Available diagnostic tools

- Sputum smear microscopy
  - Cheap, feasible in periphery, diagnose infectious cases fast
  - Low sensitivity (60%), does not detect resistance
- X-ray chest
  - Sensitive, quick
  - Costly, low specificity/ reliability
- Tuberculin skin test
  - Diagnosis infection and not diseases, additional tool for children
  - Positive test doesnot confirm disease and negative does not rule out TB, not for adults
- Culture and Drug-sensitivity test (DST)
  - Highly sensitive (>95%), highly specific, detects resistance
  - Liquid culture is relatively faster than sold
  - Requires big set-up, training, bio-safety, takes long time to give (2-3 months), costly, specifically for national/regional lab

Note: If the patient was recently treated for TB, the Xpert MTB/RIF test could be falsely positive. Send sputum for smear microscopy and culture instead.

In all patients, with a history of TB, send a sputum specimen for culture and sensitivity.

Definitions of Pulmonary TB Suspect
Table Definition of presumptive TB

In adults and adolescents	
In non-high risk groups	*In **high risk groups** (HIV positives, diabetics, contacts of DR,RR, EPTB)*
TB suspect refers to individuals who have cough for more than 2 weeks, fever, loss of weight or night sweats	TB suspect refers to individuals who have current cough, fever, loss of weight or night sweat
In children	
In non-high risk groups	In high risk groups (HIV positives, diabetics, contacts, EPTB)
TB suspects refers to individuals who have cough and fever for more than 2 weeks, weight loss or failure to thrive and history of contact with pulmonary TB case in last 2 years	TB suspects refers to individuals who have poor weight gain, fever or current cough and history of contact with pulmonary TB case in the last 2 years.

Recommended methods for diagnosis of pulmonary TB

1. Sputum smear microscopy

- Under the National TB Programme, 24 hours 3 sputum sample collection is the primary tool for diagnosing pulmonary tuberculosis.

- All TB suspects including children those who can produce sputum, should be examined for smear microscopy.

Number of bacilli seen	Oil immersion field	Grading of results
No AFB	Per 100 oil immersion field	Neg.
1-9 AFB	Per 100 oil immersion field	Scanty
10-99 AFB	Per 100 oil immersion field	1+
1-10 AFB	Per 1 oil immersion field	2+
>10AFB	Per 1 oil immersion field	3+

Indications for culture

- Scheduled follow-up of Drug-resistant TB patients while on 2 nd line treatment

Drug susceptibility test (DST) - Susceptibility tests are used to determine the susceptibility or resistance of a patient's bacillary strains to the different anti-tuberculosis drugs

Indications for culture and DST

- MDR-TB suspects (Sputum non-converters at 3months during treatment cat I, all sputum positive re-treatment cases before start of Cat II, symptomatic contacts of MDR-TB patients) with Rifampicin resistance detected on Xpert MTB/RIF

- TB suspects among high risk groups (HIV pos. diabetics, MDR-TB contacts, prisoners) with Rifampicin resistance detected on Xpert MTB/RIF

3. X-ray chest

X-ray chest is sensitive, quick and convenient but less reliable than sputum microscopy.

Indications for X-ray

- In high risk TB suspects, when all three pre-treatment sputum smear results are negative and there is no response to antibiotics
- When EP TB (e.g. pleural effusion, pericardial effusion etc.) is suspected
- Add on test to diagnose TB in children
- If suspecting complications (e.g. pneumothorax, repeated haemoptysis etc.)
- Pre-treatment and on treatment (at regular interval) evaluation of MDR-TB patient

4. Tuberculin test

Tuberculin skin test has limited value in clinical work, especially where TB is common.

Indications for Tuberculin test

- To help in diagnosing TB in children
- In HIV positive patients, after screening for TB symptoms, TST is done and INH preventive therapy is initiated among TSTpositives.

6. Gene expert

- Detects TB as well as Rifampicin resistance in 2 hours.
- The sensitivity of diagnosing TB is >90% in sputum smear positive TB but about 70% in sputum negative, culture positive TB.
- Specificity remains high at >99% for diagnosing TB as well RFM resistance.

Case definitions
B***acteriologically*** confirmed and/or clinicallydiagnosed, and relapsTB case (Pulmonary and extrapulmonary).

B. Classification Based On Historyof Previous Tb Treatment

- **B1**. New,
- **B2.1** Relapse
- **B2.3** Treatment after failure
- **B2.4** Treatment after loss to follow-up
- **B2.5** Othersexample any thing that does not fit to the above clacification……..
  - **Transfer in-**Registered to continue treatment from another HF.
  - **and transfer out**continue treatment in another HF until S/he finishes treatment and with known out come,reported to where the case was diagnosed and refered.
  - if no feedback of his treatment follow up and out comeclacified as **not evaluated.)**.

General Principles of tuberculosis Management

The strategy is DOTS

- If more than two doses of treatment are missed, extra effort should be made to identify and manage any problems the patient might have.
- Early case finding and adequate treatment of tuberculosis patients is the corner-stone of tuberculosis control.
- Supervised Rx, monitoring, and evaluation
- Uninterupted drug suply
- Councelling and pt educaton (on diagnosis, during treatment and after treatment)
- Contact tracing prophylaxis to children<5
- Quarterly bases cohort analysis

Drug Treatment Regimens

Administer the total daily amount of each medicine in one dose and not as divided doses. Refer To the NTCP Guidelines.

Important medicine interactions

- Rifampicin may reduce the efficacy of low dose combined oral contraceptives, resulting in possible unplanned pregnancies.
- Alter the oral contraceptive to a high dose preparation for the duration of TB treatment or use an injectable contraception or IUD.
- Use additional contraception in patients using a progestin-only subdermal implant for the duration of TB therapy.

- In patients on injectable contraceptives, it is not necessary to shorten the dose interval when using rifampicin or any other enzyme inducing medicine.

CAUTION: Antiretroviral medicines frequently interact with TB medicines. Consult the National Department of Health antiretroviral treatment guidelines.

Anti TB treatment are given in two phases

1. **An intensive phase for 2 or 3 months**
   DOTs, and If patients cannot be observed they should be hospitalized for the intensive phase.
2. **A continuation phase of 4 months is also DOTS observed at home by community health providers or HW or family members.**

Essential first line anti-TB drugs and recommended daily doses for adults
Table First line drugs and dosages

Drug	Dose and range (mg/kg body weight)	Maximum (mg)
Isoniazid	5 (4- 6)	300
Rifampicin	10 (8- 12)	600
Pyrazinamide	25 (20- 30)	
Ethambutol	15 (15- 20)	
Streptomycin	15 (12- 18)	

Standardized Treatment Regimens
Cat I (Initial regimen): **2RHZE/ 4RH**

Dosages of Cat I drugs as per weight bands

Pre-treatment body weight kg	**Two months initial phase**	**Four months continuation phase**	
	RHZE (150/75/400/275)	RH(150/75)	RH(300/150)
30–37 kg	2 tablets	2 tablets	
38–54 kg	3 tablets	3 tablets	
55–70 kg	4 tablets		2 tablets
≥71kg	5 tablets		2 tablets
R- Rifampicin, H- Isoniazid, Z- Pyrazinamide, E- Ethambutol			

- Keep strictly to the correct dose and the duration of treatment.
- Weigh patient monthly and adjust the dose according to current weight.

Table - Dosages of Cat II drugs as per weight bands

Weight bands	**Intensive phase: 3 months**			**Continuation phase: 5 months**	
	Month 1 and Month 2		**Month 3**		
	RHZE 150/75/400/ 275 mg	**S** 1000 mg	**RHZE** 150/75/400/ 275 mg	**RH** 150/75 mg	**E** 400 mg
30-39 kg	2 tabs	500 mg	2 tabs	2 tabs	1.5 tab.
40-54 kg	3 tabs	750 mg	3 tabs	3 tabs	2 tab,
55-70 kg	4 tabs	1000 mg	4 tabs	4 tabs	3 tab.
>70 kg	5 tabs	1000 mg	5 tabs	5 tabs	3.5 tab
R- Rifampicin, H- Isoniazid, Z- Pyrazinamide, E- Ethambutol, S= Streptomycin					

Pulmonary Tuberculosis (TB) In Children

Most children acquire tuberculosis from infected adults by inhalation. Malnourished, immunosuppressed (HIV and AIDS) children and children< 5years of age are at increased risk for pulmonary tuberculosis.

Diagnosis

Any child presenting with symptoms and signs suggestive of pulmonary TB is regarded as a case of TB if there is:

- A chest X-ray suggestive of TB, **AND/OR**
- History of exposure to an infectious TB case and/or positive tuberculin skin test (TST) e.g. Mantoux.
- A positive Xpert MTB/RIF and/or smear microscopy and/or culture, on early morning gastric aspirate or induced sputum, confirms TB disease.

Signs and symptoms include:

» unexplained weight loss or failure to thrive,
» unexplained fever for ≥ 2 weeks,
» chronic unremitting cough for > 14 days,
» lymphadenopathy (especially cervical, often matted),
» hepatosplenomegaly,
» consolidation and pleural effusion.

Tuberculin skin test (TST), e.g. Mantoux.

A positive test: TST induration > 10 mm.

» A TST may be falsely negative in the presence of:

- malnutrition, immunodeficiency, e.g. HIV and AIDS, immunosuppression, e.g. steroid therapy,
- cancer chemotherapy and,

- following overwhelming viral infection, e.g. measles or post vaccination
  - In these circumstances a TST induration > 5 mm may be regarded as positive.
  - Frequently, the TST will be non-reactive in these cases.
  - TB treatment should be considered, despite a negative TST.

The following may be evident on chest X-ray:
Direct or indirect evidence of hilar or mediastinal adenopathy with or without parenchymal opacification and/or bronchopneumonia

TB Chemoprophylaxis/Isoniazid Preventive Therapy (IPT) In Children

Consider TB chemoprophylaxis/isoniazid preventive therapy (IPT) in all children exposed to a pulmonary TB contact.
Exclude active TB (i.e. no signs or symptoms suggestive of TB).

- Refer to Section: Pulmonary tuberculosis in children.
- If any signs or symptoms of pulmonary TB are present, refer for chest X-ray.
- Never give IPT to children with active TB.
- **Pharmacological Treatment**
  Isoniazid, oral, 10mg/kg daily for 6 months.
  Max.dose: 300 mg daily.

Weight kg	Daily isoniazid (INH) 100 mg tablet
>2-3.4 kg	¼ tablet
>3.5- 6.9 kg	½ tablet
>7 – 9.9 kg	1 tablet
>10–14.9 kg	1½ tablet
>15–19.9 kg	2 tablets
>20–24.9 kg	2½ tablets
>25 kg	3 tablets

Children with HIV or malnutrition or existing neuropathy

ADD

- Pyridoxine, oral, 12.5 mg daily for duration of prophylaxis.

Recommended dose ranges in mg/kg Cat I or CatIII		
	Daily(mg/kg)	**Maximum daily dose**
H	10–15	300 mg
R	10–20	600 mg
Z	30–40	2 g
E	15-25	1200 mg

Uncomplicated Pulmonary TB

Includes smear negative pulmonary TB with no more than mild to moderate lymph node enlargement and/or lung field opacification, or simple pleural effusion on chest x-ray.

2-4 monthsChildren ≤ 8 years of age

	2 months intensive phase given daily			4 months continuation phase given daily
Weight kg	RH	Z		RH
	60/60	150 mg* OR150mg/3 mL	500mg	60/60
2–2.9 kg	½ tablet	1.5 mL	expert advice on dose	½ tablet
3–3.9 kg	¾ tablet	2.5 mL	¼ tablet	¾ tablet
4–5.9 kg	1 tablet	3 mL	¼ tablet	1 tablet
6–7.9 kg	1½ tablets		½ tablet	1½ tablets
8–11.9 kg	2 tablets		½ tablet	2 tablets
12–14.9 kg	3 tablets		1 tablet	3 tablets
15-19.9 kg	3½ tablets		1 tablet	3½ tablets
20–24.9 kg	4½ tablets		1½ tablet	4½ tablets
25–29.9 kg	5 tablets		2 tablets	5 tablets

* For each dose, dissolve 150 mg dispersible (1 tablet) in 3 mL of water to prepare a concentration of 50 mg/mL (150 mg/3 mL)

Note: Give Z 150 mg or 500 mg, and not both.

AND

Children > 8 years and adolescents

Pre-treatment body weight kg	**2 months intensive phase given daily**	**4 months continuation phase given daily**	
	RHZE (150,75,400,275)	RH (150,75)	RH (300,150)
30–37 kg	2 tablets	2 tablets	
38–54 kg	3 tablets	3 tablets	
55–70 kg	4 tablets		2 tablets
>71 kg	5 tablets		2 tablets

Complicated Pulmonary Tb

- Includes all other forms of pulmonary TB, such as smear positive TB, cavitation pulmonaryTB, bronchopneumonic TB, large lesion pulmonary TB, tuberculous empyema.
- Refer all cases of miliary TB for exclusion of TB meningitis.

Children ≤ 8 years of age

Intensive phase:

Standard dose 4-drug therapy daily (RHZE) for 2 months.

THEN

Continuation phase:

Standard dose 2-drug therapy daily (INH+rifampicin) for 4–7 months.

	Intensive phase: 2 months				**Continuation phase:4–7 months***
Weight kg	**RH**	**Z**		**E**	**RH**
	60/60	150 mg** OR150 mg/3 mL	500mg	400 mg tablet OR 400 mg/8 mL* solution	60/60
2–2.9 kg	½ tablet	1.5 mL	Expert advice on dose	1 mL	½ tablet
3–3.9 kg	¾ tablet	2.5 mL	¼ tablet	1.5 mL	¾ tablet
4–5.9 kg	1 tablet	3 mL	¼ tablet	2 mL	1 tablet
6–7.9 kg	1½ tablet		½ tablet	3 mL	1½ tablets
8–11.9 kg	2 tablets		½ tablet	½ tablet	2 tablets
12–14.9 kg	3 tablets		1 tablet	¾ tablet	3 tablets
15–19.9 kg	3½ tablets		1 tablet	1 tablet	3½ tablets
20–24.9 kg	4½ tablets		1½ tablet	1 tablet	4½ tablets

25–29.9 kg	5 tablets		2 tablets	1½ tablets	5 tablets

Note: Give Z 150 mg or 500 mg, and not both.

***Continuation phase may be prolonged to 7-12months in slow responders and children with HIV.

Children > 8 years and adolescents

body weight kg	**2 months intensive phase given daily**	**4 months continuation phase given daily**	
	RHZE(150,75,400,275)	**RH** (150,75)mg	**RH** (300,150mg
30–37 kg	2 tablets	2 tablets	
38–54 kg	3 tablets	3 tablets	
55–70 kg	4 tablets		2 tablets
>71 kg	5 tablets		2 tablets

AND

If HIV-infected, malnourished or have existing neuropathy:

Pyridoxine, oral, 12.5 mg daily for 6–9 months.

- Weigh at each visit and adjust treatment dosages to body weight.
- Keep strictly to the correct dose and the duration of treatment.
- The patient should be weighed regularly and the dose adjusted according to the current weight.

NOTE
If Ethambutol is to be given for more than 8 weeks, reduce to 15 mg/kg body weight. Ethambutol is recommended by WHO global report updated for children use.

Referral

- Disseminated forms of TB.
- All patients who cannot be managed on an ambulatory basis.
- Children< 12 years of age for a chest X-ray for diagnostic purposes.
- Retreatment cases of children.
- Children who are contacts of patients with open MDR or XDR TB.

Types of adult TB patients and allotment of treatment

All new TB cases (pulmonary and extra-pulmonary) are given Cat I regimen.

Some forms of extra-pulmonary TB cases like, TB of the central nervous system, bone or joint require longer duration of treatment and provided extended Cat I regimen (2HRZE/10RH) for 12 months using same weight bands.

All previously treated cases (re-treatment) should have their one sputum sample sent for Xpert MTB/RIF and if no RFM resistance detected, then started on Cat I regimen. In case of RFM resistance detected on Xpert MTB/RIF, patient is started on empirical MDR-TB treatment and samples (two) sent for culture and

DST.The treatment is then adjusted according to the DST result

Monitoring during treatment

All patients are monitored at regular interval to assess their response to therapy by using following examinations.

Table 11 Follow-up schedule of Cat I and Cat II patients

New pulmonary TB case (Cat I)	
Follow-up examination	Time interval and guidance
Sputum smear examination	*Routinely*, at *2* months, *5* months and *6 months* - If all negative, patient is declared "cured" *If pos. at 2 months* - Continue treatment in continuation phase and repeat smear at 3 months *If pos. at 3 months* - Continue treatment and send sputum for Xpert MTB/RIF examination *If pos. at 5 months* *Stop treatment in Cat I and shift in Cat II and send sputum for Xpert MTB/RIF examination* Note: If Xpert MTB/RIF suggests resistance to RFM, shift patient to MDR-TB treatment and send sputum for culture & DST
Weight	Every month
X-ray chest	- Routinely, at 6 months if patient was initially diagnosed by X-ray - Anytime during treatment if suspected respiratory complications

Previously treated pulmonary TB case (Cat II)	
Follow-up examination	Time interval and guidance
Sputum smear examination	*Routinely*, at *3* months, *5* months and *8 months* - If all negative, patient is declared "cured" if initial sputum was positive and "completed" if initial sputum was negative *If pos. at 3 months* - Continue treatment in continuation phase and send sputum for Xpert MTB/RIF examination *If pos. at 5 months* - Continue treatment and send sputum for culture & DST *If pos. at 8 months and all –ve results R/o other (Chronic)* Note: If Xpert MTB/RIF suggests resistance to RFM, shift patient to MDR-TB treatment and send sputum for culture & DST
Weight	Every month
X-ray chest	- Routinely, at 8 months if patient was initially diagnosed by X-ray - Anytime during treatment if suspected respiratory complications

Symptom-based approach to managing side effects of anti-TB drugs

Side effects	Drug(s) probably responsible	Management
Major		
Skin rash with itching	Streptomycin, isoniazid, rifampicin,pyrazinamide	Stop responsible drug(s) and refer to clinician urgently
Deafness	Streptomycin	
Dizziness	Streptomycin	
Jaundice	Isoniazid, pyrazinamide,rifampicin	
Confusion	Most anti-TB drugs	
Visual impairment	Ethambutol	
Shock, purpura, acute renal failure	Rifampicin Rifampcin	
Decreased urine output	Streptomycin	

Minor		
Anorexia, nausea, abdominal pain	Pyrazinamide, rifampicin, isoniazid	Give drugs with small meals or just before bedtime, and advise patient to swallow pills with less water.If symptoms persist or worsen, consider the side-effect to be major and refer to clinician urgently
Joint pains	Pyrazinamide	Aspirin or non-steroidal anti-inflammatory drug, or paracetamol
Burning, numbness or tingling sensation in the hands or feet	Isoniazid	Pyridoxine 50–75 mg daily
Drowsiness	Isoniazid	Reassurance. Give drugs before bedtime
Orange/ red urine	Rifampicin	Reassurance

Treatment outcomes*(For definitionsof the following : Cured, Treatment Completed, Treatment failed, Died, Lost to follow up*
Treatment success: Is the sum of cured and treatment complete.
Treatment of Tuberculosis In Special Cases See latest national TB treatment manual (NATCOD)
1 Pregnancy: 2 Breastfeeding: 3 Oral contraceptives: 4 Liver disease: 5 Renal failure; 6 HIV/AIDS: 7 The role of adjuvant steroid therapy

7 Drug-resistant TB

Drug-resistant TB (DR-TB) threatens TB control and is a major public health concern in many countries.
DESCRIPTION - **MDR TB** is diagnosed when there is resistance to rifampicin and isoniazid.
XDRTB is diagnosed when there is resistance to rifampicin and isoniazid plus resistance to fluoroquinolones and an injectable medicine e.g. kanamycin.

Causes of DR-TB

- Although, there are microbial, clinical and programmatic reasons for the development of DR-TB, it is essentially a man-made phenomenon.
- From a microbiological perspective, resistance is caused by a genetic mutation that makes a drug ineffective against the mutant bacilli.
- From a clinical and programmatic perspective, it is due to an inadequate or poorly administered

treatment regimen that allows a drug-resistant strain to become the dominant strain in a patient infected with TB.

- Short course chemotherapy by first line drugs in DR-TB patient may have an amplified effect in creating more resistance to the drugs in use.
- Ongoing transmission of drug-resistant strains in a population is also a significant source of new drug-resistant cases.

As per the method of diagnosis

A Bacteriologically confirmed drug-resistant TB

1. Rifampicin-resistance (RR-TB)
2. Mono-resistance
3. Poly-resistance
4. Multidrug-resistance
5. Extensive drug-resistance

B. Presumptive drug resistant TB.

1. Rifampicin resistant (RR-TB)
2. Multidrug resistant (MDR-TB)

Definitions of treatment outcomes of RR-TB and MDR-TB

Cured,Treatment Completed,Treatment failed, Died,Loss of follow up andTreatment success

* The terms conversion and reversion of culture results are defined as follows:

Conversion (to negative): when two consecutive cultures taken at least 30 days apart are found to be

negative. In such case, the date of the first negative culture is used as the date of conversion.
Reversion (to positive): when, after an initial conversion, two consecutive cultures taken at least 30 days apart are found to be positive.

Case finding strategy

Early identification of MDR-TB suspects and their diagnosis and early treatment prevents mortality, morbidity and spread of drug-resistant TB strains in the community.

Treatment of DR-TB (All MDR and X- MDR patients are managed at spestility hospital so needs referal).

13.2 Leprosy

A chronic infectious disease caused by Mycobacterium leprae - an acid-fast bacillus. It mainly affects the skin and peripheral nerves and can affect all ages and both sexes.

It is transmitted from one person to another via the respiratory tract or skin.

Clinical features

- Presents with one or more skin patches (which are usually less pigmented than surrounding normal skin) with definite loss of sensation. Sometimes cases present with skin nodules or smooth, shiny diffuse thickening of the skin without loss of sensation
- Damage to peripheral nerves as evidenced by thickening and impairment of function

Classification of Leprosy

According to WHO classification, there are two major forms of leprosy:

1. **Pauci-bacillary (PB) or tuberculoid type of leprosy**
   - Patients with one to five leprosy skin lesions
   - Negative skin smear
2. **Multi-bacillary (MB) or lepromatous type of leprosy**
   - The bacilli are numerous and can spread to almost all parts of the body except the brain and spinal cord.
   - Patients with six or more leprosy skin lesions
   - Positive skin smear

Differential diagnosis

- Hypo-pigmentation e.g. birthmark, early vitiligo
- Fungal infections of the skin
- Other nodular conditions, e.g. Kaposi's sarcoma and neurofibromatosis
- Other causes of peripheral nerve damage, e.g. diabetes mellitus

Investigations

In most cases, a definite diagnosis of leprosy can be made using clinical signs alone

At referral centre: Stain slit skin smears for Acid Fast Bacilli (AFB)

Note: Skin biopsies (which may also aid diagnosis) are not recommended as a routine procedure.

Pharmacological Treatment

1. Dosage (Adult MB)

- **Monthly Treatment:**
  - Day 1:Rifampicin 600mg (2x 300mg) **Plus** S:Clofazemine 300mg (3 x 100mg) **Plus** Dapsone 100mg

- **Daily Treatment: Days 2 – 28,**
  - Clofazemine 50mg**Plus**:Dapsone 100mg
  - Duration of treatment: 12 blister packs to be taken within a period of between 12-18 months
- **Dosage (Child MB 10 – 14 years)**
  - Monthly Treatment: Day 1; Rifampicin 450mg (3 x 150mg) **Plus** Clofazemin 150mg (3 x 50mg) **Plus** :Dapsone 50mg
- **Daily Treatment: Days 2 – 28**
  - Clofazemine 50mg every other day **Plus** Dapsone 50mg daily
  - Duration of treatment: 12 blister packs to be taken within a period of between 12-18 months

2. **Dosage (Adult PB**)

- **Monthly Treatment:**
  - Day 1**:** Rifampicin 600mg (2 x 300mg)**Plus**Dapsone 100mg
- **Daily Treatment: Days 2 – 28;**
  - Dapsone 100mg
  - Duration of treatment: 6 blister packs to be taken within a period of between 6-9 months

- **Dosage (Child PB 10 – 14 years)**
  - Monthly Treatment: Day 1
  - Rifampicin 450mg (3 x 150mg) **Plus** Dapsone 50mg
- **Daily Treatment: Days 2 – 28**
  - Dapsone 50mg daily
  - Duration of treatment: 6 blister packs to be taken within a period of between 6-9 months

3. Duration of MDT

Paucibacillary leprosy

- Patients should receive 6 doses to be taken within a maximum period of nine months.
- When collecting the 6th dose the patient should be released from treatment (treatmentCompleted)
- Every effort should be made to enable patients to complete chemotherapy. A patientwhose treatment is cumulatively interrupted for more than three 'months' or patient whohas missed three doses of MDT in a total and hence cannot complete the 6 doses within9 months, should be recommended as defaulter
- If a defaulter returns later to the clinic, s/he should be given ONE- second course of Multbacillary leprosy
- MB patients should receive 12 doses to be completed within a maximum period of

18months. When collecting the 12th dose of MDT the patient should be released from treatment (treatment completed)

- Patient who fail to collect the 12 doses of MDT within 18 months should given ONE second chance to complete a full course of Blister Pack.The procedures for asecond course fo MB

Note 1

- A patient whose treatment is cumulatively interpted for more than six ‘months’ or Apatient who has missed 8 doses of MDT in total and hence cannot complete the 12 doses within 18 months, should be recorded as defaulter
- When a defaulter report at a clinic, a second course of MDT should be started after the importance of regular treatment has been discussed with the patient
- Patients who restart the treatment must be registerd Leprosy Register again with a new number as return after default and thus should be included in another treatment cohort for assessing completion of treatment
- Every effort should be made to ensure that patients complete the second course of MDTas recommended

- After completion of the second course of MDT the patient should be recorded as treatment completed

Note 2

- Treatment should continue for a full 12 months
- In MB Leprosy, never use rifampicin alone or in
- combination with dapsone without a third bactericidal
- drug because of the high prevalence of primary or
- secondary dapsone resistance, and the subsequent
- high risk of developing rifampicin resistance
- Prevention
- Early reporting of cases and effective treatment
- BCG vaccination may be helpful

Treatment in special cases

- Pregnancy: The standard MDT regimens are considered safe, both for mother and child and should therefore be continued during pregnancy.
- Tuberculosis: Patients suffering from both tuberculosis and leprosy require appropriate anti-tuberculosis therapy in addition to the MDT. Rifampicin must be given in the dose required for the treatment of tuberculosis. Once the intensive phase of anti TB treatment is completed, the patient should continue with his/her monthly rifampicin for leprosy treatment.

- HIV/AIDS: The management of a leprosy patient infected with HIV is the same as that for any other patient. The response and cure rate of HIV positive patient is the same as in other patients. The management, including treatment reactions, does not require any modifications.
- rate of HIV positive patient is the same as in other patients. The management, including treatment reactions, does not require any modifications.

14. MUSCULOSKELETAL &JOINT DISORDERS

14.1 Arthralgia

Arthralgia is joint pain without swelling, warmth, redness or systemic manifestations such as fever. It is usually self-limiting. It may be an early manifestation of degenerative joint conditions (osteoarthrosis) or local and systemic diseases. It may follow injuryto the joint, e.g., work, play and position during sleep. Suspect rheumatic fever in children, especially if arthralgia affects several joints in succession.

GENERAL MEASURES
Advise patient to:

- Apply heat locally to the affected joint, taking precautions not to burn oneself,
- exercise after relief from pain,
- reduce weight, if overweight, to decrease stress on the join
- Exclude other causes.
- Reassure patient.

Pharmacological Treatment
•**Paracetamol,** oral, Children10–15 mg/kg/dose 6 hourly when required. Adults 1 g, 6 hourly when required.
•**diclophenac gel 1%**, topical, applied to affected areas may be considered in selected patients.
Treat for 1 week (maximum 2 weeks) provided no new signs develop.

Referral

- Pain for 1 week in children, and pain for > 2 weeks in adults.
- Recurrent pain. » Severe pain. » Neurological signs.
- Backache with radiation to one or other lower limb.
- Signs of arthritis (swelling, redness, tender on pressure, warmth).
- Fever.

14.2 Inflammatory Conditions

General Guidelines

- The first line treatment for most of these conditions is a non-steroidal anti- inflammatory drug (NSAID). This group includes Aspirin, Indomethacin, Ibuprofen, diclofenac but does **NOT** include Paracetamol
- NSAIDs should be used cautiously in pregnancy, the elderly, and patients with asthma and liver or renal impairment
- NSAIDs should be avoided in patients with current or past peptic ulceration.
- NSAIDs should be taken with food
- If dyspeptic symptoms develop in a patient on NSAIDs, try adding alluminium magnesium hydroxide mixture. If dyspepsia persists and NSAID

use considered essential, use famotidine or omeperazole oral.

- Physiotherapy is a useful adjunct treatment in many inflammatory joint conditions
- Refer patients with serious rheumatic disease and peptic ulceration for specialist help.

14.2.1 Arthritis, Rheumatoid

Description

Rheumatoid Arthritis (RA) is a chronic, inflammatory, systemic condition of fluctuating course and of unknown etiology.

In the majority of patients with RA, the onset is insidious with joint pain, stiffness and *symmetrical* swelling of a number of peripheral joints

It may affect many organs, predominantly joints with:

- Swelling or fluid, affecting *at least 3 joint areas* simultaneously.
- Rheumatoid nodules occur most frequently on extensor surfaces of the forearm.
- Pain.
- Limited movement with morning stiffness for longer than 30 minutes, which improves with activity. This distinguishes osteoarthrosis from rheumatoid arthritis.
- Destruction of affected joints.

- Mainly affects the small joints of the fingers and hands with the exception of the distal interphalangeal joints, although any joint can be involved.
- The distribution is symmetrical.

Causes
Autoimmune disease
Investigations
•Rheumatoid Factor •Antinuclear antibodies (ANA)
• FBC •ESR •X-ray of affected joints

Treatment Objectives
•To reduce pain, swelling and stiffness
•To prevent deformities
•To delay disease progression and onset of long term complications

Non-pharmacological treatment
• Rest of affected joints; Physiotherapy; Nutritious diet

Pharmacological treatment
Diclofenac, oral, 50 mg 8 hourly or as required ***OR***
OR
Diclofenac suppositories, 100 mg 12 hourly, or as required.

NOTE: Patients with intractable symptoms may require special treatment at specialists centre.

Rheumatoid Arthritis should be treated in the tertiary hospitals, as early as possible, with disease modifying anti-rheumatic drugs (DMARDs) to control symptoms and delay disease progression.DMARDs (from the ENLM, include:methotrexate, sulphasalazine and corticosteroids.

14.2.2 Juvenile Rheumatoid Arthritis

Rhumatoid arthritis in children may present in one of three forms:

1. Systemic onset arthritis (Still's disease)
2. Polyarticular onset arthritis
3. Pauci-articular onset arthritis

Causes

- In most no known cause.
- Autoimmune disease

1 Systemic Onset Arthritis

This may occur at any age (mostly at 2-4 years old). It may also occur in young adults (early 20s).

Symptoms

- Joint pain • Malaise

Signs

- Swinging fever
- Rash maculopapular, especially on the torso
- Lymphadenopathy common
- Hepato-splenomegaly may be present
- Arthritis involving multiple joints

2 Polyarticular Onset Arthritis

This *typically involves five or more joints*; usually the small joints.
Rheumatoid factor is positive in older girls in whom the disease course is similar to the adult type.

3 Pauci- articular Onset Arthritis

Commonest type of juvenile rheumatoid arthritis (50 %)
Symptoms
Joint pain

Signs
Less than five joints affected

- Usually asymmetrical; large joints of lower extremities. Occasionally single joint (proximal interphalangeal joint) and swollen knee may be the only joints affected.
- There is a high tendency to develop uveitis

Investigations
- FBC, differential • ESR • Rheumatoid factor
- X-ray of affected joints
- Anti Nuclear Antibodies (ANA) - often positive in pauci-articular
- Slit lamp examination to be done every six months- for pauci-articular

Treatment objectives

- To control inflammation and pain
- To prevent deformities and growth retardation
- To control extra articular complications

Treatment

Non-pharmacological treatment

- Physiotherapy to maintain full joint movement
- Psychotherapy

Pharmacological treatment

For pain

- Ibuprofen, oral,
  Adult: 400 mg 8 hourly
  Children: >7kg; 10 mg / kg 6-8 hourly **Or**
  Diclofenac gel, topical, Apply 12 hourly

Refer

All suspected cases in children should be referred to a pediatrician after giving antpain medicines.

Systemic Lupus Erythematosus

Systemic lupus erythematosus (SLE) is a multisystem autoimmune disease of unknown etiology. It is commoner in women and occurs at a peak age of 15-25 years.

This is a complex disease with variable presentations, progression of disease and prognosis. It is characterized by remissions and flares. Due to the systemic nature of the disease there is a need for the involvement of multiple medical specialists in the care of these patients.

Causes

- Autoimmune

Symptoms

- Malaise, weight loss
- Hair loss,
- Fever
- Joint pain
- Arthritis
- Anaemia
- Lymphadenopathy
- Alopecia
- Oedema from renal involvement
- Photosensitive skin eruptions (butterfly rash on the nose, bridge and cheeks)
- Psychiatric manifestations

Investigations

- FBC • ESR • LE cells • BUE, Creatinine
- Urinalysis; Antinuclear antibodies (ANA)
- Anti DNA antibodies

Treatment

Treatment objective

- To relieve symptoms • to suppress manifestations

Non-pharmacological treatment

- Adequate rest
- Avoidance of exposure to sunlight in photosensitive patients

Pharmacological treatment

- Ibuprofen, oral, 400 mg 8 hourly

REFER

Refer all patients for physician specialist care.

14.2.3 Gonococcal Arthritis

In gonococcal arthritis, joint involvement may be asymmetrical and polyarticular. The symptoms and signs are similar to those of non-gonococcal arthritis. Additional features include rash (macular, vesicular or pustular), tenosynovitis and urethral discharge.

Causes

- Neisseria gonorrhoeae

Investigations

- Culture of urethral discharge, skin or genital lesions

Treatment

Treatment objectives

- To relieve pain
- To treat infection,
- To prevent joint damage

Non-pharmacological treatment

- Rest the affected joint e.g by splinting or traction during theacute phase
- Joint aspiration

Pharmacological treatment

Ciprofloxacin, oral,

Adult: 500 mg 12 hourly for 14-21 days, **OR**

Ceftriaxone, IV,

Adult: 1 g 12 hourly
Children: 50 - 75 mg/kg 12 hourly
Neonates: 25 mg/kg 12 hourly

Note -Because of high prevalence of co-existent chlamydia infection concomitant therapy with oral

doxycycline 100 mg 12 hourly should be provided for 10-14 days

Note: The first two medicines indicated are level 3 and above and may be available in the tertiary hospitals..

REFER - to appropriate specialist if not responding to treatment.

14.2.4 Arthritis, Septic

It is an acute infective condition involving one or more joints.

The joint is hot, swollen, very painful and with restricted movements.

Signs of systemic infection, including fever, are usually present. The infection is usually blood borne, but may follow trauma to the joint. The course may be acute or protracted. A wide spectrum of organisms is involved, including staphylococci and N. gonorrhoea.

Note: haemophiliacs may present with an acute arthritis similar to septic arthritis.

This is due to bleeding into a joint and not due to infection.

NOTE: All patients for confirmation of diagnosis and surgical drainage should be referred urgently.

Children with suspected septic arthritis should be assessed for evidence of septicaemia and septicaemic shock, which should be treated accordingly

Pharmacological Treatment

Infant ≤ 2 months of age, who fulfill the IMCI criteria for “possible serious bacterial infection” should receive

a first dose of **ceftriaxone**and other IMCI urgent care while arranging transfer.
• **Ceftriaxone,** im, 80 mg/kg/dose immediately as a single dose.
Do not inject more than 1 g at one injection site.
Treat shock if present, while preparing for transfer.

14.3 Gout

1. Gout, Acute

It is a metabolic disease in which uric acid crystal deposition occurs in joints and other tissuesof crystals of monosodium urate from supersaturated hyperuricaemic body fluids.
Gout commonly occurs in ***men > 40 years*** of age and in postmenopausal women.

Symptoms

- The main clinical features are those of an acute gouty arthritis, often nocturnal, throbbing crushing or excruciating
- The signs resemble an acute infection with swelling, hot red and very tender joints.
- The first metatarsophalangeal joint of the big toe is frequently involved but the inflammation may extend beyond the joint.

Investigations
Increased serum uric acid level.
However, the serum uric acid level may be normal during acute attacks.

Treatment objectives

•Termination of acute attack
•Prevention of recurrence
•Prevention of further deposition of urate crystals.

General measures

- Immobilise the affected joint during the acute painful attack.
- Increase (high) fluid intake. »
- Avoid alcohol,
- Avoid aspirin
- Avoid eating red meat especially roasted
- Avoid diuretics

Pharmacological Treatment

- **Ibuprofen**: give 400 – 800 mg every 8 hours Alternatively,
- **Indomethacin:** start with 75 mg oral,(with food) then 50 mg every 6 hours until 24 hours after relief of pain. Reduce dose to 50 mg every 8 hours for 3 doses then 25 mg every 8 hours for three doses, **OR,**
- **Diclofenac sodium** 75 mg hourly. Continue as long as necessary**. OR**
- **Colchicine*:*** give1 1.0mg stat followed by 0.5mg every 2 hours orally until patient improves or a maximum of 10 mg is taken or gastrointestinal tract side effects develop.

Prevention of recurrence

- Institute prophylactic indomethacin
- In obese patient, reduce weight
- Avoid precipitants e.g. alcohol

- Institute anti-hyperuricaemic therapy e.g. **allopurinol**give 100 mg every 8 or 12 hours to reduce uric acid synthesis and prevention or reversal of deposition of uric acid crystals in males. Aim is to maintain serum uric acid level below 8 mg/dl (0.48 mmol/1)

Referral

- No response to treatment.
- for confirmation of diagnosis, if in doubt
- patients with chronic kidney disease
- Patients with suspected secondary gout (e.g. hematological malignancies).

Note:

- Patients with suspected metabolic syndrome often have impaired renal function and the use of NSAIDS has safety implications.
- Gout may be secondary to other medical conditions, e.g., haematological malignancies.
- Gout may co-exist with hypertension, diabetes mellitus (as a risk factor for Degenerative vascular disease) and chronic renal disease. The pharmacological treatment of these conditions could precipitate gout.

2 Gout, Chronic

Gout with one or more of the following:

- uric acid deposits in and around the joints and cartilages of the extremities (tophi)

- initial involvement of the first metatarso-phalangeal joint in the majority of patients
- involvement of the instep, ankle, heel and knee
- involvement of bursae (such as the olecranon)
- significant periarticular inflammation
- serum uric acid over 0.5 mmol/l
- bone destruction
- prolongation of attacks, often with reduction in pain severity
- incomplete resolution between attacks

General measures

- If possible, avoid known precipitants and medicines that may increase uric acid, e.g. low dose aspirin, ethambutol, pyrazinamide and diuretics, especially hydrochlorothiazide at a dose of ≥ 25 mg/day.
- encourage weight loss.
- avoid alcohol.

Treatment

Uric acid lowering therapy is required in all of the following:

- 2 acute attacks per year
- urate renal stones
- chronic tophaceous gout
- urate nephropathy

When the acute attack has settled completely, i.e. usually after 3 weeks: Give

- **Allopurinol, oral,** 100 mg daily; Increase monthly by 100 mg according to urate blood levels. Titrate dose to reduce serum urate to < 0.3 mmol/l. Average dose: 300 mg/day. Maximum dose: 400 mg daily.
- The elderly and patients with renal impairment require lower doses.

Referral

- Suspected secondary gout.
- No response to treatment.
- Non-resolving tophaceous gout.

14.4 Osteoarthrosis (Osteoarthritis)

Description

It is a common form of arthritis, characterized by degenerative loss of articular cartilage, subschondral bony sclerosis, and cartilage and bone proliferation subsequentto osteophyte formation. Cause is unknown, but genetic, metabolic and biomechanical have been suggested.

Gradual onset of one or a few joints involved.

Signs and symptoms include:

•Pain

•morning stiffness, lasting < 30 minutes

• Limited movement

•joint swelling

Symptoms

Pain is the commonest symptom

Specific clinical features depend on the joint involved e.g. Enlargement of distal interphalangeal joint (Bouchard's nodes)

General measures

Patient and family education on:

- Rest the joint.
- Use crutches or walkers to protect weight bearing joints in severe cases.
- Crepe bandage or braces also can be worn during the active phase of disease.
- Reduction of weight in obese patients
- Physiotherapy and/or occupational therapy.– exercise to the affected joints

Pharmacological Treatment

Pain:

Aspirin 500-1000 mg orally every 6-8 hours with food

OR

Indomethacin 25 mg every 6-8 hours with food

OR

Diclofenac sodium (PO) 50 mg 8 hourly for 3 – 5 days.

CAUTION

Long-term use of NSAIDS has adverse effects on renal and cardiac function, the GIT and on joint cartilage.

NOTE: In severe cases surgery may be indicated e.g. hip joint replacement, knee replacement

Referral
All cases with:
•intractable pain,
•infection,
•uncertain diagnosis
•for consideration of joint replacement

14.5 Low Back Pain

Low back pain is a common presenting complaint especially among the elderly. It may be a mild, transient symptom or chronic and disabling complaint.

Causes
•Acute ligamentous (sprain) lesions
•Muscular strain
•Chronic osteoarthritis

Other causes include:

- Back strain due to poor posture worsened by mechanical factors like overuse, obesity and pregnancy
- A protruding or ruptured intervertebral disk
- Traumatic ligament rupture or muscletear
- Fracture
- Infection (e.g. tuberculosis or septic discitis)
- Malignancy e.g. metastases, multiple myeloma or spinal tumour, prostatic carcinoma
- Congenital abnormalities e.g., abnormal intervertebral facets, sacralization of L−5 transverse process

- Spondylolisthesis − i.e., slipping forward of a vertebra upon the one below
- Narrowed spinal canal from spinal stenosis
- Psychogenic pain: The back is a common site of psychogenic pain: Inconsistent historical and physical findings on sequential examination may make one suspicious of this diagnosis
- Fibromyalgia rheumatica, connective tissue diseases

Points of Distinction between Inflammatory and Mechanical Back Pain

	Inflammatory	Mechanical
ONSET	Gradual	Sudden
WORST PAIN	In the morning	In the evening
MORNING STIFFNESS	Present	Absent
EFFECT OF EXERCISE	Relieves pain	Aggravates pain

Features that suggest that back pain may be serious

•Recent onset;, Raised ESR;

Weight loss;

•Symptoms elsewhere e.g. chronic cough, weaknessof the lower limbs, incontinence etc

•Localized pain in the dorsal spine, and

•Fever

Investigation

•X-ray is common

•Full Blood Picture, ESR

•CT scan and/or MRI in case of spinal stenosis

Treatment for Acute low back pain

Non−pharmacological Treatment

Treat by relieving muscle spasm with bed rest in a comfortable position with hip and knees flexed; local heat and massage

Pharmacological Treatment

Analgesics:

A: Ibuprofen 400 mg oral 3 times daily for 3 to 7 days For severe pain

- Diclofenac 75 mg (I.M) 12 hourly by deep IM injection **OR**
- Diclofenac 50 mg rectal 8 hourly for 3 days **OR**
- Tramadol 50 mg (O) 8 hourly for 3 days.

Treatment for Chronic Low-back Pain

Non−pharmacological Treatment

Treat the cause, e.g. weight reduction in the obese, Improving muscle tone and strength through physiotherapy, improving posture. Depending on the cause, surgical procedures may be necessary, e.g. in disc disease or spinal stenosis.

Pharmacological Treatment

Analgesics are given for pain as above.

AVOID opioid analgesics. If symptoms persist, refer the patient.

Treatment of Psychogenic pain

•Reassurance is needed

•Explore causes
•Treat depression if appropriate
•Physical therapy may be helpful
•Give analgesics but AVOID narcotic analgesics

At Referral level
Several investigations including X-ray, CT-SCAN, MRI, serum uric acid etc. should be performed according to specialist protocol. Treatment may still be non-surgical as above or otherwise. For radicular pain in chronic low back pain give:
Vit B1+B6+B121tablets 12 hourly

14.6 Infections of the Bones and Joints

14.6.1 Osteomyelitis

Osteomyelitis denotes infection of the bone and is most common in children under 12 years. Staphylococci are the most frequent responsible organisms.
Salmonella osteomyelitis infection is a common complication of sickle cell anaemia. Tuberculous osteomyelitis occurs in association with having tuberculosis

Diagnosis
Common symptoms are:

- fever, malaise and severe pain at the site of bone infection
- if the infection is close to a joint there may be a 'sympathetic' effusion

Types of bone infection and treatment

Condition	Treatment	Duration
Acute Osteomyelitis	Surgical dranage recommended **cloxacillin(iv**) or **clindamycin**	6 wks or stop 3 wks if x-ray normal
Chronic Osteomyelitis	Surgery,antibiotics generaly not recomended	
Septic arthritis	Surgical drainage Cloxacilline or clindamycin	
Gonococal arthritis	Benzylpencillin(iv) or kanamycin(i.m)	6 days 7 days
Compound fracture	Cloxacilline(iv) or Clindamycin(iv) ceftraxone	3 days

Note: acute osteomyelitis

- Culture and sensitivity tests are essential to determine further treatment
- For osteomyelitis, treatment may be completed orally after 4weeks, if fever and toxicity have resolved.
  4 ESR useful as guide of efficacy of treatment

14.6.2 Tropical Pyomyositis

The cause of tropical pyomyositis is uncertain since abscesses explored early are sterile but later culture of the pus usually yields S. aureus.

Symptoms

The main clinical features are fever and painful induration of one or more of the large muscles, mostly in the lower limbs

Treatment

•Drain the pus from abscess and give:

Adults:

Erythromycin give 500 mg every 6 hours for 14 days;

OR

Flucloxacillin: give 500 mg every 6 hours for 14 days

Children

Erythromycin 10 mg/kg body weight every 6 hours for 14 days

OR

Chloramphenicol 500mg every 6 hours for 5-10 days; child 12.5 mg/kg per dose

15. NUTRITIONAL DISORDERS

Nutritional disorders can be caused by an insufficient intake of food or of certain nutrients; by inability of the body to absorb and use nutrients, or by over-consumption of certain foods.

The major nutritional disorders in ranking order, are:

1. *Protein-energy malnutrition* (deficiency of carbohydrates, fats, protein)
2. *Nutritional anaemia* (deficiency of nutrients that are essential for the synthesis of red blood cells i.e iron, folic acid and vitamin B12
3. *Iodine deficiency disorders* (deficiency of iodine which is important for the synthesis of the thyroid hormones), and
4. *Vitamin A deficiency*.

Other disorders do exist, though are of less public health significance. These include:

- Overweight/obesity,
- Disorders associated with various vitamin deficiencies, and,
- Disorders associated with deficiency of some trace minerals

15.1 Protein-Energy Malnutrition (PEM)

This develops as a result of inadequate intake of carbohydrates, fats and protein. Deficiency of some micronutrients, particularly iron and vitamin A, become partly responsible for the signs of PEM. Infection also plays a role in the development of the features of PEM.

The population group most affected by PEM is children aged below five years. There are many ways of classifying PEM based on clinical and anthropometric feature.

Clinical forms of PEM

Underweight– is moderate malnutrition. Casually the child may appear normal, but on close examination, the child looks thinner and smaller than other children of the same age. Oedema is absent.
Marasmus– is severe malnutrition. The child shows remarkable failure of growth. He has very severe muscle wasting with flaccid, wrinkled skin and bony prominence. The child looks awake and hungry and displays what is referred to as 'old person's face'. Oedema is absent.
Kwashiorkor– is also severe malnutrition. There is failure of growth but the child is not as severely wasted as in marasmus. The abdomen is swollen (hepatomegaly due to fatty infiltration). The child shows hair changes (having turned brown, straight and soft) and rashes on the skin (flaky paint dermatitis). It is inactive, apathetic, irritable and difficult to feed. The child has bilateral oedema.

Marasmic-kwashiorkor– is acondition combining severe wasting (marasmus) and oedema (kwashiorkor). The child has other clinical features characteristic of marasmus and kwashiorkor.

[NB: Presence of oedema (of any grade) is considered severe malnutrition, regardless of the weight of the child].

Anthropometric features of PEM

PEM can be detected by use of anthropometry (body measurements). The following are the anthropometric indicators commonly used in describing PEM: height for age (Stunting), weight for height (wasting), weight for age (underweight), small body mass index (BMI) and small mid-upper arm circumference (MUAC).
The 3 forms of PEM

- **Stunting** – is low height for age. It reflects failure to receive adequate nutrition over a long period of time and is also affected by recurrent and chronic illness. It indicates chronic **malnutrition.**
- **Wasting** – is low weight for height. It reflects a rapid decline of weight while height has remained unchanged. Therefore wasting is **acute malnutrition** – a result of inadequate food intake or a recent episode of illness causing loss of weight and onset of malnutrition.
- **Underweight** – is low weight for age. This is a composite indicator which takes into account both **chronic and acute malnutrition.** That is, underweight is caused by either chronic malnutrition

(e.g. long period of illness or not having enough to eat) or acute malnutrition (due to diarrhoea, infection etc).

Each of the above types of nutrition can be divided into 3 levels of severity as seen in the table below using the WHO growth chart for determination of cut-off levels

Table 1: Anthropometric features of PEM

Malnutrition condition	Z – score (SD from median of the reference value)	Diagnosis
Stunting, **Wasting** or **Underweight**	Below -3 SD	Severe
	-3 SD to below – 2 SD	Moderate
	Below – 2 SD	Total malnutrition

Mid Upper Arm Circumference (MUAC):

MUAC is the circumference of the left upper arm, measured at the mid-point between the tip of the shoulder (acromium) and the tip of the elbow olecranon process).
Low MUAC measurement from 6 months -5 years shows acute PEM
MUAC is measured in cm; cut-off points are different for different population groups, as follows:

Population group	Severe under nutrition	Moderate under utrition	Total under-nutrition
Children 6/moths - 5 years	Below 11.5 cm	11.5 to 12.4 cm	Below 12.5 cm
Children 5 to 9 years	Below 13.5 cm cm	13.5 to 14.4 cm	Below 14.5 cm
Children 10 to 14 years	Below 16.0 cm	16.0 to 18.4 cm	Below 18.5 cm
Adolescents 15+ years, non-pregnant women, non lactating women, adult men.	Below 19.0 cm	19.0 to 21.9 cm	Below 22.0 cm
Pregnant women, lactating women from 0 to 6 months	Below 19.0 cm	19.0 to 22.9 cm	Below 23.0 cm

Body Mass Index (BMI):

BMI also is used for assessment tof nutritional status especially in adults. BMI relates weight to the body's surface area and is derived as follows: **Weight (in kg) ÷ height^2 (in meters**).

BMI thus provides a measure of the body mass, ranging from thinness to obesity. Categorization of BMI is as follows:

Table

BMI (kg/m ^{2})	Diagnosis
Below 16.0	Severe under-nutriton (thinness grade 3)
16.0 – 16.9	Moderate under-nutrition (thinness grade 2)
17.0 – 18.4	Mild under-nutrition (thinness grade 1)
18.5 – 24.9	Good nutritional status
25.0 – 29.9	Overweight (overweight grade 1)
30.0 – 39.9	Obesity (overweight grade 2)
40 or above	Severe obesity (overweight grade 3)

Malnutrition condition	Z – score (SD from median of the reference value)	Diagnosis
Wasting	Below -3 SD	Severe
	-3 SD to below – 2 SD	Moderate
	Below – 2 SD	Total malnutrition

15.2 Childhood Malunutrition

General

- Conduct anthropometric assessment
- Conduct appetite test
- Conduct medical assessment
- Admit to Outpatient therapy at CBT or referral to hospital

The steps and procedures for assessing and treating acute childhood malunutrition are discussed. The assessment of malnutrition is done in two steps:

- assessment for severe acute malnutrition and
- when severe acute malnutrition is present, assess for complications.

The assessment for malnutrition includes important steps.

- Look for signs of acute malnutrition : looking for visible severe wasting and looking for edema of both feet.
- Determine WFH/L is Weight-for-Height or Weight-for-Length determined by using the WHO growth standards charts).
- Measure MUAC in a child 6 months or older.

If WFH/L less than -3 z-scores or MUAC is less than 115 mm, then as patient has SEVERE PEM, then: Check for any medical complication present.

If no medical complications present:

- If Child is 6 months or older, offer RUTF*** to eat to see if able to finish RUTF portion (Appetite test).
- If Child is less than 6 months, assess breastfeeding if infant has have a breastfeeding problem.

After you complete the assessment for malnutrition, you will classify as:

1. Complicated severe acute malnutrition or
2. Uncomplicated severe acute malnutrition or
3. Moderate acute malnutrition or
4. No malnutrition

Below are the signs of **a child less than 6 months** with SAM:

- Infant has oedema of both feet
- Weight-for-length is less than 3 z-score

Then:

- Check the child for medical complications.
- Check the child for a breastfeeding or feeding problem

Below are the signs of a child 6 months and older with SAM:

- Child has oedema of both feet
- Weight-for-height/length is less than 3 z-score
- MUAC is 115 mm or below

Then:

- Check the child for medical complications, as was described above.
- Conduct an appetite test with RUTF.

Moderate Acute PEM (Including Chronic malnutrition- Stunting and Severe Acute PEM

Moderate Acute Malnutrition

If the child's weight-for-height/length is between -3 and -2 Z-score or MUAC between 115 and 125, is classified as moderate acute malnutrition.

Not growing well may be due to:

- Insufficient food intake due to anorexia and illness or poor availability of food.
- Insufficient uptake of nutrients, e.g. malabsorption.
- Insufficient use of nutrients for growth due to chronic disease.

- Increased demand for nutrients due to illness such as TB and HIV and AIDS.

Treatment

- Assess the child's feeding and counsel the caregiver about feeding her child according to the recommendations in the FOOD box on the COUNSEL IMNCI chart. .
- If the child has a feeding problem, they should follow-up in 5 days.
- If there is no feeding problem, the child should be follow-up in 30 days
- Conduct a clinical assessment to determine the cause
- Provide supplements according to a child's age to meet specific nutritional needs
- Not Growing Well / Failure to Thrive/ Growth Faltering could be an earlier sign that would require intervebntion.

Severe Acute PEM

Severe acute malnutrition is defined as the presence of oedema of both feet and severe wasting (weight-for-height/length <-3SD or midupper arm circumference < 115 mm). No distinction is made between the clinical conditions of kwashiorkor or severe wasting because their treatment is similar.

Children with severe acute malnutrition with loss of appetite or any medical complication have ***complicated severe acute PEM***and should be admitted for inpatient care.

- Presence of At least one Medical complications

- Poor appetite as tested by the appetite test
- Bilateral pitting edema grade 3 (+++) or Marasmic – kwashiorkor
- No suitable or willing caregiver
- Open skin lesions
- Patients <6 months of age

Uncomplicated Severe Acute Malnutrition
This is shown in children with severe acute malnutrition who

- have a good appetite,
- with no open skin,
- bilateral pitting edema Grade 1 to 2 (+ and++) and
- does not have other signs of complication.

Uncomplicated severe PEM can be managed as outpatients in a Community Based Therapeutic feeding program (CBT) if all necessary resources are available.

Criteria For Admission To In-Patient Or Outpatient Care (CBT Center) For All Ages

For patients **<6 months***

- Weight-for-Length) less than <-3 Z-score, **or**
- Presence of bilateral pitting edema.
- The infant is too weak or feeble to suckle effectively (any weight-for-length)
- If the infant is not gaining weight at home (by serial measurement of weight during growth monitoring, i.e. change in weight-for-age)

(*The aim of treatment of these patients is to return them to full exclusive breast feeding, Thus, the admission criterion is failure of effective breast feeding and the discharge criterion is gaining weight on breast milk alone (anthropometry is not used as primary admission criterion).

For patients **from 6 months to 18 years of age**, any of the following:

- W/H <-3 Z-score
- Presence of bilateral oedema
- MUAC < 110mm in children of more than 75cm length.

For patients more than 18 years of age

- BMI < 16
- Presence of bilateral oedema unless there is a clear cut other cause
- MUAC <180mm with recent weight loss or underlying chronic illness OR MUAC<170mm

For management of acute malunitution in children <5 years, five years or above, pregnant and lactating women –refer to the latest Eritrean National Guidelines for Management of Acute Malnutrition

Management of SAMIn Children

Treatment Objective

- Treat life-threatening complications
- Rehabilitate with nutrition

- Achieve catch-up growth
- focuses on appropriate feeding practices, nutritional supplements

General treatment involves 10 steps in two phases: initial stabilization and rehabilitation and transition in between.

Phase I or Stabilization Phase

- Is given in an Inpatient facility.
- Given if poor appetite and/or major medical complications.
- Weight gain at this stage is dangerous.

The principles of management include: dietary management, giving routine drugs, treatment of complications and monitoring

Dietary management

- The starter/ F75 (130ml =100kcal) should be given for patients of all ages except for the less than 6 months old infant without edema.
- There should be 8 feeds per day (every 3 hours).
- Give an Amount F75 at 130 ml/kg per day or 100 ml/kg per day if the child has severe oedema

Breast-fed children should be offered breast-milk before the diet and on demand.

Naso-gastric tube (NGT) feeding is used when a patient will not take sufficient diet by mouth. The reasons for use of an NG tube are:

- Taking less than 75% of prescribed diet per 24 hours in phase 1
- Pneumonia with a rapid respiration rate
- Painful lesions of the mouth
- Cleft palate or other physical deformity
- Disturbances of consciousness.

Routine Medicine

Vitamin A: on day of admission

Age	**Vitamin A IU orally in day 1, 2 and 14 (ug)**
< 6 months	50,000 IU (2 drops of Red capsule)
6 to 11 months	3 drops of red capsule or one blue capsule (capsules of 100,000IU = 30,000ug)
12 months (or 8 kg) and more	Two blue capsules or One red capsule (capsules of 200,000IU = 60,000ug)

In xerophthalmia the patient has signs of clinical vitamin A deficiency repeat the same dose on days 2 and 14.

Folic acid on the day of admission:

- 5 mg as one single dose daily for 5 days

Systematic Antibiotics:

Antibiotics should be given to every severely malnourished patient, even if they do not have signs of systemic infection.

No complication of sepsis

- Amoxicillin, oral. 15 mg/kg/dose x3 daily for a duration of all of Phase 1 and 4 more days.

If a complication of Sepsis is suspected, give Gentamycin plus ampicillin IV or chloramphenicol IV/ IM.

- Gentamycin 7.5mg?kg im/IV/IM plus
- Ampicillin 40mg/kg IV every 6 hours **or** Benzyl penicillin 50,000 IU /kg IV every 6 hours **OR**
- Chloramphenicol **25mg/**kg IV/IM every 6 hours **OR** Other antibiotics on specific diagnosis.

Treatment of Complications

Most common medical complications in severely malnourished children include the following features:

- Hypoglycemia
- Hypothermia
- Diarrhea and Dehydration
- Sepsis and shock
- Oral candidiosis
- Severe anaemia
- Congestive *heart failure*.

- Treat dermatosis of kwashiorkor / weeping skin lesions

Hypoglycemia:

All severely malnourished children are at risk of hypoglycaemia and immediately on admission, RBS should be checked.

Hypoglycaemia may be due to inappropriate feed timing or to a serious infection that blocks gluconeogenesis (glucose production in the body).

Low body temperature (<36.5oC), lethargy, limpness, loss of consciousness and eye-lid retraction on sleep (this is due to increased sympathetic activity) is noticed are the main signs of hypoglycaemia in the severely malnourished.

RBS < 54 mg/dl is hypoglycemia.

Treatment:

- All malnourished patients with suspected hypoglycaemia should be treated promptly
- Patients who are conscious and able to drink should be given 50 ml of sugar water (10% sugar) , or F-75 diet (or F100) by mouth.
- Patients who are unconscious treat with IV 10% glucose at 5 ml/kg or, if IV access cannot be quickly established, then give 10% glucose or sucrose solution by nasogastric tube.
- RBS need to be monitored.
- All malnourished patients with hypoglycaemia suspected serious systemic infection should be treated with anti-microbials.

Hypothermia

Hypothermia is very common in malnourished children and often indicates coexisting hypoglycaemia or serious infection. All severely malnourished patients are highly susceptible to hypothermia, i.e. rectal temperature below 35.5oC or under arm temperature below 35oC.

Treatment

- All children with hypothermia should be treated routinely for hypoglycaemia and infection.
- Feed the child immediately and then every 2 h unless they have abdominal distension; if dehydrated, rehydrate first.
- Re-warm the child: Make sure the child is clothed (especially the head); cover with a warmed blanket and place a heater (not pointing directly at the child) or lamp nearby, or put the child on the mother's bare chest or abdomen
- (skin-to-skin) and cover them with a warmed blanket and/or warm clothing.
- Keep the child away from draughts. Use the Kangaroo technique for infants
- Give appropriate IV or IM antibiotics
- Take the child's rectal temperature every 2 h until it rises to > 36.5 °C. Take it every 30 min if a heater is being used.

Dehydration:

Do not use the IV route for rehydration, except in cases of shock

Rehydrate slowly, either orally or by nasogastric tube, using ReSoMal. Oral rehydration solution for malnourished children (5–10ml/kg per h up to a maximum of 12 hours).

If in shock or severe dehydration but cannot be rehydrated orally or by nasogastric tube, give IV fl uids, either Ringer's lactate solution with 5% dextrose or half-strength Darrow's solution with 5% dextrose or .if neither is available, 0.45% saline with 5% dextrose should be used..

Give the ***ReSoMal rehydration fluid orally*** or by nasogastric tube, more slowly than you would when rehydrating a well-nourished child:

– Give 5 ml/kg every 30 min for the fi rst 2 h.

– Then give 5–10 ml/kg per h for the next 4–10 h on alternate hours, with F-75 formula.

Note:

- I.V. fluids should NEVER be given as a routine, as prophylaxis, to prevent dehydration in children with diarrhea or to prevent recurrence of dehydration after treatment.
- When an I.V. infusion is started it should be very carefully monitored and has to be discontinued at the earliest possible opportunity.

Infection

In severe acute malnutrition, the usual signs of bacterial infection, such as fever, are often absent, yet multiple infections are common. Therefore, assume that all children with severe acute malnutrition have an infection on their arrival in hospital, and treat with antibiotics immediately. Hypoglycaemia and hypothermia are often signs of severe infection.

Treatment

- If the child has uncomplicated severe acute malnutrition, give oral **amoxicillin**

If there are complications (hypoglycaemia, hypothermia or the child looks lethargic or sickly) or any other medical complication, give parenteral antibiotics:

- **Gentamycin** 7.5mg?kg im/IV/IM plus Ampicillin 40mg/kg IV every 6 hours **or** Benzyl penicillin 50,000 IU /kg IV every 6 hours **OR chloramphenicol 25mg/kg IV/IM every 6 hours or** Other antibiotics on specific diagnosis.

Oral candidiosis
For oral thrush see chapter on Orodental disorders

Congestive *heart failure*

Treat dermatosis of kwashiorkor / weeping skin lesions

Zinc deficiency is usual in children with kwashiorkor, and their skin quickly improves with zinc supplementation. In addition:

- Bathe or soak the affected areas for 10 min/day in 0.01% potassium permanganate solution.
- Apply barrier cream (zinc and castor oil ointment, petroleum 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

Blood transfusion should be given in the first 24 h only if:

- Hb is < 4 g/dl
- Hb is 4–6 g/dl and the child has respiratory distress.

In severe acute malnutrition, the transfusion must be slower and of smaller volume than for a well-nourished child. Give:

- Whole blood, 10 ml/kg, slowly over 3 h **or**If the child has signs of heart failure, give 10 ml/kg of packed cells
- Furosemide, 1 mg/kg IV at the start of the transfusion.

Transition phase

Progress from phase I to transitions phase when

- A good appetite and:

- Marasmic patients spend a minimum of 2 days in transition phase.
- Edematous patients (kwashiorkor) should remain in transition phase until they have completely lost all their oedema.

Treatment

- Avoid a sudden change to large amount of diet before physiological function is restored.
- Patients start to gain weight as F100 is introduced and the quantity of F100 given is equal to the quantity of F75 given in phase I.
- The only change made to the treatment in phase I, is a change in the diet that is given from F75 to F100 or RUTF.
- The number of feeds, their timing and the volume of the diet given remains exactly the same as in phase I.

Criteria to move back from transition phase to phase I

- Increasing edema
- If a child who did not have edema develops edema.
- Rapid increase in the size of the liver.
- Any other sign of fluid overload.
- Tense abdominal distension.
- Significant refeeding diarrhoea with weight loss.
- Develops medical complications.

Phase II Rehabilitation phase

During this phase patients

- have good appetite
- does not have major medical complications
- Can occur at inpatient or outpatient setting

Diet

- F100 (100ml = 100 kcal) used in inpatient onlyor ready to use therapeutic feeding (RUTF) can be used.
- Five feeds of F100 should be given to those who are less than 8kg and Five feeds of F100 and one porridge may be g given for patients who are more than 8kg.
- Increase each successive feed by 10 ml / day if more is needed.
- If both F100 and RUTF are being given they can be substituted on the basis that about 100 ml of F100 = 20g of RUTF.

Routine medicine

Iron: is added to the diet of children in phase 2.

Assess progress and monitor progress by the rate of weight gain: If the weight gain is:

- poor (< 5 g/kg per day), the child requires a full re-assessment
- moderate (5–10 g/kg per day), check whether the intake targets are being met or if infection has been overlooked
- good (> 10 g/kg per day).and

Sensory stimulation

Provide tender loving care, a cheerful, stimulating environment, structured play therapy for 15–30 min/day, physical activity as soon as the child is well enough and Provide suitable toys and play activities for the child.

Preparation for discharge

- The mother should be counseled on appropriate feeding. .
- Children with severe acute malnutrition should be **discharged** from the nutritional treatment programme only when their:
  - weight-for-height/length is at least about -2 z score and they have had no oedema for at least 2 weeks, or
  - MUAC is ≥ 125 mm and they have had no oedema for at least 2 weeks.

Follow-up

When a child is discharged to outpatient, make a plan for following up for continuing supervision of the child. In general, the child should be weighed monthly or more frequently after discharge and if he or she

- fails to gain weight over a 2-week period or
- loses weight between two measurements or
- develops loss of appetite or edema, the child should be referred back to hospital for further assessment and to avoid relapse.

Summary of the t*ime frame for the management of a child with complicated severe acute malnutrition:*

PHASEI / Stabilization PHASE II / Rehabilitation

Days 1–2 Days3–7 Weeks 2–6

1. Hypoglycaemia _____
2. Hypothermia _____
3. Dehydration _____
4. Electrolytes

_____

5. Infection

_____

6. Micronutrients _____ no iron __ _____ with iron_____
7. Initiate feeding

_____

8. Catch-up feeding

_____

9. Sensory stimulation

_____

__

10. Prepare for follow-up

_____

MONITORING / Surveillance

- Use multichart for monitoring patients
- Weight and oedema – daily
- Body temperature is measured at least twice daily.
- Height/Length is measured every 3 weeks.
- The standard clinical signs (stool, vomiting, etc) each da

- MUAC is taken each week.

Failure To Respond

Criteria for failure to respond and Time after admission
Primary failure to respond

- Failure to regain appetite Day 4
- Failure to start to loose edema Day 4
- Edema still present Day 10 - 14
- Failure to gain more than 5g/kg/d Day 10

Secondary failure to respond

- Failure to gain more than 5g/kg/d for 3 successive days During phase 2

Usual Causes of Failure To Respond

Problems withThe Treatment Facility:

- Poor environment for malnourished children
- Insufficient or poorly trained staff
- Inaccurate weighing machines
- Food prepared or given incorrectly

Problems Of Individual Children:

- Insufficient food given
- Food taken by siblings or caretaker
- Vitamin or mineral deficiency
- Malabsorption
- Rumination
- Infection, especially:
    - Diarrhoea
    - dysentery
    - pneumonia
    - tuberculosis
    - urinary infection/ Otitis media

- malaria
- HIV/AIDS
- Schistosomiasis/ Leishmaniasis
- Hepatitis/ cirrhosis
- Other serious underlying disease

Severe Acute Malnutrition in Infants Aged < 6 Months

Severe acute malnutrition is less common in infants < 6 months than in older children. An organic cause for the malnutrition or failure to thrive should be considered, and, when appropriate, treated. Infants less than 6 months of age with severe acute malnutrition with any of the following complicating factors should be admitted for inpatient care.

15.3 Micronutrient Deficiencies

Micronutrient deficiencies are major health problem. Deficiencies occur across all population groups but women and children are highly vulnerable because of rapid growth and inadequate dietary practices. These public healthimportant micronutrient include deficiencies of vitamin A, iron, iodine and zinc. Interventions to address micronutrient deficiencies include food-based approaches whereby production and consumption of micronutrients rich foods are promoted. Micronutrient supplementation programs target most vulnerable groups such as pregnant and lactating women, and children aged below 5 years.

Food fortification with micronutrients is another approach aimed to deliver micronutrients to the general population, most vulnerable groups included. *Food fortification includes iodization of edible salt and fortification of staple foods such as cereal flours and cooking oil.*

15.3.1 Anaemia

Anaemia is a pathological condition arising as a result of low level of haemoglobin in the body for the age and sex of the individual.

Reduction of haemoglobin impairs oxygen transport to the tissues – the basis of the clinical features of anaemia. Anaemia can be classified according to cause and mechanism of development. Four major groups are distinguished:

•***Haemorrhagic anaemia*** develops due to various forms of bleeding (trauma, excessive menses, bleeding associated with pregnancy and birth giving, and parasitic infestations such as hookworms and scistosomiasis).

• ***Haemolytic anaemia*** – due to massive destruction of red blood cells as occurs inmalaria and sickle cell disease.

• ***Hypoplastic/Aplastic anaemia*** – due to failure of bone marrow to produce sufficient red blood cells. Bone marrow depression can be caused by diseases (autoimmune,viralinfection),radiation and chemotherapy and intake of some drugs (anti-inflammatory, antibiotics).

• ***Nutritional anaemia*** – due to deficiency of the nutrients needed for the synthesis of red blood cells. Nutritional anaemias are

- Iron deficiency anaemia
- Folic acid deficiency anaemia
- Vitamin B12 deficiency anaemia

Anaemia affects all population groups but children aged below five years and pregnant women are the most vulnerable. Detection of anaemia is by determining the concentration haemoglobin (Hb) and the cut-off points at sea level are as follows:

Population group	***Hb levels indicating anaemia (g/dl)***
Children 6 to 59 months	Below 11.0
Children 5 to 11 years	Below 11.5
Children 12 to 14 years	Below 12.0
Adult men (15+ years or above)	Below 13.0
Adult women (15+ years or above, non-pregnant)	Below 12.0
Pregnant women (regardless of age)	Below 11.0

Severity of anaemia:

•Hb 11.0 – 10.0 g/dl to the cut-off point = mild anaemia
•Hb ≤ 10.0 – 7.0 g/dl = moderate anaemia
•Hb < 7.0 – 4.0 gdl = severe anaemia
•Hb < 4.0 g/dl = very severe anaemia

Prevention of anaemia:

- Consumption of iron and vitamin rich foods. Iron in foods of animal origin (haem iron) is more easily

absorbed compared with iron in foods of plant origin (which is mostly non- haem iron). Vitamin C enhances absorption of iron while tea and coffee inhibits iron absorption.

- Prevention and treatment of anaemia related diseases (malaria, worm infestation, and other infections)
- Iron and folic acid supplementation to the most at risk groups – children, pregnant women, sickle cell patients (See National Guidelines for Micronutrient Supplementation)
- Use of micronutrients fortified foods (iron and folic acid included).

Iron Deficiency

The main function of iron is transport of oxygen at various sites in the body. Thus iron is a component of haemoglobin and myglobin (protein molecule in the muscle which carries oxygen for muscle metabolism. While Hb concentration is used to define anaemia, it does not define the body's iron status. Three stages are distinguished in the reduction of the body's iron status:

1. Depletion of iron stores: the body's storage pool (deposits in the liver, spleen and bone marrow) diminishes due to insufficient dietary intake. This has no effect on the Hb yet.

2. Iron deficiency erythropoiesis: storage levels substantially reduced,inadequate iron isavailable in the bone marrow for the synthesis of Hb. Still, there is no overt effect on the Hblevel.

3. Iron deficiency anaemia: last and most severe stage of iron deficiency – iron stores are insufficient to maintain Hb synthesis. Hb level decreases leading to anaemia.

Signs and symptoms of deficiency

•Pallor
•Glossitis
•Diziness
•Decreased mental alertness
•Anaemia (microcytic hypochromic)

Dietary measures

- Rich sources of iron include meat (especially liver), poultry, fish, and seafood. These contain heme iron, which is easily absorbed in the gut.
- Others are fruits, vegetables, eggs, milk and dairy products, which contain non-heme iron. Absorption can be enhanced by vitamin C (taking meal with fruit).
- Use of foods fortified with iron.

NOTE: When food is boiled in water, iron is leached and is lost if the water is discarded.

15.3.2 Iodine Deficiency Disorders (IDD)

Iodine is an essential component of the thyroid hormones – Triiodothyronine (T3) andTetraiodothyrinine (T4 or Thyroxine). The hormones have profound influence on energy metabolism, protein synthesis, growth and development.

They also play part in the conversion of carotene toVitamin A and synthesis of cholesterol.
Insufficient level of iodine leads to inadequate production of the hormones.This, in turn, affects brain development, physical growth and functioning of muscles, heart, liver and kidneys.
Goitre is an enlarged thyroid gland– a result of thyroid over-activity as it strives to capture sufficient iodine from the blood. Deficiency of iodine results in pathological conditions referred collectively as iodine deficiency disorders (IDD).

Manifestation of iodine deficiency:

Iodine deficiency disorders (IDD) include the following:

- ***Goitre***: Enlarged thyroid gland from over-activity
- ***Hypothyroidism***: Dry skin, weight gain, puffy face, frequent constipation and lethargy – from under-active thyroid
- ***Exophthalmia***, rapid pulse and weight loss – from over-active thyroid
- ***Cretinism***: Child born to a mother who was iodine deficient during pregnancy. Has mental retardation, retarded growth and neurological problems (spasticity).

Dietary measures

The iodine content of the individual foods varies considerably according to the type of soil, fertilizer, animal feed and processing methods used.

- Iodized salt (table salt fortified with iodine compound) is the strategy for control of iodine deficiency worldwide.
- Potassium iodate (KIO) or potassium iodide (KI) is added to edible salt.

15.3.3 Vitamin A Deficiency (VAD)

Vitamin A is a fat-soluble vitamin. It plays important roles in the body, including role in vision, maintenance of epithelial tissue, synthesis of mucous secretion, growth, reproduction and immunity.

Causes of VAD include the following:

- Low consumption of vitamin A rich foods
- Dietary deficiency due to poor food processing, preservation and preparation.
- Limited consumption of fats and oils (for example, non-use of cooking oil) leading to poor absorption of vitamin A from food.
- Poor breastfeeding (non-use of colostrum, insufficient breastfeeding).
- Diseases that deplete vitamin A from the body (measles, ARI).
- Diseases affecting food absorption (chronic diarrhea, intestinal parasites).

Manifestation of VAD

- **Xerophthalmia** (the eye manifestations of VAD)
  - Night blindness, Xerosis (corneal, conjunctival), Bitot's spots.
  - Corneal ulcer, Xerophthalmic fundus and Keratomalacia (often leading to blindness).

•Slowed growth and development
•Reduced reproductive health
•Increased risk of anaemia
•Follicular hyperkeratosis.

Prevention of VAD

- Increase consumption of fruitsand vegetables
- Improve child feeding practices (breastfeeding, complementary feeding),
- Use of cooking oil,
- Early and proper treatment of diseases (measles, ARI, diarrhea, worms),
- Vitamin A supplementation and Use of food fortified with vitamin A.

Treatment of VAD (disease targeted supplementation)

Different treatment regimens are prescribed for patients presenting with different conditions, as follows:

- Children presenting with xerophthalmia, measles or persistent diarrhea or severe acute malnutrition.
- Pregnant women presenting with xerophthalmia

15.3.4 Deficiency of Vitamin B1 (Thiamine)

Vitamin B1 is utilized in carbohydrate, fats and protein metabolism for production of energy. It, contributes to body's supply of niacin (another B vitamin) by facilitating in the conversion of tryptophan (an amino acid) to niacin. Promotes appetite and supports the functioning of the central nervous system. Thus deficiency leads to shortage of energy and lesions in nervous tissues.

Deficiency is commonly caused by consumption of highly polished cereals or foods containing thiaminase (anti-thiamine factor). Alcoholics are also prone to deficiency of thiamine.

Signs and symptoms of deficiency

- Characterized by enlargement of nerves, weight loss (due to loss of appetite), oedema and disturbance in heart function
- Lack of energy, Lesions in nervous tissues.

Dietary measures

Whole grain cereals and pulses, Green vegetables (such as green peas), fruits, fish, meat, milk, oil seed, yeast

Pharmacological treatment

Mild chronic thiamine deficiency and for those with malabsoption:

Vitamin B_1 5 – 25 mg i/m every 12 hours for 3 days then orally for 1 month

- For severe deficiency:

Vitamin B_1 200 – 300 mg daily for 3 days

15.3.5 Vitamin B2 (Riboflavin) Deficiency

Vitamin B2 is utilized in the metabolism of carbohydrates, fats and proteins for production of energy. Also it plays part in synthesis of corticosteroids and productionof red blood cells.

Deficiency occurs in populations consuming highly polished cereals.

Signs and symptoms of deficiency
It is characterized by sore throat, pharyngeal and oral mucousmembranehyperaemia, angular stomatitis, cheilosis, glossitis and anemia.
Riboflavin deficiencyalmost invariablyoccurs in combinationwith other vitamin deficiencies.

Dietary measures

- Animal products (milk, meat liver, fish, eggs, cheese)
- Vegetable products (green leafy vegetables)
- Cereal grains and pulses

Pharmacological treatment
Vitamin B-complex 1 tablet 8 hourly for 1 month.

15.3.6 Vitamin B3 (Niacin) Deficiency

Niacin is utilized in carbohydrate, fat and protein metabolism for production of energy. Niacin deficiency occurs in communities whose main staple food is maize or sorghum and particularly during rainy season when food diversification is at its lowest. Deficiency leads to **Pellagra.**

Signs and symptoms of deficiency
It is a disease characterized by a triad, referred to as

three Ds:

- **Dermatitis** (darkened scaly skin on the parts exposed to the sun)
- **Diarrhea**
- **Dementia** (memory loss)
- Some patients may present also with glossitis

Dietary measures
•Animal products (especially liver), pork, poultry
•Groundnuts, beans, peas, other pulses, yeast
•Cereal grains (but not maize or sorghum)

Note: - •Treatment of maize with alkalis such as limewater makes the niacin much more available
•Protein is good source as the amino acid tryptophan can be converted to niacin in the gut.
Pharmacological treatment:
Give vit B complex.

15.3.7 Vitamin B6 (Pyridoxine) Deficiency

Pyridoxine is involved in synthesis and breakdown of amino acids (hence important in protein metabolism), in the conversion of glycogen in the liver and muscle tissue to glucose (hence maintenance of blood glucose levels), and in reaction that produces a heme precursor, necessary for formation of haemoglobin. Pyridoxine also aids in the conversion of amino acid tryptophan to niacin. Disease or clinical features associated specifically with pyridoxine are rare.

However, various medical conditions and drugs affect vitamin pyridoxine metabolism, for example, deficiency of the vitamin occurs in patients who are on chloramphenicol and TB patients who are on isoniazid

Signs and symptoms of deficiency
•Dermatitis, glossitis, cheilosis •Macrocytic anaemia
•Convulsions

Dietary measures
•Animal sources – meat, liver, pork, fish, milk.
•Vegetables – spinach, turnips, broccoli
•Fruits – bananas, oranges, water melon
•Yeast
Pharmacological treatment
Pyridoxine 50 mg every 8 hours until recovery
In case deficiency is isoniazid induced, it should be replaced with ethambutol.

15.3.8 Vitamin B12 (Cobalamin) Deficiency

Vitamin B12 is involved in the synthesis of the thymine nucleotides of DNA (along with folic acid) and therefore in the synthesis of red blood cells. It plays part in the metabolism of fatty acids, hence in the formation of myelin (the sheathing around the axons of nerve cells). The vitamin is involved also in the carbohydrate metabolism (stabilizes glutathione – a component of enzymes needed in carbohydrate metabolism).

Signs and symptoms of deficiency
- •Macrocytic megaloblastic anaemia
- •Decreased white blood cells
- •Angular stomatitis, glossitis
- •Delusions, nerve problems, unsteady gait.

Dietary measures
Main source is animal foods – meat, liver, seafood, eggs, milk, and cheese.
Note:
- Animals or plants do not synthesize the vitamin – it is synthesized by bacteria in animals.
- Humans can not obtain the vitamin by action of bacteria in the gut because it can not be absorbed very far down the intestine
- Some plants (legumes that contain nodule bacteria) can synthesize the vitamin

Pharmacological treatment
Adult
Cyanocobalamin 50 to 150µg oral daily, taken between meals.
Children give orally 5- to 105µg in 1-3 divided doses.
Intramuscular injection: Initially 1mg, repeated 10 times at intervals of 2 – 3 days. Maintenance dose: 1 mg every month.

In malabsorption patients use injectable Vitamin B complex 0.25ml– 2.0ml IM

15.3.9 Folic Acid Deficiency

Folic acid is involved in the metabolism of amino acid (conversion of histidine to glutamic acid). It is also involved in the synthesis of thymine (a distinctive component of DNA) and therefore in the formation of red blood cells and maintenance of nervous system.

Signs and symptoms of deficiency

- •Macrocytic megaloblastic anaemia
- •Stomatitis, glossitis
- •Diarrhea
- •Neural tube defects (spina bifida, anencephaly, encephalocele)

Dietary measures

- •Green leafy vegetables
- •Legumes
- •Liver, meat, fish, poultry

Drug treatment

Adults and children over one year

Folic acid 5 mg oral, daily for 4 months, then maintenance dose of 5 mg every 1-7 days depending on underlying disease.

Children up to one year: 0.5 mg/kg body weight daily

15.3.10 Vitamin C (Ascorbic Acid) Deficiency

Vitamin C helps the body use calcium and other nutrients to build boned and the walls of blood vessels, helps form collagen which is important for connective tissues, increases absorption of iron from foods, increases resistance to infection, enhances protein metabolism, is an antioxidant.

Signs and symptoms of deficiency

- •Scurvy (bleeding gums, dry skin, dry mouth, impaired wound healing).
- •Gingivitis (bleeding sore and inflamed gums)
- •Stomatitis (sores on corners of the mouth)
- •Anaemia (of iron deficiency)

Prevention (dietary measures)
•Fruits: citrus fruits, berries, pawpaw, mangoes, melons, guavas, bananas.
•Vegetables: green vegetables, tomatoes, potatoes (with skin), sprouted cereals, pulses.

Note: Substantial vitamin C can be lost during food processing, preservation and preparation.

Pharmacological treatment
Ascorbic acid tablets 250 mg daily, in divided dose, until recovery
Prophylactic:
Ascorbic acid tablets 25 – 75 mg daily
•In malabsoption patients injectables ascorbic acid IV/IM 500mg

15.3.11 Vitamin D Deficiency

Vitamin D facilitates calcium and phosphorus absorption and utilization, hence formation of bones and teeth.

Signs and symptoms of deficiency
- Rickets – a disease of bones in infants and children
- Osteomalacia in adults

Prevention
•Breast milk is poor in Vitamin D, infants need to be exposed todirectsunlight from 9:30 am to 3 PM. Vitamin D is produced by the action of the sun on the skin.

•Vitamin D rich foods: wheat germ, fish, liver, egg yolk, organ meats, cheese, milk (breast milk other milks), butter, margarine, mayonnaise.

Pharmacological Ttreatment

- **Vitamin D injection: 600, 000 IU im stat**
- **Ergocalcifero**l 1000 – 5000 iu/daily (PO) for 2 weeks then 4000 iu/daily for 2 months

15.3.12 Vitamin E (Tocopherol) Deficiency

Vitamin E is an antioxidant. It plays role in reproductive health (enhances fertility) and also in haemoglobin synthesis.

Signs and symptoms of deficiency

•Leg cramps,
•Muscle weakness,
•and hearing problems.

Dietary measures

•Consumption of vegetable oils
•Whole grain cereals

Pharmacological treatment

Adult
Alpha tocopherol acetate 50 - 100mg daily until recovery
Below 1 yr.: 50mg until recovery

15.3.13 Vitamin K Deficiency

Vitamin K is essential for the synthesis of prothrombin in the liver, factor VII, IX and X. It also helps in the

production of proteins necessary for bone calcification. Primary deficiency of vitamin K occurs only in neonates. Secondary deficiency may be associated with malabsorption syndrome, liver cirrhosis and the use of Coumarin derivatives such as dicumarol, warfarin and other analogues.

Signs and symptoms of deficiency

- Injuries/wounds taking long to stop bleeding.
- Infants are relatively deficient in vitamin K and therefore at risk of serious bleeds including intracranial bleeding.

Dietary measures

Vitamin K exists in two forms ($K_1$and K_2) and is obtained in foods of plant and animal origins:

- Vitamin K_1 (phylloquinone), synthesised by plants
- Vitamin K_2 (menaquinone), synthesized by bacteria in animal intestine

Pharmacological treatment

•Adults:

Phytomenadione 10 mg i/v stat

•To prevent vitamin K deficiency bleeding (haemorrhagic disease of the newborn):

Phytomenadione 0.5-1 mg i/m once, at birth OR Phytomenadione oral, 2 mg, two doses given in the first week.Third dose given at1 month.

Note:

Not use in patients with suspected Warfarin overdose and neonates

15.3.14 Zinc Deficiency

Zinc is known to be essential nutrient for the body. It is a component of insulin and many enzymes, including:

- Carbonic anhydrase (which transports CO2from RBCs to the lungs).
- Carboxypeptidase (necessary for peptide digestion)
- Alcohol dehydrogenase

It plays role in the synthesis of nucleic acids and protein, metabolism of vitamin A from the liver and wound healing (synthesis of collagen) and enhancement of absorption of folic acid

Zinc occurs in all tissues, higher concentrations being in:

- The choroid membrane of the eye.
- Male reproductive organs (especially the prostate gland).
- In the red blood cells.
- In the pancreas (as component of insulin).
- Relatively lower concentrations in the liver, skeletal muscle, bone, skin and hair.

Signs and symptoms of deficiency

•Slow growth •Loss of smell and taste •Skin lesions
•Loss of appetite •Diarrhoea •Poor wound healing

Dietary measures

Zinc is present in most foods of animal and plant origins.

- The richest sources tend to be protein rich foods e.g. meat, seafood, eggs yolk and oysters.
- Cereal grains and legumes also contain zinc (but milling reduces the zinc content. Also phytates found in whole grain products and vegetables reduces the bioavailability of zinc.

- Fruits, vegetables and egg white are poor sources of zinc.

Pharmacological treatment
Zinc tablets 50mg 2 to 3 times daily until recovery

15.3.15 Calcium Deficiency

Calcium strengthens bones and teeth, facilitates normal functioning of the heart and helps blood clotting. Calcium also helps in the maintenance of normal blood pressure.

Signs and symptoms of deficiency
•Delayed blood clotting
•Osteoporosis (weak breakable bones)
•Osteomalacia •Teeth problems
•Low resistance to infection •Stunting

Dietary measures
•Foods of animal origin: milk, yoghurt, cheese
•Fish with bones that are eaten •Legumes, peas.
•Vegetables: green leafy vegetables such as broccoli

Pharmacological treatment
Adults
Calcium gluconate10% I.V (94.7 mg elemental calcium) at a rate of not exceeding 5ml/minute.
Pediatric dose: Calcium gluconate 10% I.V (47.5 mg elemental calcium) at a rate of not exceeding 5ml/minute
OR
Calcium carbonate 500mg daily until recovery

16. CARE AND PROBLEMS OF THE NEONATE

- Most babies are born healthy and at term.But some babies who are sick or premature may require special attention.
- All babiesneed basic care to help ensure their survival and well-being. This routine basic newborn care given to all babies is called **Essential Newborn Care (ENR).**
- Globally over 2.9 million babies die every year before they reach the age of one month.
- Many of these deaths can be prevented.
- The care they receive during the first hours, days, and weeks of life can determine their survival and development.

16.1 Routine Care of the Neonate

Essential Newborn Care

- Most newborns require only simple supportive care at and after delivery.
- Dry the infant with a clean towel.
- Observe the infant while drying.
- Maintain the infant in skin-to-skin contact position with the mother.
- Cover the infant to prevent heat loss.
- Clamp and cut the cord at least 1 min after birth.
- Encourage the mother to initiate breastfeeding within the first half hour
- Apply tetracycline 1% eye ointment.
- Give the first immunization (BCG, OPV0)
- Give the first immunization (BCG, OPV0).

The General Measures and sterps in the care at and after delivery can be seen below:
Immediately after birth:
Check if the baby needs resuscitation:

- ✓ Is the baby breathing?
- ✓ Is the heart rate > 100?
- ✓ Is the baby centrally pink?

If the answer is NO to any of the questions, resuscitate immediately. See next section on neonatal resuscitation.
Then

- Dry the baby with a warm towel immediately.
- If there are excess secretions, turn the baby onto the side.
- Check and record the Apgar score:

Apgar score	**0**	**1**	**2**
Heart rate	Absent	< 100/min	> 100/min
Respiration	Absent	Slow or irregular	Good, crying
Muscle tone	Limp	Slight flexion	Active, moves
Response to stimulation	No response	Grimace	Vigorous cry
Colour	Blue or pale	Body pink, limbs blue	Pink all over

- Clamp the cord after the first few cries.
- Replace forceps with disposable clamp or sterile cord tie 3–4 cm from the abdomen.

Start resuscitation immediatelyor Refer to a neonatal unit if the baby required resuscitation or if the Apgar score at 5 minutes is ≤ 7.

Check risk factors

- Membranes ruptured for > 18 hours.
- Mother diabetic.
- Smelly liquor or baby.

- Start proper antibiotics
- ***If Mother***is HIV-infected, see Section: The HIV exposed infant, to check the feeding choice.and other PMTCT management..

Check baby from head to toe and the back

- ✓ Check the weight.
- ✓ Check the head circumference.
- ✓ Check forneonatal danger signs:
    - Central cyanosis.
    - Grunting, Fast breathing,
    - Chest indrawing
    - Less than normal movements.
    - Major congenital abnormality.
    - Weight (> 4 kg or < 2 kg)

If any of the above is present, assess need for urgent care and **refer** to a neonatal unit.

Initiate bonding and feeding

- Place the baby on the mother's chest.
- Initiate breastfeeding.

Pharmacological Treatment

1 Bleeding prophylaxis

Vitamin K, IM, on **anterior mid-thigh** immediately after birth routinely.

- for babies ≥ 1.5kg and/or ≥ 32weeks give 1mg stat
- for babies<1.5kg and / or <32 weeks give 0.5mg im stat.

2 Neonatal conjunctivitis prophylaxis

Tetracycline ophthalmic ointment 1%, applied routinely to each eye after birth.

3 Routine EPI immunisation:

- BCG vaccination, intradermal, once neonate is stable.
- Polio 0 vaccine, oral, once neonate is stable.

No baby must be sent home without immunisation.

4 Identify and record

• Formally identify the baby with the mother.

• Place a label with the mother's name and folder number, baby's sex, time and date of birth on the baby's wrist and ankle.

•After giving vitamin K and chloramphenicol eye ointment, give the baby back to the mother, unless there is a reason for the baby to be transferred to a neonatal unit.

16.2 Neonatal Resuscitation

Approximately 10% of newborns require some assistance to begin breathing at birth;
about 1% needs extensive resuscitative measures to survive. In contrast, majority (at least 90%) of newly born babies make the transition from intrauterine to extrauterine life without difficulty.
Every birth should, therefore, be attended by someone who has been trained in initiating a neonatal resuscitation. Additional trained personnel will be necessary if a full resuscitation is required.

Be prepared
Be at the delivery
Check the equipment and emergency medicines

Assessment:

Ask 3 questions to evaluate the infant:

- Is the baby breathing adequately and not just gasping?
- Is the baby's heart rate (HR) > 100 beats/minute?
- Is the baby centrally pink, i.e. no central cyanosis?

If the answer to all 3 questions is "yes": The baby does not need resuscitation.
If the answer to any of the questions is "no": The baby needs resuscitation.

- **Count breaths in one minute**
  - Breathing rate <30/ minute is a sign of birth asphyxia that needs urgent resuscitation and start resuscitation.
    - Position the newborn supine with neck slightly extended

- Clear the mouth and nose with gauze or clean cloth
- Ventilate with appropriate size mask and self inflating bag
- If the resuscitation is successful continue giving essential newborn care.

– Monitor continuously for 6 hours.

Continue assessment of the baby using the above 3 questions every 30 seconds during resuscitation.

- ✓ If the baby is improving, then the interventions, e.g. bagging, can be stopped.
- ✓ Only if the baby is not responding or getting worse, is further intervention needed e.g. chest compressions. (See algorithm).
- ✓ Check that each step has been effectively applied before proceeding to the next step.
- ✓ The algorithm follows the assumption that the previous step was unsuccessful and the baby is deteriorating.
- ✓ Use the lowest inspiratory oxygen concentration that alleviates central cyanosis. Obtain target pulse oximetry readings, if pulse oximeter is available, and restore a heart rate > 100 beats/minute. (Thereis evidence that routine resuscitation with 100% oxygen is potentially harmful to the baby).

An unsatisfactory response to resuscitation includes:

- A sustained slow heart rate, usually ≤ 60 beats/minute or a progressive decrease in heart rate until cardiac arrest occurs.
- Episodes of cardiac arrest, with a progressively weaker response to chest compressions, positive pressure ventilation and medicines.
- A decreasing blood pressure, increasing acidosis, severe hypotonia with central cyanosis or intense pallor.
- Apnoea or weak, irregular and inefficient respiratory efforts.

If the baby's response to resuscitation is inadequate once the ventilation and circulation are adequately supported, then the following steps should be carried out:

- If the mother is known or suspected to have had narcotic pain relief and the baby has normal heart rate and colour response to bag-mask ventilation, but has not initiated sustained regular respiratory effort:

✓ Naloxone, IV, 0.1 mg/kg.
✓ Check the blood glucose of the baby.
✓ If hypoglycaemia is present: Glucose (dextrose) 10%, IV, 2.5–5 mL/kg.

- If no adequate response has occurred by this stage, a person

- skilled in neonatal resuscitation should be consulted and the baby transferred with ongoing resuscitation to a higher level of care:

  • Discontinue resuscitation if the unsatisfactory response to resuscitation persists for > 20 minutes and underlying conditions e.g. Pneumothorax, diaphragmatic hernia has been excluded, or> 10 minutes of unresponsive cardiac arrest (asystole) and/or > 20 minutes of unsustained respiration.
  • Babies requiring minimal resuscitation with prompt and complete response may be watched with their mothers.
  - Babies with a favourable response to resuscitation should be referred to a neonatal higher level care or intensive care unit, if available, for post resuscitation care.
  - Babies, who, after resuscitation, are not completely normal, should be referred to a higher level for care using transport with necessary support, e.g. oxygen and temperature control.

Medicines may be used during neonatal resuscitation as in the table below.

Medicine and dose	Indications	Effect
Epinephrine (Adrenaline) • ML/kg of a 1:10 000 dilution IV, (0.01 mg / kg / dose). • *ET, up to 1 mL/kg of a 1:10 000 dilution (0.1 mg/kg/dose).	» Asystole. » Heart rate <60/minute.	»↑Heart rate. »↑Myocardial contractility. »↑Arterial pressure.
Naloxone • IV/IM, 0.1 mg/kg • May need repeating after 2 hours.	»Maternal administratioof opiates with apnoeic infant.	»Corrects apnoea and/or Hypoventilation.
Dextrose. • IV, 2.5–5 mL/kg of 10% dextrose water (250–500 mg/kg) • 10% solution: draw up 4 mL of 50% dextrose water into a 20 mL syringe then draw up 16 mL waterfor injection – mix by agitating the syringe.	» Hypoglycaemia (usually only occurs after acute resuscitation).	» Corrects hypoglycaemia.
Fluid for volume expansion. IV, sodium chloride 0.9%, 10–20mL/kg, slow IV (5–10 minutes).	» Hypovolaemia (usually history of blood loss, child pale shocked with poor pulses and perfusion).	»↑Blood Pressure and improve tissue perfusion.

*ET = Endotracheal tube

16.3 Sick Neonate and Neonatal Emergencies

A young infant can become sick and die ***very quickly*** from very severe disease or serious bacterial infections.

Neonates can become ill very rapidly and signs of disease are often not readily appreciated unless specifically looked for. All of these conditions in neonates are signs and symptoms that suggest **emergencies and very sick neonate** and therefore should be referred urgently.

The most common serious conditions are: neonatal sepsis, congenitalmalformations (e.g. of heart and central nervous system… etc,), respiratory distress conditions and late effects of asphyxia, prematurity, major birth injuries, metabolic e.g. hypoglycaemia, hypocalcaemia, or other severe abnormalities. These must be suspected and referred for management to a higher level care when appropraiate.

Signs and symptoms of severe illness include:

- respiratory distress[fast breathing (> 60 breaths/minute), severe chest indrawing, nasal flarng or grunting respiration, shallow or slow breathing,cyanosis, recurrent cessation of breathing (apnoea)].
- convulsions and bulging fontanelle
- Reduced spontaneous movements or being very floppy
- Poor sucking and refusal feeding
- Lowor high temperature

- umbilical redness extending to the skin and draining pus many or severe skin pustules
- swollen eyes with pus draining from eye
- lethargic or unconscious or less than normal movements
- diarrhoea (obvious)
- vomiting everything or bile-stained vomitus and abdominal distension or passing blood per rectum
- Pallor and bleeding
- jaundice within the first 24 hours of life
- Weak cry or inability to cry
- Bradycardia (<100 beats/minute) , Tachycardia (>160 beats/minute) or Heart murmurs

General Measures:

- Seriously ill or extremely preterm infants may require resuscitation.
- If unable to suck and take orally, consider giving expressed milk and nasogastric tube feeding or IV infusion.

- Keep the neonate warm, the axillary temperature should be 36.5–37.5 ^{o}c is best done by "Kangaroo care".where the neonate is kept naked against the mother's skin betweenher breasts inside her clothing. or by wrapping with warm cloth.
- if baby's tongue and lips are blue: **oxygen,** using nasal canula or catheter at 2 l/minute.

- if infection, hypoglycaemiaor jaundice see below for a specific treatment.
- Urgent referral. or admission as appropriate for specific diagnosis and correct treatment.

16.4 Neonatal Sepsis

Neonatal sepsis is defined as bacteremia with systemic manifestation in the absence of other primary systemic problems during the first 28 days of life'

Neonatal sepsis can be divided into two subtypes:

Early onset sepsis: Occurs within the first 72 hours of life. It is caused by organisms prevalent in the genital tract of the mother or in the labour room, which includes mainly group B streptococci, *E coli*, Coagulase-negative Staphylococcus and L. monocytogenes. Majority of the neonates with early onset sepsis clinically manifest with respiratory distress due to intrauterine pneumonia. Early onset sepsis has usually fulminant course and high mortality.

Late onset sepsis: The onset is delayed for a minimum of four days in most cases symptoms appear by the end of first week of life. About 2/3 cases of late onset septicemia are caused by gram negative bacilli while the rest are contributed by gram positive organisms. Meningitis is more frequent.

Recognition of systemic sepsis

Signsare usually non-specific since other conditions cause similar clinical states (e.g., cardiac or respiratory failure, metabolic disorders)

Clinical features

- Pallor, lethargy, jaundice, fever, hypothermia - temperature instability (note 1/3 of confirmed sepsis cases are normothermic)
- hypoglycemia,
- increased respiratory rate, apnea, grunting, cyanosis
- tachycardia, bradycardia episodes, poor perfusion, hypotension ,
- petechiae, bleeding from puncture sites
- poor feeding, vomiting, abdominal distension, feed intolerance - bilious aspirates/vomitus and loose stools
- lethargy, irritability,seizures

Any baby who is unwell must be considered at risk of sepsis and appropriate antibiotics commenced as soon as possible after taking cultures. Inability to obtain cultures should not delay administration of antibiotics.

Investigations

- Laboratory:-complete blood count, blood culture, CSF analysis and culture, urinalysis and culture, stool culture
- Chest X-ray
- Ultrasonography of the brain and CT-scan of the brain (in complicated meningitis).

Treatment Objectives

- Alleviate symptoms
- Avoid life-threatening complications

Non pharmacologic

- Maintenance of body temperature (Kangaroo mother care, radiant warmer, incubator)
- Adequate calorie and fluid maintenance - Correction of associated metabolic abnormalities

Pharmacologic

Till the culture report is collected start with broad-spectrum antibiotics, which includes penicillins and Aminoglycoside.

First line Ampicillin, 100mg /kg/day every 12 hours IV.Or crystalline penicvillin 50,000/kgevery 12 hours IVfor 10 days.*PLUS* **Gentamicin**, 7.5mg/kg / IV Daily for 10 days

16.5 Neonatal Conjunctivitis

Neonatal conjunctivitis or ophthalmia neonatorum is an acute purulent conjunctivitis of the newborn in the first month of life, usually contracted during birth from the genital secretions of the mother following a gonococcal or chlamydial infection. The etiologic agent can sometimes be distinguished by the timing of infection: infection with gonococcus typically occurs on day 3 to 5, while infection with Chlamydia occurs between 5 to 14 days. Occasionally other bacteria and viruses as well as chemical irritation may be the cause. This condition can lead to blindness. All cases should therefore be managed promptly to prevent eye damage.

Eye prophylaxis at the time of birth, which involves the cleaning of the neonate's eyes immediately after birth and the application of 1% tetracycline ointment into the eyes, is effective in preventing the condition and must be

implemented as a policy in all health facilities in which child deliveries are undertaken.

Aside treatment of the neonate, the mother and sexual partner(s) should also be assessed and treated for gonorrhoeae and chlamydia infection in cases suspected to be STI-related (see section on Sexually Transmitted Infections).

Causes

- Neisseria gonorrhoea
- Chlamydia trachomatis
- Other bacteria - staphylococci, streptococci
- Viral - herpes simplex virus
- Chemical e.g. silver nitrate

Signs and Symptoms

- Swelling of the eye lids
- Eye discharge, which may be purulent
- Redness and swelling of the conjunctivae
- Oedema and redness of the eyelids

Investigations

- Conjunctival swabs for Gram staining and cultures

Non-pharmacological treatment

Clean the eyelids frequently (every 2 hours) with cotton wool dipped in sterile saline solution or boiled (cooled) water

Pharmacological treatment

Treatment of the neonate

- Ceftriaxone, IM or IV, 50 mg/kg (maximum 125mg) stat **Plus** tetracycline eye ointment 1% or chloramphenicol eye drops, 0.5% **Erythromycin**, single strip of ointment applied 2-3 times daily for 2 weeks
- Erythromycin, oral (syrup), 12.5 mg/kg 6 hourly for 14 days **Plus** tetracycline eye ointment 1% : applied to each eye every 2 hours for 48 hours (after cleaning away discharge-saline irrigation)

Treatment of the mother

- Ceftriaxone, IM, 250 mg stat Plus
- Erythromycin, oral, 500 mg 6 hourly for 7 days

Treatment of mother's partner(s)

- Ceftriaxone, IM, 250 mg stat **OR** Ciprofloxacin, oral, 500 mg stat Plus
- Doxycycline, oral, 100 mg 12 hourly for 7 days

OR

Erythromycin, oral, 500 mg 6 hourly for 7 days

Refer

Refer all neonates with corneal involvement and those who appear distressed or unwell or who present or develop systemic signs (e.g. fever) to a pediatrician or ophthalmologist.

16.6 Prevention of neonatal infections

Many early neonatal infections can be prevented by:

- hand-washing before delivering and handling the infant

- good basic hygiene and cleanliness during delivery (e.g chlorhexid cream for all maternal vaginal examinations)
- appropriate umbilical cord care
- appropriate eye care
- avoiding unnecessary separation of the newborn from the mother e.g.baby unit

Give prophylactic antibiotics only to neonates with documented risk factors for infection:

- Membranes ruptured > 18 h before delivery.
- Mother had fever > 38 °C before delivery or during labour.
- Amniotic fluid was foul-smelling or purulent.

Give IM or IV **ampicillin and gentamicin** for at least 3days and reassess; continue treatment only if there are signs of sepsis (or a positive blood culture).

Many late neonatal infections are acquired in hospitals. These can be prevented by:

- exclusive breastfeeding
- strict procedures for hand-washing or alcohol hand rubs for all staff and for families before and after handling infants
- using Kangaroo mother care and avoiding use of incubators for preterm infants if possible. If an incubator is used, do not use water for humidifi cation

(Where *Pseudomonas* will easily colonize) and ensure that it was thoroughlycleaned with an antiseptic.

- strict sterility for all procedures
- clean injection practices
- removing IV drips when they are no longer necessary.

16.7 Neonatal Hypoglycaemia

This refers to a blood glucose level below than 45 mg/dL (<2.6 mmol/L). This may result in unconsciousness and death if not promptly treated. It should be treated as soon as suspected. Successful treatment results in prompt response.

Risk factors

- Prematurity
- Intra uterine growth retardation
- Baby born to a diabetic mother
- Infection
- Asphyxia
- Large for gestational age.
- Reduced feeds with inadequate intravenous glucose.
- Polycythemia.
- Hypothermia
- Rhesus disease.

Signs and Symptoms

- Irritability/restlessness
- Sweating
- Lethargy
- Tremor /jitteriness; seizures; convulsion
- Tachycardia
- Unconsciousness

Investigation

- Random blood glucose (using a bed-side glucose metre)

Pharmacological Treatment

10% Glucose, IV, 4 ml/kg as a bolus followed by maintenance dose of 1 /5 **Normal Saline in 10% Glucose** at 60-100 ml/kg/day.

REFER

Refer if patient does not respond promptly in spite of adequate treatment.

16.8 Neonatal Jaundice

Jaundice in neonates can result in kernicterus because of the consequences of hyperbilirubinaemia on the brain of the newborn.

Kernicterus causes death in most infants and survivors suffer mental and physical handicaps with cerebral palsy, high frequency nerve deafness, poor memory, low IQ and visual-motor incoordination.

Jaundice appearing in the *first 48 hours after birth*, or a bilirubin concentration >170 micromol/L(10mg/dl) in premature infants, or >255 micromol/L (15mg/dl) in

full-term infants, warrants investigation. However, jaundice appearing from the third day after birth onward is usually physiological.
Exchange transfusion is the definitive treatment for hyper-bilirubinaemia that has reached the level where kernicterus may occur.

Common Causes
<24 hours old :

- Hemolytic : Rh setup, ABO setup
- Congenital infection

24 hours to 2 weeks old

- Hemolytic : Rh setup, ABO setup
- Sepsis / Infection
- Breast - feeding jaundice
- Breast milk jaundice
- Polycythemia
- Neonatal hepatitis

Prolonged jaundice

- Hypothyroidism
- Biliary atresia

Lab tests.

- Total and direct serum bilirubin concentration
- Haematocrit, reticulocyte count, direct Coombs test
- Blood film for red cell anomalies
- Blood group and rhesus (Rh) group of both infant and mother G6PD status

- Cultures of blood, urine, and spinal fluid may be indicated by the history, physical examination or initial laboratory findings
- Abdominal ultrasound

Phototherapy (if available**)** is used if the jaundiceis mild.

- A Blue - green light (wavelength 425 – 475 nm) converts unconjugated bilirubin to harmless isomers.
- In term-baby, phototherapy should be started at jaundice is 15 mg/dl,
- in premature newborns photo therapy should be started at lowerlevels 12 to 13.
- Fluid should be given at maintenance

Exchange transfusion is needed if:

- Serum bilirubin of more than 20mg/dl (340 micromol/L) in term infant i.e. >2 kg or (body weight (kg) x10) x 17 micromol/L in newborns weighing <2 kg
- Cord Hb <12 g/dL or cord bilirubin >80 micromol/L
- Rate of rise of bilirubin >17 micromol/L /hr (1 mg/dL/hr)
- Rapid progression of anaemia in presence of resolving jaundice
- Hydrops fetalis (requires immediate exchange with packed cells)

Exchange transfusion, via umbilical vein, 160 ml/kg over about 2 hours

Note-

- Use warm blood (37°C), cross-matched against maternal and infant serum.
- Monitor heart rate, respiratory rate, and bilirubin and blood glucose during the procedure.
- Stop the exchange transfusion if the heart rate fluctuates by more than 20 beats/minute.
- Further exchanges may be needed if the bilirubin level continues to rise.

- The threshold for intervention by phototherapy or exchange transfusion should be lower in the following cases: in sick or low birth weight babies, or following asphyxia, prolonged hypoxemia, acidosis and sepsis.
- Since there is no exact test to determine the risk of kernicterus and hence the level at which exchange transfusion is necessary the following rule of thumb has proved useful as a guide;

Refer- all babies who develop jaundice within 48 hours of life to a pediatrician. Also refer all babies who have severe jaundice if exchange transfusion cannot be done at the facility.

16.9 Prematurity

Pretermand low birth weight babies have high risk of death and therefore, they need special attention and care.

All newborns are assessed for their birth weight and gestational age. Determining the birth weight and gestational age helps to assess the baby'smaturity. Preterm babies have more feeding and breathing problems, and are prone to develop hypoglycemia and more infections than term babies.
Based on birth weight and gestational age preterm babies are classified into 2 gross catagories or clssifications

- Very low birth weight and/or very preterm.
- Low birth weight and/or preterm.

Very low birth weight and/or very preterm

- If the Weight of the newborn is < 1500gm or if the Gestational Age < 32 weeks the baby and have higher risk of dying and need urgent referral to higher level care with the mother.
- Continuing feeding with expressed breast milk and Kangaroo Mother Care on the way to the hospital.

Low Birth Weight and/or Preterm

- Babies with a birth Weight 1500 to < 2500 grams or gestational age 32-38 weeks are classified as **low birth weight and/or preterm.**
- Home treatment and require special care because they may have difficulty of feeding and difficulty of keeping their body temperature warm.

Treatment includes

- giving Vitamin K 1mg IM on anterior mid thigh,

- Keep the LBW young infant warm at home using Kangaroo Mother Care (KMC) or dressing the baby with extra clothings including hat, gloves and socks and cover the baby with blanket.
- counseling on exclusive breastfeeding and
- feeding expressed breast milk when necessary,
- counseling mother/family on prevention of infection,
- providing follow-up visits and advising mother when to return immediately.

16.10 Birth Injuries

The incidence of severe birth injuries has fallen dramatically over the last 50 years. This is because prolonged, obstructed labor and diffi cult instrumental deliveries are avoided by cesarean section. However, birth injuries still occur,
especially in infants who have had instrumental deliveries, shoulder dystocia, malpresentation (e.g. breech deliveries) or are preterm.

Causes: Difficult delivery and instrumental delivery
Birth injuries include extensive caput succedaneum, subgaleal haemorrhage, cephalohaematoma, nerve palsies and bone fractures.

Extensive Caput Succedaneum

- Diffuse swelling of the presenting part of the scalp that may extend beyond suture lines

Cephalhaematoma

- Diffuse swelling of the scalp that is restricted to one half or bothe sides and does not extend beyond the midline

Subgaleal haemorrhage

- Large swelling of the scalp which may result in a distorted shape of the head and face.
- Can be complicated by severe pallor andjaundice.
- Immediate blood transfusion should be given.

Nerve injuries

- Excessive traction resulting in injury to the brachial plexus causing the following:
- **Erbs Palsy** - Whole upper limb does not move. There's movement only in the fingers
- **Klumpke's Palsy** - Fingers of the arm affected do not move but there is spontaneous movement in arm and fore arm

Extensive Caput Succedaneum

Non-pharmacological treatment

- Reassure parents. It resolves spontaneously over 3-4 days

Cephalhaematoma

Non-pharmacological treatment

- Leave swelling alone. Do not perform incision and drainage
- It resolves with time
- Reassure parents

Pharmacological treatment

- Phytomenadione (vitamin K), IM, 2mg mg stat

Subgaleal Haemorrhage

Non-pharmacological treatment

- Give phototherapy if jaundice is severe

Pharmacological treatment

- Transfuse with blood if Hb <12 g/L
- **Phytomenadione** (vitamin K), IM,1 mg stat

Nerve Injuries

Non-pharmacological treatment

Patient needs early and regular physiotherapy

Refer

Refer severe cases to higher level care as needed

17. OBSTETRICS AND GYNAECOLOGY

17.1 Miscarriage

It is the expulsion of a fetus before it is viable, normally at 28th week of gestation, which may or may not be associated with lower abdominal pain (LAP) .It is classified as follows:

- Threatened miscarriage:
  - mild vaginal bleeding, usually no associated LAP
  - cervix closed on digital examination
- Inevitable miscarriage:
  - moderate vaginal bleeding with associated LAP
  - cervical dilatation is usually present
- Incomplete miscarriage:
  - vaginal bleeding with clots
  - passage of products of conception
- Complete miscarriage:
  Complete passage of all products of conception usually still requires referral for confirmation
- Unsafe (septic) miscarriage:
  Any miscarriage with history of interference, pyrexia, tachycardia and/or offensive products of conception

Diagnosis

- Clinical features will depend on the types of abortion
- Varginal bleeding which may be very heavy in incomplete abortion,
- intermittent pain which ceases when abortion is complete and cervical dilation in inevitable abortion
- In missed abortion, dead ovum retained for several weeks while sympoms and signs of pregnancy disappear
- When infected (septic abortion) patient presents with fever tachycardia, offensive vaginal discharge, pelvic and abdominal pain.

17.2 Puerperal/Post abortal Sepsis

Pyrexia in women who have delivered or miscarried in the previous 6 weeks may be due to puerperal or abortal sepsis and should be managed actively. Abdominal pain in addition to pyrexia is strongly suggesstive. The uterus may need evacuation in case of retained tissue is suspected however, parenteral antibiotics must be administered before evacuation.

General Measures

- Monitor vital signs and Haemoglobin (Hb
- Treat for shock if indicated.
- Counselling and support.

Pharmacological treatment

- Ampicillin (I.V) 1gm start ***Plus***
- Metronidazole 500mg**Plus**
- Gentamycin 80mg stat

Patient should continue with the following oral antibiotics after evacuation for 5 to 7days
For Mild/moderate

- Amoxycillin (O) 500mg every 8 hours for 10 days
  Plus
- Metronidozole (O)500 mg every 8 hours for 10 days
  or
- Doxycycline (O)100 mg every12hrs for 10 days ***Plus***
- Metronidozole (O) 500 mg every 8 hours for 10 days

Treatment Guidelines for severe cases

- Body temperature higher than (38 C) and marked abdominal tenderness are signs of severe post abortal sepsis

Drug of Choice:

- Benzylpenicillin (I.V) 2MU every 6 hours **Plus**
- Chloramphenicol (I.V) 500 mg every 6 hours **Plus**
- Metronidazole (O) 1 g twice daily

Note: If patient cannot swallow continue with parenteral treatment give Metronidazole, 1 gm (PR) twice daily or IV/500 mg every 8 hours
Choice for parenteral antibiotics:

- Ampicillin (IV) 500 mg every 6 hours Plus
- Gentamicin (IM) 80 mg every 8 hours Plus
- Metronidazole (O) or (PR) 1 g twice daily for the duration of 5 to 7 day

Note: Pelvic abscess may be suspected if after 48 hours no response, in this case laparatomy or referral may be necessary

- Oxytocin 20 units, IV, diluted in 1 000 mL sodium chloride 0.9% and infused at 125 mL/hour in all cases, except where threatened miscarriage is suspected.

> Caution: Use of Ceftriaxone
> Do not administer calcium containing fluids, e.g. Ringer-Lactate, concurrently with ceftriaxone.

In Rh-negative, non-sensitised women

- Anti-D immunoglobulin, IM, 50–100 mcg preferably within 72 hours **but** may be given up to 7 days following management of miscarriage.

Note: For patients with safe miscarriage the need for referral is determined by skills and facilities at the primary health care level.

1.2Management of Incomplete Miscarriage in The 1st Trimester

Both Manual Vacuum Aspiration (MVA) and evacuation are equally effective for miscarriage.

General Measures

» Counselling.

» Evacuation of the uterus after ripening the cervix.

Medicine Treatment

Before MVA, to ripen the cervix:

- Misoprostol, oral/vaginal, 400 mcg as a single dose.

Medical evacuation:

- Misoprostol, oral/vaginal, 600 mcg as a single dose.
- Repeat after 24 hours if necessary.

Follow up after one week to ensure that bleeding has stopped.

REFERRAL

- Unsafe miscarriage.
- Miscarriage > 12 weeks gestation.
- Anaemia.
- Haemodynamic instability.
- Failed evacuation.

17.3 Nausea and Vomiting in Pregnancy

Nausea and vomiting of pregnancy is the most common medical condition in pregnancy women.
It commonly occurs between 5 and 18 weeks of pregnancy.

Management

- If vomiting is not excessive, advise to take small but frequent meals and drinks
- If persistent, vomiting cases, search for other reasons e.g. malaria, UTI,
- Multiple pregnancy or molar pregnancy and gastritis;

Drug of Choice:

- Promethazine (O) 25 mg at night **OR**
- Metochlopramide (O) 10mg8hrly

- Chlorpheniramine (O) 4mg at night

In Severe cases
General management
Give Ringers Lactate depending on severity of dehydration; If possible check for electrolyte imbalance.
Medicine of choice:

- Promethazine (I.V) 25 - 50 mg 12 hrly **OR**
- Metochlopramide 10mg (I.V/I.M) 8hrly **PLUS**
- Omeprazole 20mg 12hrly (caution of its use in first trimester)

For Hyperemesis Gravidarum (Vomiting and dehydration): Admit and give

- Dextrose 5% IV then Ringer lactate + Dextrose normal saline***Plus***
- Promethazine (I.M) 25 mg twice daily OR

17.4 Antepartum Haemorrhage

Description
Antepartum haemorrhage is bleeding from the genital tract after the 28th week of pregnancy, but before the delivery of the baby. It is often an early sign of miscarriage.
Vaginal bleeding in pregnancy after 22 weeks gestation.
Important causes include the following:

- abruptio placentae,
- placenta praevia, and

- Uterine rupture (particularly when misoprostol was used).

Any APH of any degree should be cared carefully and observed closelly.

Vaginal examination should never be performed on a patient with antepartum haemorrhage.

- Sodium chloride 0.9%, IV.
- Treat for shock if necessary.
- Avoid vaginal examination, unless placenta praevia excluded.

REFERRAL- Urgent All patients.

17.5 Antenatal Care

17.5.1 Routine Antenatal Care

- All pregnant women should be seen at least once during each trimester of pregnancy.
- At the first visit, a complete assessment, including a history of the current pregnancy, a complete medical history, including gynaecological and obstetrical antecedents, and family history should be taken.
- A complete physical examination should be performed, including bimanual and speculum examination of the pelvis.
- If possible, laboratory investigations for previous or current sexually transmissible diseases, hemoglobin, sugar and/or protein in the urine, parasites in the stool and malaria infection of the blood should be

done – any abnormalities should be treated appropriately.

In addition, a number of preventive measures should be taken:

- women should receive ***two doses of tetanus toxoid*** during pregnancy (at least four weeks apart) to prevent neonatal tetanus if not completed 5 doses before.
- women should receive prophylactic treatment for anaemia. This treatment consists of combined tablets of:
- **ferrous salt**60 mg elemental iron, orally, one tablet daily for the last two trimesters (start earlier if possible)***combined with*****folic acid**250 micrograms

If the combined iron/folate tablet is not available, give

- **ferrous salt** 60 mg elemental iron, orally, once daily***plus*****folic acid** 500 micrograms (1/2 of a 1 mg tablet) orally, once daily
- If possible, iron supplementation should continue for up to 3 months after delivery or until 6 months of supplementation (a total of 180 iron pills) has been completed.
- In areas where hookworm is endemic (more than 20% prevalence), pregnant women should be dewormed once in the second trimester of pregnancy with**mebendazole** 200 mg, two tablets in a single dose
- All women should be counseled to use only iodised salt

17.5.2 Hyperemesis Gravidarum

Nausea and vomiting frequently occur during the first trimester of pregnancy. In a small percentage of pregnancies symptoms can be severe, sometimes leading to metabolic and electrolyte disturbances, and/or loss of weight.

In general, reassurance, rest, frequent small meals help, but in severe cases, hospitalization and IV therapy to correct dehydration and acidosis may be indicated.

There are no approved drugs for the treatment of nausea and vomiting in pregnancy. Rule out urinary tract infections.

17.5.3 Care of HIV-Infected Pregnant Women

Transmission of HIV from mother to infant may occur during pregnancy, delivery and/or breastfeeding.

Without intervention, 25–40% of infants born to HIV-infected women may become infected. With appropriate interventions, maternal mortality as well as perinatal transmission of HIV can be substantially reduced.

For comprehensive information on the care of HIV-infected pregnant women refer to the current National prevention of mother-to-child transmission of HIV (PMTCT) Guidelines.

Note

Only common condition specific s to pregnancy are included in this chapter. So, for other complications of pregnancy, refer to the relevant chapters.

17.5.4 Hypertension, Pre-eclampsia and Eclampsia

Hypertension in pregnancy, pre-eclampsia and eclampsia may have very serious and fatal consequences for both the mother and the baby.
Hypertension occurring for the first time at ≥ 20 weeks' gestation: BP ≥ 140/90 mmHg measured on 2 occasions 4 hours apart. ***OR***•BP > 160/110 mmHg measured on a single occasion.
(Always measure BP in the left lateral, and not supine, position).

Hypertensive disorders of pregnancy can be classified as:

- ***Gestational hypertension:***
  - Hypertension without proteinuria, detected > 20 weeks of pregnancy.

- ***Pre-eclampsia:***
  - Hypertension with proteinuria > 20 weeks of pregnancy (risk factors include chronic hypertension, pre-existing kidney disease, diabetes, pre-eclampsia in a previous pregnancy, etc).
- ***Eclampsia:***
  - Generalised tonic-clonic seizures in women with pre-eclampsia where other causes of convulsion have been excluded
- ***Chronic hypertension:***
  - Hypertension without proteinuria diagnosed before pregnancy or < 20 weeks of pregnancy.

- ***Chronic kidney disease:***
  - Proteinuria with/without hypertension < 20 weeks of pregnancy.

1 Mild to Moderate Hypertension

Hypertension occurring for the first time at ≥ **20 weeks'** gestation with no proteinuria.

Characterised by:

- BP ≥ 140/90 mmHg measured on 2 occasions 4 hours apart.**OR**
- BP >160/110 mmHg measured on a single occasion.

General Measures

- May be managed without admission before 38 weeks of gestation, provided no proteinuria.
- Review the following on a ***weekly basis***:
  - ✓ BP
  - ✓ height of fundus
  - ✓ weight
  - ✓ fetal heart rate and movements
  - ✓ urine analysis for protienurea
- Educate on signs requiring urgent follow-up (headache, epigastric pain, vaginal bleeding etc).
- Refer to hospital if proteinuria develops, or at 38 weeks for delivery.

Pharmacological Treatment

- Methyldopa, oral, 250 mg 8 hourly. Titrate to a maximum dose of 750 mg 8 hourly.
- When using iron together with methyldopa, ensure that iron and methyldopa are taken at least 4 hours apart from one another.

REFERRAL

- Severe hypertension.
- Pre-eclampsia (all levels of severity).
- Poor control of hypertension.

2 Severe Hypertension

Description

BP ≥ 160/110 mmHg, with no proteinuria. (Always measure BP in the left lateral and not supine position).

Pharmacological Treatment

Aim to reduce BP to 140/100 mmHg.

Preload with:

- Sodium chloride 0.9%, IV, 200 mL unless in cardiac failure. **Plus**Acetylsalicylic acid 75 mg once daily **Plus**
- Nifedipine, oral, 10 mg (not sublingual) as a single dose.

May be repeated after an hour if diastolic BP remains > 110 mmHg.**OR**Hydralazine (IM) 12.5 mg

Referral all cases.

3 Chronic Hytpertension

Stop ACE-inhibitors when pregnancy is planned or as soon as pregnancy is established.

Prevention and Treatment of pre-eclampsia

From 14 weeks gestation onwards:

- Calcium, oral.
- For high-risk patients: Calcium carbonate, oral, 500 mg 12 hourly (equivalent to 1 g elemental calcium daily).

- Although the benefit is greatest in high-risk women, consider use of this agent in all pregnant women.

Note: Calcium reduces iron absorption from the gastro-intestinal tract. These supplements should be taken 4 hours apart from one another.

- Aspirin, oral, 75–100 mg daily with food

Treatment of chronic hypertension

- Methyldopa, oral, 250 mg 8 hourly.
- Maximum dose: 750 mg 8 hourly.

Referral

- Poor control of hypertension.
- Chronic hypertension with superimposed pre-eclampsia.
- All women with pre-eclampsia

Treatment of Mild to Moderate Pre eclampsia
General measures

- Regular check of BP
- Monitoring of foetal wellbeing
- Advice on adequate rest
- Exclude UTI
- Check urine for protein
- Count this as a high risk antenatal patient
- Plan delivery at 37 weeks or before

Pharmacological Treatment

- Methyldopa 250-500mg 8 hrly **OR**
- Nifedipine 10 mg 12 hourly

17.5.5 Severe Pre-eclampsia

Criteria for diagnosis:
Blood pressure ≥ 160/110; Severe headache, Epigastric/ retrosternal pain, Blurring of vision, Hyperreflexia, Oliguria, Protenuria ≥5g/ 24hrs collection (≥+3 in dip stick) and,
Intra uterine growth restriction (IUGR)

General measures

•Admit in the hospital

Give:

- Normal saline **Plus**
- Nifedipine 10-20 mg 12 hrly; **Plus**
- Hydralazine 10 mg (I.V) slowly **Plus**
- Magnesium sulphate 4gm (IV) dilute to 20 mls of normal saline for 10-15 min followed by 5gm of 50% MgSO4IM in each buttock; Followed by 4gm of MgSO4 in 250 mls of normal Saline to run over 4hrs. Maintenance dose: 1gm/hr.
- Deliver as soon as the BP is controlled.

Note: MgSO4 regimen should continue until 24 hrs after the last fit.

Imminent Eclampsia

This is proteinuria PIH characterized by visual disturbance or epigastria pain and or signs of brisk reflexes.

Management

- Plan urgent delivery

- Prevent convulsions by
  - Diazepam (I.V – infusion) 40 mg diluted in 1 litre of Sodium chloride 0.9% over 6 hours

Treatment
If diastolic pressure still >110 mm give antihypertensive:

- Hydralazine 12.5 (I.M) intermittently **OR**
- Nifedipine (sublingually) 10 mg.

17.5.6 Eclampsia

General principle
- Control fits
- Control Blood pressure
- Deliver (mode of delivry depends on the favorability of the cervix).

General Measures
- Ensure safe airway.
- Turn woman onto left lateral position.
- Administer oxygen.
- Fluid and electrolyte balance
  •Insert a Foley's catheter.

Pharmacological Treatment
- Magnesium sulphate, IV, 4 g as a loading dose diluted with 200 mL sodium chloride 0.9% and infused over 20 minutes. **AND**
- Magnesium sulphate, IM, 10 g given as 5 g in each buttock
  - Then IM, 5 g every 4 hours in alternate buttocks.
  - Give anthypertensive as above

Referral

Urgent

•Pre-eclampsiaandEclampsia:

– stabilise the patient,

– initiate magnesium sulphate loading dose before referral,

– monitor vital signs while awaiting transport.

•Severe hypertension.

17.5.7 Diabetes in Pregnancy

- Gestational diabetes develops in women during pregnancy because of insulin resistance or insensitivity due to steroid hormones produced from the placenta.
- High blood sugar levels in the mother's body are passed through the placenta to the developing baby. This can cause health problems.
- Gestational diabetes usually begins in the second half of pregnancy and goes away after the baby is born.

Management

- Diabetic pregnant women require management before and throughout pregnancy
- Diabetes should be controlled by diet, oral hypoglycaemics and or Insulin and physical activities.
- Throughout pregnancy blood sugar should strictly be within the range of 4-6 mmol/L
- Insulin requirement will increase as pregnancy progresses

- During labour check blood sugar 4hourly in order to detect hypoglycaemia and manage accordingly
- When labour induced give half the usual insulin dose first and start on IV infusion of dextrose 5% at 125 ml per hour
- Manage the patient on a sliding scale of insulin after labour
- Continue to monitor blood sugar after delivery in order to adjust insulin requirement

17.5.8 Heart Burn in Pregnancy

Heartburn (also called acid indigestion or acid reflux) is a burning sensation that often extends from the bottom of the breastbone to the lower throat. It's caused by some of the hormonal and physical changes in pregnant women.

Management

Pregnant women <u>should avoid</u>:

- Food and beverages that cause gastrointestinal distress
- Tobacco and alcohol
- Eating big meals; should eat several small meals throughout the day
- Drinking large quantities of fluids during meals
- Eat close to bedtime; they should give themselves two to three hours to digest food before they lie down
- Sleep propped up with several pillows or a wedge. Elevating upper body will help keep the stomach acids where they belong and will aid food digestion.

Treatment

- Magnesium hydroxide and aluminium hydroxide mixture tablet or suspension) as needed **OR**
- Omeprazole 20 -40 once a day

17.5.9 Anaemia during Pregnancy

Definition:

- Hemoglobin level less than 11g/dl;
- Mild anaemia 9 – 11 g/dl;
- Moderate 7-8.9 g/dl;
- Severe less than 7g/dl,
- mostly due to either iron deficiency, folic acid deficiency or a combination of both.
- Women with iron deficiency often have 'pica', e.g. eating substances such as soil, charcoal, ice, etc.

Investigate for the following in case of anaemia

- Stool for ova and parasites,
- Full blood count (FBC)
- Peripheral blood film for malaria parasites
- Urine for microscopy, culture and sensitivity test,
- HIV test

Pharmacological Treatment
Established anaemia with Hb < 11 g/dL:

- **Ferrous sulphate** compound BPC, oral, 170 mg 8 hourly with food. **OR**

- **Ferrous fumarate**, oral, 200 mg 8 hourly with food. Continue for 3 months after the Hb normalises in order to replenish body iron stores.
- Do not take iron tablets within 4 hours of taking calcium tablets.

AND

- ***Iron folic acid***, oral, daily.

General management for Severe Anaemia

- Admit to the hospital
- Give blood transfusion slowly until at least heamoglobine is built to 10mg/dl.
- Give frusemide 40mg- 80mg before blood transfusion
- Continue with haematinics as above

Referral

Urgent

- Symptomatic anaemia (tachycardia > 100 heartbeats/minute, dizziness, shortness of breathe).
- Signs or symptoms of acute or chronic blood loss.
  - Evidence of cardiac failure.
- Hb < 7 g/dL in women who have not responded to oral therapy, after a month.
- Women > 34 weeks gestation with Hb < 7 g/dL.
  - Any low Hb with an obstetric complication.
  - Pallor (anaemia) plus signs of chronic disease, e.g. suspicion of TB, or the presence of hepatosplenomegaly.
- Anaemia of sudden onset.

17.5.10 Urinary Tract Infection during Pregnancy

Diagnosis

Whenever possible urine specimen for microscopy, and/ or culture and sensitivity tests should be carried out before drug treatment is initiated, except on acute conditions.

First Line:

- Amoxycillin (O)500 mg every 8 hours for 5 days

Second Line:

- Nitrofurantoin (O) 100 mg every 6 hours for 5 dayswith food **Plus**
- Amoxicillin +Clavulanic acid 625mg (O) 8hrly for 5days

For Positive RPR or Syphilis during pregnancy

- Benzathine penicillin B (IM) 1.2 MU 2 vials weekly 3 doses.

For Penicillin allergic patients

- Erythromycin oral 500 mg every 6 hours a day for 14 days

17.5.11 Vaginal Discharge during Pregnancy

Vaginal discharge during pregnancy can be physiological or due to infection.(Bacterial, fungal). The infection is usually polymicrobial and necessitates the use of combined drugs. For bacterial infections treatment options are:

- Erythromycin (O) 500 mg every 8 hours for 10 days **and**

- Metronidazole (O)400 – 500 mg every 8 hours for 7 days

For fungal infection (vaginal candidiasis) give:

- Clotrimazole vaginal tablets500mg one tablet in the evening for 6 days OR
- Miconazole vaginal pessaries once daily for 3 days

CAUTION!!

- Avoid taking both drugs concomitantly if sides effects are intolerable
- Avoid metrondazole in the first trimester
- Avoid alcohol while taking metronidazole

17.5.12 Tetanus Toxoid Vaccination (TT)

The goal of tetanus toxoid vaccination is to protect the newborn baby immediately after delivery. Follow the latest MOH recommendations for TT vaccination.

17.5.13 Syphilis in Pregnancy

Description

- A sexually transmitted infection with many manifestations that maybe asymptomatic in pregnant women.
- It is caused bythe spirochaete, T pallidum.
- Vertical transmission to the fetus occurs in up to 40% of cases in untreatedmothers.
- Untreated maternal syphilis may leadto miscarriage, stillbirth, non- immune hydrops fetalis, or congenital syphilis in the newborn.

- Diagnosis is made by positive serology, preferably with on-site rapid testing.
- All pregnant women should have a syphilis serology test at the first visit.
- Women who booked in the first trimester and tested negative should have a repeat test done at 32 weeks gestation.

General Measures

- Encourage partner notification and treatment.
- Provide counselling and promote HIV testing.
- Educate on treatment adherence.
- Promote condom use.

Pharmacological Treatment

Pregnant woman

- Benzathine benzylpenicillin, IM, 1.2 MU weekly for 3 weeks.
- Reconstitute with 6 mL of lidocaine1% without epinephrine (adrenaline).
- Follow up at 3 months after the last injection to confirm a fourfold (i.e. 2 dilution) reduction in RPR titres, provided the initial titre was ≥ 1:8. If initial titre < 1:8, further reductions may not occur (serofast reaction).

Penicillin allergy -Refer for penicillin desensitisation.

Newborn baby

- Refer all symptomatic babies.
  - Hepatosplenomegaly.
  - Pseudoparesis.
  - Snuffles.

- Oedema.
- Jaundice.
- Anaemia.
- Purpura.
- Desquamative rash (especially involving palms and soles).

- Asymptomatic, well baby:
  - Mother was not treated, or
  - If the mother has received < 3 doses of benzathine benzylpenicillin, or
  - If the mother delivers within 4 weeks of commencing treatment.
    - Benzathine benzylpenicillin (depot formulation), IM, 50 000 units/kg as a single dose into the lateral thigh.

CAUTION
Benzathine benzylpenicillin (depot formulation) must never be given intravenously.

Referral

- Symptomatic babies of mothers with syphilis.
- Penicillin allergy in the pregnant woman.

17.6 Preterm Labour (PTL)

Description
Regular painful contractions: rsulting to cervical dilatation and effacment, occurring < 37 weeks of gestation.
General Measures

< 26 weeks

- Refer without tocolysis (medicines to inhibit uterine contractions).

26–34 weeks of gestation:

- Refer with initial tocolysis and corticosteroids.

>34 week's gestation:

- Allow labour to continue at midwife obstetric unit.

Medicine Treatment

26–34 weeks gestation

- Betamethasone, IM, 12 mg two doses 24 hours apart.
- Dexamethasone5mg I.m every 12 hrs for four doses.

Tocolysis:

Preload with:

- Sodium chloride 0.9%, IV, 200 mL. THEN
- Nifedipine, oral, 20 mg as a single dose.
- Follow with 10 mg after 30 minutes, if contractions persist.
- Then 10 mg every 4 hours until patient is transferred.
- Maximum duration: 24 hours.

Referral

All cases before 34 weeks.

17.6.1 Preterm Prelabour Rupture of Membranes

Description

Rupture of the membranes ***before 37 weeks*** of gestation.

It should be confirmed with a sterile speculum examination demonstrating leakage of amniotic fluid.
If there is clinical uncertainty, test for pH – liquor is alkaline.Avoid digital vaginal examination.

Pharmacological Treatment
26–34 weeks gestation

- **Hydrocortisome (IV) 250** mg repeats after 24 hours **OR**
- **Dexamethasone,** 5 m.g every 12 hrs for four doses.

Referral
All cases.

17.6.2 Prelabour Rupture of Membranes at Term

- Rupture of membranes before the onset of labour at term ***(> 37 weeks***).
- A sterile speculum examination is required to visually confirm amniotic fluid draining through the cervical os.

General Measures
- If PROM is followed by uterine contractions at > 34 weeks' gestation, allow labour to proceed.
- If the woman does not develop uterine contractions within 12 hours of PROM, commence antibiotics and transfer for induction of labour.

Pharmacological Treatment
- **Ampicillin IV**, 1 g as a single dose. **AND**
- **Metronidazole** oral, 400 mg as a single dose.

Referral

- Suspected chorio-amnionitis (refer after starting antibiotics).
- Prolonged rupture of membranes (> 12 hours).

17.7 Intrapartum Care

For the comprehensive management of women in labour refer to the most recent National Maternity Care Guidelines.

Description
Labour is divided into 4 stages:

- **First stage** -onset of regular uterine contractions at term to full dilatation of cervix.
- **Second stage** -full dilatation to delivery of the baby.
- **Third stage**–from delivery of the baby to delivery of the placenta.
- **Fourth stage** -1 hour post delivery of the placenta.

General Measures

- Encourage companion support.
- Ensure that the mother is adequately hydrated (can be done orally).
- Monitor progress of labour on partogram.

Pharmacological Treatment
First stage with cervical dilatation < 10 cm:
For pain:

- **Pethidine**, IM, 100 mg 4 hourly. OR
- **Morphine**, IM, 10 mg, 4 hourly (Doctor initiated). OR

For nausea and sedation, if needed:
- **Promethazine, IM,** 25 mg 4 hourly.

Second stage
If episiotomy is needed, local anaesthetic:
- Lidocaine 1%.
- Do not exceed 20 mL.

17.8 Post partum Complications

17.8.1 Post partum hemorrhage (PPH)

It is an excessive bleeding of more than 500ml after the second and third stage of labour and a major cause of maternal mordidity and mortaility.
Major causes are;
- Retained products of conception
- Uterine atony
- Rarely rupture of the uterus
- Tears of the vagina/vulva
- Bleeding disorder (e.g coagulopathies, DIC)

Management
- In order to prevent the occurrence of this condition, active management of the third stage of labour (ATMSL) is mandatory.
- This involves the injection of an oxytocic after the delivery of the foetus followed by controlled cord traction and uterine massage.

Treatment
Drugs of Choice:
- Oxytocin (I.M) 10 I.U. OR

- Ergometrine (I.M) 0.25 – 0.5 mg OR
- Misoprostol 800 -1000 microgram (mcg) orally/rectally

- Give Oxytocin (I.M) 5 units after delivery of the infant; when no response gives Oxytocin (I.V infusion) 10-20 units in 1 litre of NS running at 10-20 drops per minute (dpm)
- Second Choice: Ergometrine (IM) 0.5 mg after delivery of the infant, in the absence of myometrial contraction and to prevent postparum hemorrhage

Note: Use Ergometrine cautiously in hypertensive heart disease patients.

17.8.2 Myometrial Relaxation

This is done to relax the uterus in order to:

- Relieve fetal distress immediately prior to ceasarian section
- Stop contraction of uterine in premature labour
- Prevent uterine rupture
- Perform external cephalic version

Terbutaline injection,50µg/5ml:

Note - β –stimulants such as salbutamol should NEVER be used if the patient had an antepartum hemorrhage β -stimulants are CONTRA-INDICATED for the following:

- With cardiac disease
- Severe anemia in pregnancy

17.8.3 Respiratory Syndrome

Respiratory Distress Syndrome is likely to occur in newborn and in premature labour before 36 weeks gestation.
Drug of choice for the before delivery

- **Hydrocortisome (IV)** 250 mg repeats after 24 hours OR
- **Dexamethasone(IV)** 4mg, Check the dosage.

Note:

- If no delivery the course can be repeated after one week
- CAUTION!!:
- Anemic patients under Beta stimulants and steroids are inclined to congestive cardiac failure

Stimulation of Labour and Myometrial contraction

- Myometrial stimulants should be used with great care before delivery , especially in porous women
- Use in obstructed labour should be avoided

Oxytocics are indicated for:-

- augmentation of labour
- Induction of labour
- Active management of third stage of labour.
- Uterine stimulation after delivery

17.8.4 Labour Induction

- For induction of labour use in a setting where EMNOC (C/S) is performed.
- Follow the protocol in the maternity word for induction and ougumentation.

17.8.5 Primary Postpartum Haemorrhage (PPH)

It is an excessive bleeding of more than 500ml after the third stage of labour and a major cause of maternal mordidity and mortaility.
Major causes are;

- Uterine atony
- Tears of the vagina/vulva
- Retained products of conception
- Rarely rupture of the uterus
- Bleeding disorder (e.g coagulopathies, DIC)

Management
In order to prevent the occurrence of this condition, active management of the third stage of labour (ATMSL) is mandatory.
This involves:

- Injection of an oxytocin after the delivery of the foetus followed by controlled cord traction and uterine massage.
- Bi-imanually compresses the uterus to expel clots from vagina.
- Empty the bladder.
- Two intravenous lines (wide bore if possible).

Treatment
Drugs of Choice:

- Oxytocin (I.M) 10 I.U**.** Give Oxytocin (I.M) 5 units after delivery of the infant; when no response gives

Oxytocin (I.V infusion) 10-20 units in 1 litre of NS running at 10-20 drops per minute (dpm)

OR

- Ergometrine (I.M) 0.25 – 0.5 mg **OR**
- Misoprostol 800 -1000 microgram (mcg) orally/rectally
- Second Choice: Ergometrine (IM) 0.5 mg after delivery of the infant, in the absence of myometrial contraction and to prevent postparum hemorrhage

Note: Use Ergometrine cautiously in hypertensive heart disease patients.

- Oxytocin, IV, 20 units in 1 000 mL sodium chloride 0.9% infused at 250 mL/hour in one line.

As fluid replacement:

- Sodium chloride 0.9%, IV, infused as fast as possible in the 2 nd line.

If no response:

- Ergometrine, IM, 0.5 mg. **OR**
- Oxytocin/ergometrine, IM, 5 units/0.5 mg, 1 mL.

Avoid ergometrine in hypertensive women and those with heart disease, unless haemorrhage is life threatening.
Repeat after 10–15 minutes if no response to 1st dose, while arranging referral.

- Only in settings where oxytocin is not available: Misoprostol, sublingual, or rectal, 600 mcg as a single dose.

17.8.6 Secondary postpartum Haemorrage

- Secondary postpartum bleeding is abnormal bleeding which occurs 24 hours or more after delivery.
- It is not common, but it is as serious as primary PPH.
- It is usually due to retained products, and there is frequently infection (puerperal sepsis).
- Affected patients need to be referred immediately to a hospital for further treatment with antibiotics and fluid therapy.
- Give**amoxycillin** 500 mg orally, every 8 hours***plus*****metronidazole** 500 mg orally, every 8 hours for 10 days.
- In patients with known penicillin hypersensitivity, give **erythromycin** 250 mg every 6 hours for 10 days in the place of amoxycillin.

17.8.7 Rh-negative mother

Administer to Rh-negative mother, if baby is Rh-positive or baby'sRhgroup is unknown:

- Anti-D immunoglobulin, IM, 100 mcg, preferably within 72 hours but can be given up to 7 days after delivery.

Observe mother and neonatefor 1–2 hours before transfer to the postnatal ward.

REFERRAL

- •Prolonged labour according to charting on partogram.
- •Post-partum haemorrhage.
- •Retained placenta.
- •Other complications of mother or baby.

17.8.8 Puerperal Sepsis

Puerperal sespsis results from infection of the genital tract before the 10nd day after delivery. Two or more of the following are present:

- Perceived fever, or a measured temperature greater than 38.5 ^{o}c on 2 successive days postpartum
- Pelvic pain
- Abnormal vaginal discharge (pus, or foul odor)
- Slow reduction in the size of the uterus (less than 2 cm per day during the first 8 days following delivery)

Other causes of postpartum fever include:

- Femoral thrombophlebitis and breast infection, which tend to occur after the third day postpartum. These causes have to be carefully differentiated from puerperal infections.
- Thorough examination and an accurate diagnosis are essential.

If a puerperal infection is diagnosedgive:

- Amoxycillin 500 mg orally, every 8 hours*plus*
- Metronidazole 500 mg orally, every 8 hours for 10 days.

In patients with known penicillin hypersensitivity, give **erythromycin** 500 mg every 6 hours for 10 days instead of amoxycillin.

Refer immediately to hospital

If the patient develops spiking fever and chills and/or a rapid increase in pulse, or if there is no improvement after 48 hours of antibiotic therapy.

17.8.9 Deep Venous Thrombosis (DVT)

Pulmonary embolism secondary to deep venous thrombosis is one of the major complications of the period surrounding delivery. It is an important cause of maternal mortality.

Symptoms and signs:

Swelling of the involved limb, oedema, pain, and a change in colour of the limb.

Refer the patient immediately to a tertiary hospital.

17.9 Post-partum Care

17.9.1 Postpartum Depression

- Postpartum depression affects 10-15% of new mothers between 4 weeks and 1 year after delivery and is characterised by symptoms of depressive disorder as in mood disorder.
- Postpartum depression should be differentiated from "maternity blues" which is mild in severity and self limiting.

- Treatment of postpartum depression involves standard approaches of treating depressive disorder

with antidepressant and support should be provided to the mother to continue giving appropriate care for the child.

17.9.2 Postpartum Psychosis

This is a less common condition affecting 1-2 per 1000 mothers characterised by psychotic symptoms of hallucinations, labile affect, agitation and delirium. The symptoms may appear between 3 days upto one month after delivery.
Treatment requires antipsychotic medication with chlorpromazine. Response to treatment is good but there may be a risk of recurrence.

17.9.3 Mastitis

Description

- Inflammation of the breast tissue surrounding the milk ducts.
- Retrograde infection from a fissured nipple and milk stasis are known risk factors.
- Commonly isolated pathogens include S. aureus and S. epidermidis.
- Presentation includes painful breast(s), fever, erythema and malaise.

General Measures

- Compresses.
- Regular expressing of breast milk.
- Do not stop breastfeeding, unless a breast abscess has developed.

- If breast abscess present, refer for incision and drainage.

Pharmacological Treatment

- Flucloxacillin, oral, 500 mg 6 hourly for 5 days.

Penicillin allergy

- Eritromycin, oral, 500 mg daily for 3 days.

Pain:

- Paracetamol, oral, 1 g 6 hourly when required.

Referral

- Breast abscess

17.10 Gynaecology

17.10.1 Pregnancies, Ectopic

Description

Pregnancy outside the uterus, usually presenting with the combination of:

- Amenorrhoea (missed menstrual period)
- Anaemia
- Sudden lower abdominal pain
- Dizziness
- Shock
- Shoulder tip pain
- Urine pregnancy test usually positive

Note: Consider ectopic pregnancy in young women, complaining of lower abdominal pain.

Referral

- All suspected cases of ectopic pregnancy.
- Treat shock if indicated.

17.10.2 Vaginal Bleeding

Note: Women should receive regular screening for cervical cancer after the age of 30 years. Any opportunity to perform screening should be taken; this includes taking pap smears during pregnancy.

- Abnormal vaginal bleeding is all bleeding that is different from the normal menstrual pattern in amount, duration or interval. The group includes:
  - ***menorrhagiahypermenorrhagia***(excessive amount or duration of menses);
  - ***polymenorrhea***(too frequent menses);
  - ***metrorrhagia*** **(**non-menstrual or inter-menstrual bleeding);
  - ***Menopausal bleeding*** (any bleeding occurring 6 months or more after the last normal menses at the menopause).
- When examining the patient, always keep in mind that bleeding may be due to trauma.
- In managing abnormal vaginal bleeding, young adolescents, women of child-bearing age, and post-menopausal women must be distinguished

1. Abnormal Vaginal Bleeding

Increased vaginal blood flow either in volume, duration and/or frequency, including menorrhagia or dysfunctional uterine bleeding

Causes:

- Complications of pregnancy, including ectopic pregnancy. Patients with ectopic pregnancies must be referred to a higher level without delay.

- Pelvic inflammatory disease.
- Use of a hormonal method of contraception or intrauterine device (IUD). If this is the cause, refer the patient.
- Cervical cancer. If suspicious, refer the patient immediately for examination and diagnostic work-up.
- Uterine fibroids. If suspected, refer for hospital treatment.
- Trauma.

Persistent bleeding after delivery or abortion needs urgent referral.

General Measures

- Assess current contraceptives used.
- Exclude pregnancy complication or organic disease e.g. cervical cancer, fibroids.

Pharmacological Treatment

Dysfunctional uterine bleeding:

- Mild cases, control bleeding with;
  - *Norethisterone acetate*, oral, 5 mg 8 hourly for 10-12 days
- Life threatening bleeding admit patient to hospital and resuscitate with IV fluids and possibly blood transfusion. Control bleeding with
  - *Oestrogen, oral*, 1.25-2.5 mg daily for 10-12 days

- When the bleeding is controlled continue treatment with
  - *Norethisterone, oral*, 5 mg 8 hourly for 10-12 days Or
  - *Medroxyprogesterone Acetate, oral*, mg 8 to 12 hourly for 10-12 days **Or**
  - Low dose oral contraceptive pill (ethinylestradiol/levonorgestrel) for 3-6 cycles.
- ***Ibuprofen***, oral, 400 mg 8 hourly with or after food as needed for 2–3 days. Ibuprofen may reduce blood loss in menorrhagia associated with intrauterine device (IUD) or chronic salpingitis.

Note: If heavy menses return, the tablets can be continued for as long as necessary.
Atrophic vaginitis responds to vaginal oestrogen cream treatment such as conjugated oestrogen cream.

If blood loss has been severe or there are signs of anaemia:

- Ferrous salt (sulfate or fumarate), oral, 200mg8 hourly with food.

OR

- Continue for 3 months after the Hb normalises in order to replenish body iron stores.
- Do not take iron tablets within 4 hours of taking calcium tablets.

Referral

- No improvement.

- Girls < 12 years of age with vaginal bleeding before the development of theirsecondary sexual characteristics.
- For investigation of other causes such as:
- Sexual abuse
- Foreign bodies
- Tumours of the genital tract •Severe anaemia.

2. Bleeding, Post-Menopausal

Description

- Vaginal bleeding 6 months following the complete cessation of menstruation.
- The use of corticosteroids, which cancause vaginal bleeding, should be ruled out.
- One of the commonest causes of post-menopausal vaginal bleeding is cervical cancer.
- If no other cause can be readily ascertained, the patient should be referred for examination and diagnostic work-up at the hospital level.

Note: If bleeding is profuse, stabilise before referral.

REFERRAL

All cases to exclude underlying malignancy and other pathology.

17.10.3 Dysmenorrhoea

Description

- Pain associated with menstrual cycles.
- In primary dysmenorrhoea there is no known cause.

- Secondary dysmenorrhoea usually has an organic cause.

General Measures

- Advise and reassure women with primary dysmenorrhoea about the nature of the condition.
- Encourage patient to carry on with normal everyday activities.

Pharmacological Treatment

- Ibuprofen, oral, 400 mg 8 hourly with or after food as needed for 2–3 days.

ADD

- Combined oral contraceptive pill, if symptoms stillproblematic, and if pregnancy is not planned.
- Treat for pelvic infection when present.

Referral

- Poor response to treatment.
- If an organic cause is suspected, e.g. fibroids.

17.10.4 Menopause

- Menopause refers to the point in time when permanent cessation of menstruation occurs usually due to loss of ovarian function.
  The age at onset is usually between 45 and 55 years. It may however occur earlier.

- A woman is considered to be menopausal if there is no menstruation for a period of at least 6-12 months in the absence of pregnancy.
- It is associated with physical, emotional and psychological upheaval of varying intensity in the affected individual.
- Sixty percent of menopausal women may be asymptomatic.

Causes

- Natural onset due to the age of the individual
- Due to surgical removal of the ovaries (bilateral oophorectomy)
- Pelvic irradiation.
- Premature
- Ovarian failure
- Pituitary damage from primary post-partum haemorrhage (PPH) (Sheehan'ssyndrome)
- Cytotoxic (anticancer) therapy

Symptoms

- Hot flushes (heat or burning in the face, neck and chest with resultant sweating).

The flushes may be associated with

- Palpitations• Faintness
- Dizziness • Fatigue • Weakness
- ***Emotional and psychological problems include***:
  - Mood changes • Depression • Loss of libido
  - Anxiety • Nervousness • Irritability

Atrophic changes in the genital tract may give rise to the following:

- Increased frequency of micturition and dysuria.

- Stress incontinence (urinary incontinence with coughing or straining).
- Vaginal dryness and dyspareunia

Signs

- No specific physical signs

Investigations

- Hormone tests if available (serum LH, FSH, Oestradiol)
- Routine investigations e.g. FBC, blood glucose, lipid profile
- Tests to exclude pregnancy

Treatment

Treatment objectives

•To control symptoms e.g. severe hot flushes, atrophic vaginitis and recurrent cystitis

•To prevent osteoporosis especially in individuals with premature menopause

- To prevent cardiovascular morbidity

Non-Pharmacological treatment

- Counselling and reassurance.
- Encourage active lifestyles, exercise and regular physical checkups for common medical problems.

Pharmacological treatment

In women with intact uterus

• Conjugated oestrogens and progestogen (28 tablets each containingconjugated oestrogens-625 micrograms and 12 tablets each containing norgestrel - 150 micrograms) 1conjugated oestrogen tablet daily continuously,

and 1norgestrel tablet daily on days 17-28 of each 28-day treatment cycle; subsequent courses are repeated without any interval

In women with previous hysterectomy

- Conjugated oestrogens 625 microgram daily

Note

Women with intact uterus should never be given oestrogens alone. Current evidence suggests that hormone replacement therapy (HRT) in the menopause does not prevent coronary heart disease or strokes.

HRTincrease the risk of venous thrombo-embolic phenomena, breast cancer and endometrial cancer after prolonged use and should therefore be given for the shortest possible time whenever indicated.

- Topical vaginal oestrogen cream, to be applied daily

Refer all patients to a speciality hospital.

Refer cases with osteoporosis or severe unremitting symptoms to a specialist.

18. FAMILY PLANNING

Contraception, Introduction

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The key objective of FP is to ensure that everyone should plan their family so that all children are born when wanted, expected, and welcome. The health benefits of FP also have a major role in protecting the lives of infants, children, women, and the family as a whole

- ✓ The appropriate choice of family planning method should be decided on by the woman in consultation with the health care professional taking into consideration safety, efficacy, acceptability and access.
- ✓ A complete medical and sexual history must be obtained and an appropriate physical examination performed to identify potential risks to the individual's health.
- ✓ Exclude pregnancy before commencing contraception.

NOTE: **Consult the most recent National Contraception Clinical Guidelines**

Contraceptive Methods

18.1 Intrauterine device/contraception (IUD)

Advantage

- Can be used in most women, including nulliparous women.
- Provides long-term protection i.e. 10 years.
- Convenient, does not require regular follow up.
- Works immediately on insertion.
- Fertility returns on removal of IUD in women of child- bearing age.
- Medicine interactions do not lower contraceptive effect.

Disadvantages

- Pain during and following insertion of IUD.
- IUD must be inserted or removed by a trained health care professional.
- Not indicated in women with dysmenorrhea and abnormal uterine bleeding.

18.2 Hormonal

18.2.1 Subdermal Implant

The subdermal implant is an effective, safe, reversible and convenient long-term contraceptive method requiring minimal patient involvement and no regular follow-up.

Progestin-only subdermal implant contraceptive,

e.g:

- Levonorgestrel, subdermal, 150 mg, two-rod implant.

- The progestin-only subdermal implant can be inserted any time during the menstrual cycle, once pregnancy has been excluded.
- If the implant is inserted within 7 days of the onset of the menstrual cycle the contraceptive effect is achieved on the day of insertion.
- Progestin-only hormonal contraceptives are contraindicated in certain conditions e.g. unexplained vaginal bleeding, active liver disease, and progestin-dependant tumours. Consult the package insert in this regard.

Caution

Do not use progestin-only subdermal implants in women on long term medicines that induce the metabolism of progestins, which could reduce contraceptive efficacy. These medicines include efavirenz, nevirapine, rifampicin, phenytoin, carbamazepine and phenobarbital. Women with implants on these medicines should be counseled to use additional contraceptive methods.

Insertion and removal procedures

- Participation in a training session is strongly recommended to become familiar with the use of the subdermal implants and techniques for insertion and removal.
- Only health care professionals familiar with these procedures should insert andremove subdermal implants under aseptic conditions.
- Insert the implant subdermally just under the skin.
- Refer to the package inserts, for detailed information.

REFERRAL

- Heavy or prolonged bleeding, despite treatment with COCs
- Infection at insertion site, inadequately responding to initial antibiotic treatment.

18.2.2 Injectable

Dual contraception with barrier methods, are preferred to reduce the risk of STIs.
Progestin-only injectable contraceptive, e.g.:
Medroxyprogesterone acetate (long-acting), IM, 150 mg, 12 weekly.
Progestin-only hormonal contraceptives are contraindicated in certain conditions e.g. unexplained vaginal bleeding. Consult the package insert in this regard.

When to start the injection

- The injection can be started anytime within the menstrual cycle but it is advisable to start during menses.
- If the first injection is given within 5 days of the onset of the menstrual cycle the contraceptive effect is achieved on the day of the first injection.
- Recommend dual contraceptive method i.e. condom in combination with the injection, irrespective of when the injection is started within the cycle.

Late injection

» If it has been < 2 weeks since the missed injection, the next injection can be given without loss of protection. Continue with dual contraceptive method i.e. condom in combination with the injection.

» If it has been > 2 weeks since the missed injection:

- Exclude pregnancy.
- If the patient is not pregnant, the next injection can be given. Recommend dual contraceptive method i.e. condom in combination with the injection.
- If unable to exclude pregnancy consideremergency contraception if indicated.The next injection can be given. Recommend dual contraceptive method i.e,, condom in combination with the injection.

For heavy or prolonged bleeding

Give COCs for 3–6 months, thereafter refer.

For pain:

Ibuprofen, oral, 400 mg 8 hourly as needed for up to 5 days.

REFERRAL Heavy or prolonged bleeding despite treatment with combined oral contraceptives.

18.2.3 Oral

Dual contraception with barrier methods, are preferred to reduce the risk of STIs.

- **Monophasic: progestin only pills**

Levonorgestrel, oral, 30 mcg daily.

- **Combination of estrogen and progestin in each pill**

Monophasic preparations: combination of estrogen and progestin in each pill,
e.g.: Ethinyloestradiol/ levonorgestrel, oral, 30 mcg/150 mcg:
-21 tablets ethinyloestradiol/levonorgestrel,30 mcg/150 mcg and,7 tablets placebo

Interaction with Non-liver enzyme inducing medicines
Antibiotics:

- Possible lowering of contraceptive effect.
- For the duration of the current menstrual cycle, use a condom as well.

REFERRAL
Abnormal bleeding for > 3 months.

18.2.4 Missed Pills

Progestin only pills

Efficacy is rapidly lost if one pill is forgotten or taken > 3 hours late. Recommend dual contraception for all scenarios.

Scenario	Action
One pill forgotten or if pill taken >3 hours late and unprotected sexual intercourse has not occurred in the past 5 days.	Take pill as soon as remembered and continue taking one pill daily at the same hour.
One pill forgotten or if taken > 3 hours late and unprotected sexual intercourse has occurred in the past 5 days.	Give emergency contraception Take one pill the next day and continue taking one pill daily at the same hour.

- Combination of progestin and estrogen in each pill
- Missing active pills and extending hormone free interval leads to decreased contraceptive efficacy.
- Recommend dual contraception for all scenarios.

18.2.5 Contraception, Barrier Methods

- Barrier methods are the optimum means to prevent STI and HIV transmission.
- Barrier methods are recommendedin all individuals not in a long-term monogamous relationship or where either of the partners is known to have STI, including HIV.
  - Condoms, male and,
  - Condom female in combination with IUD

18.3 Contraception, Emergency

Emergency contraception is indicated for patients not using contraception or dual contraception with IUDs to prevent pregnancy after unprotected intercourse e.g. Forgotten tablets, slipped or broken condom, progestin-only injectable contraceptive given > 2 weeks late.
Progestin-only tablets, e.g. Levonorgestrel 1.5 mg, oral, as a single dose as soon as possible after unprotected intercourse.OR

CAUTION Tablets must be taken as soon as possible, preferably within 72 hours of unprotected intercourse and not more than 5 days later.

- Copper IUD, e.g.: Cu T 380A, within 5 days of unprotected intercourse.

18.4 Male Contraceptive Method

18.4.1 Condoms

Indications

- ✓ Couples where one or both partners have HIV/AIDS even if using another FP method
- ✓ Couples needing an immediately effective method
- ✓ Couples waiting to rule out suspected pregnancy
- ✓ Protection against exposure to STIs including HIV/AIDS
- ✓ Where back-up method is needed when woman starting or forgotten to take oral contraceptives
- ✓ Where this is preferred FP method

Advantages

- Man plays role in FP
- Also protects against STI and HIV infection

Disadvantages

- Some men may have difficulty maintaining an erection with condom on
- May cause insensitivity of the penis
- Occasional sensitivity to latex or lubricants

Management

- Ensure client understands correct use, storage, anddisposal
- Supply at least 40 condoms to each client
- Advise client to return for more before they arefinished

18.4.2 Vasectomy (Male Sterilisation)

- Vasectomy is a permanent male contraceptive method which is a simple, short and safe surgical procedure.
- It is carried out by trained surgeons usually under local anaesthesia after careful counselling and informed consent.
- Vasectomy is the most effective male family planning method. Involving males in issues of reproductive health and family planning has several benefits with a positive impact on society.

Vasectomy should be encouraged for appropriate clients.

- It is less invasive and simpler than female sterilisation.

Misconceptions

- ✓ Vasectomy is ligation of the vas deferens and Not Castration
- ✓ Vasectomy does not affect erection
- ✓ Vasectomy does not affect ejaculation and orgasm. There would be normal ejaculation but the semen does not contain spermatozoa
- ✓ Vasectomy does not work immediately. A back-up method of contraception is necessary for up to 20 ejaculations,3 months after the procedure or until examination of semen shows no sperm
- ✓ After vasectomy males will still require the use of condoms to prevent sexually transmitted infections including HIV-AIDS

Effectiveness rates of various male contraceptive methods:

- Vasectomy - 99.85%
- Male condom 86%
- Withdrawal method 81%

Preoperative requirements

- Detailed counselling and informed consent
- Medical history
- Physical examination

- Laboratory investigations e.g. Hb, sickling, urinalysis

Refer

Clients should be referred to a Family Planning Unit or Urologist for the procedure.

19. PROTOZOAL DISEASES

19.1 Malaria

Note: notifiable condition.
Malaria is an infection of red blood cells by a parasite micro-organism called Plasmodium. Four species of Plasmodium are known to cause malaria in humans in Africa. The four species are:

- Plasmodium falciparum (P. falciparum)
- Plasmodium vivax (P. vivax)
- Plasmodium ovale (P. ovale)
- Plasmodium malariae (P. malariae).

The parasites are usually transmitted to humans by the bite of a vector mosquito.

In Eritrea, *P. falciparum* is the most common and the most dangerous of the malaria species and responsible for 94% of all malaria infections.

Symptoms and signs of malaria are non-specific.

The most important element in the diagnosis of malaria is a high index of suspicion in both endemic and non-endemic areas. Any person resident in or returning from a malaria area and who presents with fever (usually within 3 months of possible exposure to vector mosquito bites) should be tested for malaria. The progression of *P. falciparum* malaria to severe disease is rapid and early diagnosis and effective treatment is crucial. ***Pregnant women, young children ≤ 5 years of age and people living***

with HIV/AIDS are at particularly high risk of developing severe malaria.

Symptoms and signsa may include:

- severe headache
- shivering episodes
- fever > 38C
- nausea and vomiting
- muscle and joint pains
- flu-like symptoms

Severe disease may present with one or more of the following additional clinical features:

- prostration (severe general body weakness)
- sleepiness, unconsciousness or coma, convulsions
- respiratory distress and/or cyanosis » jaundice
- renal failure » repeated vomiting
- shock » hypoglycaemia» abnormal bleeding
- severe anaemia (Hb < 7 g/dL)» abnormal bleeding
- haemoglobinuria/black urine

DIAGNOSIS

- Diagnosis of malaria is based on clinical criteria (clinical diagnosis) supplemented by the detectionof parasites in the blood.

- Clinical diagnosis has low specificity as many illnesses present with “malaria like” signs and symptoms.
- The two most commonly used methods for parasitological diagnosis are light microscopy and rapid diagnostic tests (RDTs).
- Where rapid diagnostic tests, e.g. HRP2 antigen dipsticks are available, these can be used to diagnose malaria within 10–15 minutes.

Note: One negative malaria test does not exclude the diagnosis of malaria. Request a 2nd test.

General Measures

- Provide supportive and symptomatic relief.
- Monitor for complications.
- Ensure adequate hydration.
- Carefully observe all patients with P. falciparum malaria for the first 24 hours for features of severe malaria.

Notes on pharmacological Treatment

- All first doses of antimalarial medicines must be given under supervision and patients must be observed for at least an hour as vomiting is common in patients with malaria.

- Treatment must be repeated if the patient vomits within the first hour.
- Vomiting oral treatment is one of the commonest reasons for treatment failure.

Treatment of malaria

1. Uncomplicated malaria

Definition

Uncomplicated malaria is defined as symptomatic malaria without signs of severity or evidence(clinical or laboratory) of vital organ dysfunction.

- It is usually characterized by fever in the presence of peripheral parasitaemia.
- Other features may include headache, chills, profuse sweating, muscle pains, joint pains, abdominal pains, nausea, vomiting and refusal to feed.
- These features may occur singly or in combination.

Give antimalarial medicines only to those who test positive for parasites.

The objectives of treatment of uncomplicated malaria are to:

- To provide rapid and long lasting clinical and parasitological cure
- To reduce morbidity including malaria related anaemia

- To halt the progression of simple disease into severe and potentially fatal disease

Since the progression towards severe and fatal disease is rapid, especially in children under five years of age, it is recommended that diagnosis and initiation of treatment of uncomplicated malaria should be within 24 hours from the onset of symptoms.

19.1.1 Drugs of Choice for uncomplicated malaria

Antimalarial Combination Therapy is the simultaneous use of two or more blood schizonticidal drugs with independent modes of action and different biochemical targets in the parasite. **Artemisinin based combination therapy (ACT)** is a combination therapy whereby Artemisinin derivative is one of the components.

-Uncomplicated cases of malaria parasitologically confirmed to have infected with *P. falciparum* species are treated with combination therapy of **Artesunate + Amodiaquine (AS + AQ) tablets for three days.**

- In all zones, ***exceptin Gash Barka***, give a single dose of 0.25 mg/kg primaquine with ACT (Artesunate and Amodiaquine combination) to patients with *P. falciparum* malaria (except pregnant women, infants aged < 6 months and breastfeeding women of infants aged < 6 months) to reduce transmission.

- The first dose of ACT should be given as DOT.
- The single dose of primaquine should be given as DOT on the first day of ACT administration.

The goal for treatment of *P. vivax* and *P. ovale* infections is to: cure infection and, prevent relapses by clearing hypnozoites from the liver.

In all transmission settings, treat confirmed P. vivax or

P. ovale uncomplicated malaria cases with a 3-day **ACT**(A target dose of***4 mg/kg/day artesunate* and *10 mg/kg/day amodiaquine***)plus **primaquine** tablets for 14 days at a dose of 0.25 mg/kg given once a day

For practical reasons, primaquine treatment should start at the same time as ACT. The first dose of both the ACT and primaquine tablets should be given as DOT

Primaquine is contraindicated in pregnancylactating mothers of infants <6 months and children under 5 years of age
P. malariae infections form no hypnozoites and, therefore, treatment with only ACT for three days is sufficient.

Additional considerations for clinical management

- Counselling and follow up.
- Supportive treatment
- Fever management**:**

Note: Paracetamol should be given every six hours for three days at 15mg/kg. If Paracetamol is not available, Ibuprofen (5 mg/kg) has been used successfully as an alternative in malaria.

Management of seizures

Generalized seizures are more common in children with *P. falciparum* malaria than other malaria infections. As seizures may be a prodrome of cerebral malaria, patients with repeated seizures ***(more than two seizures within a 24 h period***) should be treated as for severe malaria.

If the seizure is on-going, the airway should be maintained and anticonvulsants given (parenteral or rectal ***benzodiazepines***If it has stopped, the child should be treated as for severe malaria, providing the core temperature is above 38.5^{o}C.

19.1.2 Treatment failures

1. Failure within 14 days

- If fever and parasitaemia ***fail to resolve or recur within two weeks*** of treatment then this is considered a failure of treatment and must be confirmed parasitologically – preferably by blood slide examination.
- This should be treated with a **second-line** antimalarial treatmenti.e. **Parenteral artesunate**.

2. Failure after 14 days

Recurrence of fever and parasitaemia ***more than two weeks after treatment*** could result either from recrudescence or new infection and this distinction can only be made through parasite genotyping by PCR. All presumed treatment failures after two weeks of initial treatment *shouldbe considered as new infections*, especially in areas of high transmission, and *be treated with the first-line ACT and single dose of primaquine.*

19.1.3 Treatment of Severe Malaria

Severe Plasmodium falciparum malaria is a medical emergency. Delay in diagnosis and provision of appropriate treatment may lead to serious complications and even death.
In Eritrea the commonest presentations of severe malaria are severe anaemia and coma (cerebral Malaria).
Complications include:

- Hyperpyrexia
- Convulsions
- shock
- hypoglycaemia
- metabolic acidosis
- acute renal failure or pulmonary oedema

Early diagnosis of severe malaria based upon a complete history, physical examination and where possible, blood smear or rapid diagnostic test (RDT)

examination for malaria parasites. Taking and reporting of blood smear must not be allowed to delay treatment unduly.

Features of severe malaria

Clinical features	Description/criteria
Prostration/extreme weakness	Unable to stand or sit up without support
Impaired consciousness	Altered level of consciousness Acute confusional state, coma
Change of behaviour	Hallucinations, delusions, agitation
Convulsions	Repetitive abnormal muscular movements
Respiratory distress (due to lactic acidosis and/or pulmonary oedema)	Acidotic breathing: deep and laboured breathing Pulmonary oedema: laboured breathing, restlessness, blood stained frothy sputum especially in adults
Bleeding tendency/DIC	Easy/prolonged bleeding
Jaundice	Yellow colouration of mucus membranes
Circulatory collapse/shock	Low systolic BP and fast pulse rate
Vomiting everything	Throwing up after every feed/drink
Inability to drink or breast feed	Not able to swallow
renal failure	
Pulmonary oedema (radiological)	

19.1.3.1 In addition to the clinical features, the presence of *one or more* of the following laboratory findings classifies the patient as suffering from severe malaria

1. Hypoglycaemia (blood glucose < 2.2 mmol/l or < 40 mg/dl)
2. Metabolic acidosis (plasma bicarbonate < 15 mmol/l)
3. Severe normocytic anaemia (Hgb < 5 g/dl, packed cell volume < 15%)
4. Haemoglobinuria
5. Hyperparasitemia (> 2% or 100 000/µl in low to moderate intensity transmission areas or > 5% or 250 000/µl in areas of high stable malaria transmission intensity)
6. Hyperlactataemia (lactate > 5 mmol/l)
7. Renal impairment (serum creatinine > 265 µmol/l).

All these clinical, laboratory or parasitological features can occur singly or, more commonly, in combination in the same patient.

The primary objective of antimalarial treatment in severe malaria is to prevent death.

Management of severe malaria comprises four main areas
Clinical assessment

1. Severe malaria is a medical emergency.

2. An open airway should be secured in unconscious patients and breathing and circulation should be assessed.
3. Unconscious patients should have a lumbar puncture for cerebrospinal fluid analysis to exclude bacterial meningitis.The assessment of fluid balance is critical in severe malaria.
4. Respiratory distress, in particular with acidotic breathing in severely anaemic children, often indicates hypovolaemia and requires prompt rehydration and, where indicated, blood transfusion.

Pharmacological treatment of severe malaria

It is essential that effective, parenteral or rectal antimalarial treatment in full doses is given promptly in severe malaria.

Two classes of medicines are available for the parenteral treatment of severe malaria:

- The**cinchona alkaloids** (quinine and quinidine) and,the**artemisinin derivatives** (artesunate, artemether and artemotil).
- The artemisinin derivatives are safe and well tolerated by young children, and so the choice of **ACT** will be determined largely by the safety and tolerability of the partner drug. **Primaquine should be avoided in infants.**
- IV artesunate is recommended for the treatment of severe P. falciparummalaria in adults and children.

•The dosage is 2.4 mg/kg BW of artesunate given through IV or IM on admission (time = 0), then at 12 h and 24 h, then once a day is the recommended treatment regimen for all age groups.
•Give parenteral antimalarials in the treatment of severe malaria for a minimum of 24 h once started, irrespective of the patient's ability to tolerate oral medication earlier, and, thereafter, complete treatment by giving a complete course of oral Artesunate + Amodiaquine.

Quinine remains an acceptable alternative where artesunate is not available.
The preferred route of administration is the intravenous (IV) route. However, intramuscular route can be used as an alternative to intravenous where intravenous route is not feasible / possible.

NOTE: If effective management of severe malaria and supportive care for complications is not possible, patients should be given pre-referral treatment and referred immediately to an appropriate facility for continued treatment.

Pre-referral treatment options:

B: Artesunate IM/rectal

OR

B: Quinine IM

Rectal artesunate is the recommended pre-referral treatment at the community level.

At a health facility the pre-referral dose of parenteral therapy should be initiated without delay.

Pre-referral rectal artesunate:
•**Available** as suppository containing 50mg or 100mg or 400mg
Dosage regimen:

- Single dose of 10 mg/kg body weight artesunate should be administered rectally.
- In the event that an artesunate suppository is expelled from the rectum within 30 min of insertion, a second suppository should be inserted and, especially in young children, the buttocks should be held together for 10 min to ensure retention of the rectal dose of artesunate.

Table 4: Dosage for initial (pre-referral) treatment using rectal artesunate

Weight (Kg)	**Age**	**Artesunate dose (mg)**	**Regimen (single dose)**
5-8.9	0-12 mo.	50	One 50 mg suppository
9-19	13-42 mo.	100	One 100 mg suppository
20-29	43-60 mo.	200	Two 100 mg suppository
30-39	5-13years	300	Three 100 mg suppository
40-59	>14years	400	One 400 mg suppository
60-80	>14 years	800	Two 400 mg suppository

>80	>14 years	1200	Three 400 mg suppository

Pre-referral artesunate IM:

- Single dose of 2.4 mg/kg body weight administered by intramuscular injection to the anterior thigh after reconstituted and diluted as directed.

Pre-referral Quinine IM:

- Give single dose of 10mg of quinine salt per kg bodyweight (not exceeding a maximum dose of 600mg).
- The calculated dose should be divided into two halves and then administered by deep intra-muscular injection preferably into the mid anterolateral aspect of the thigh (one injection on each side).

Supportive treatment

Nursing care - management for comatose patients to avoid aspiration and pressure sores.

Note: The dosage of artemisinin derivatives does not need adjustment in vital organ dysfunction.

- Metabolic acidosis**:** Exclude or treat hypoglycaemia, hypovolaemia and Gram-negative septicaemia. Give isotonic saline 20 ml/kg of body weight rapidly or screened whole blood10 ml/kg body weight over 30 minutes, if haemoglobin is <5g/dl.

- Shock, algid malaria:Suspect Gram- negative septicaemia; take blood samples for culture. Give parenteral antimicrobials; correct haemodynamic disturbances.
- Spontaneous bleeding and coagulopathy:Transfuse screened fresh whole blood or clotting factors; give vitamin K, 10 mg intravenously.
- Hyperparasitaemia:Give initial dose of parenteral antimalarial therapy; consider exchange transfusion if there are other signs of severity.
- Malarial haemoglobinuria**:** Continue antimalarial treatment; transfuse screened fresh blood if needed.
- Aspiration pneumonia**:** Give parenteral antimicrobials; change position of patient; give physiotherapy; give oxygen.

Treatment in specific populations and situations
Management of malaria in pregnancy

Early diagnosis and effective case management of malaria illness in pregnant women is crucial in preventing the progression of uncomplicated malaria to severe disease and death.

•The recommended treatment for uncomplicated malaria in pregnant women is a 3-day ACT course with the first dose given as DOT. •Treatment of severe malaria in pregnancy is the same as the general population, i.e. parenteral artemisinin in all trimesters.

Management of uncomplicated malaria in the first trimester if a laboratory blood slide is negative, it does not rule out malaria.

RDTs have an added value, as they can be positive even if parasites are hidden in the placenta.

First trimester:

- During the first trimester of pregnancy, treat with quinine for seven days. Quinine is safe in pregnancy. At present, artemisinin derivatives cannot be recommended in the first trimester of pregnancy.

Note: Lactating women should receive the recommended antimalarial treatment.

Management of severe malaria in pregnancy

- Pregnant women infected with malaria are more susceptible to develop severe malaria. It is better to admit all cases of P. falciparum malaria.
- Common presenting signs/symptoms: high fever,hyperparasitemia, low blood sugar, severe haemolyticanaemia, cerebral malaria, pulmonary oedema.
- The risk of quinine induced hypoglycaemia is greater in pregnant.
- Blood sugar should be monitored regularly and if falls below 2.5 mmol/L(< 45 mg/dl) give IV 10% or 25% dextrose.

Cautious*:*

- Parenteral antimalarials should be given to pregnant women with severe malaria in full doses without delay.
- Parenteral artesunate is preferred over quinine because quinine is associated with recurrent hypoglycaemia.

•Treatment of severe malaria in pregnancy is the same as the general population, i.e. parenteral artemisinin in all trimesters.
•In the treatment of severe malaria in pregnancy, saving the life of the mother is the primary objective.

Intermittent preventive treatment in pregnancy (IPTp)
According to WHO guidelines, IPT is **not recommended** in areas of unstable malaria such as Eritrea. Instead, in areas of unstable malaria, application of IRS and ITNs are the best options for preventing pregnant women from being sick of malaria.
Lactating women - lactating mothers can be given first line ACT.

Infants and young children

- Delay in treating *P. falciparum* malaria in infants and young children may have fatal consequences, particularly for more severe infections.
- In severely sick infants that vomit antimalarial drug treatment repeatedly, or are too weak to swallow,

artesunate should be given by the ***rectal route prior to transfer*** to a facility where parenteral treatment is possible.

19.1.4 Chemoprophylaxis

- Travelers are encouraged to use other barrier methods (LLINs, etc) to prevent or reduce bites from mosquitoes.
- In Eritrea, the currently recommended choice of drugs for prophylaxis is Mefloquine.
- Mefloquine prophylaxis is started 2 weeks before arrival in a malaria risk area, taken throughout the stay and continued for 4 weeks after leaving the area.
- For more information on mefloquine see National Malaria treatment Guidline.

19.1.5 Management in epidemic situations

After confirmation of an epidemic, Mass Screening and Treatment (MSAT) must be conducted in at least 500 metres radius from the first confirmed infected house. Mass screening for parasitaemia using RDTs and *treating all infected* persons in a targeted area or population.The drug of choice for confirmed infections is the first line treatment a 3-day ACT plus one dose of premaquine as gametocytocidal (for *P. falciparum malaria*) and a 3-day ACT plus primaquine for 14 days (for *P. vivax* malaria) .

•Only parasitologically confirmed malaria patients should be given antimalarial drugs even during epidemics.
•Mass drug administration for malaria epidemics is not recommended. Mass screening and Treatment (MSAT) for confirmed cases is the recommended option to contain epidemics.
•Pregnant women, infants aged < 6 months and breastfeeding women of infants aged < 6 months infected with falciparum should not be given single dose gametocytocidal primaquine tablets.
•Pregnant women, lactating mothers and children under 5 infected with vivax should not be given primaqine tablets.

Caution! The area where MSAT has been conducted, it may eventually return to its original prevalence levels, unless the vectorial capacity is reduced in parallel and maintained at very low level.

19.2 Leishmaniasis

- Leishmaniasis is an infection which is transmitted by the bite of a sandfly.
- It is most common in the western lowlands of Eritrea.
- The disease has a visceral manifestation (kala azar) which can include splenomegaly, a cutaneous manifestation and intermediate manifestations, determined by parasite load and the immune response of the patient.

19.2.1 Cutaneous Leishmaniasis

- The cutaneousform is characterised by single or multiple, sharply demarcated, ulcerating, granulomatous skin lesions. Secondary infection is usual.
- A microscopical diagnosis has to be made to exclude other causes.
- Cutaneous lesions are self limiting, although the healing process may take up to 18 months.

Patients with persistent lesions should be referred to the regional hospital.

If treatment with pentamidine is prescribed, it can be administered at the regional hospital or an appropriate quantity of the drug can be supplied on prescription for the patient's treatment at the local health facility. Treatment is as follows:

- **Sodium stibogluconate:**
  - Less than 18 years: 20mg/kg/day
  - Adults: 10 mg/kg, orally for 20-30 days.
- **Pentamidine isethionate** 3 mg/kg by deep IM injection, once or twice a week as prescribed, for 5-6 doses

19.2.2 Visceral Leishmaniasis

In areas of the Eritrean lowlands where leishmaniasis is commonly found, suspect patients must be referred to the Regional Hospital.
Treatment is as follows:

- **pentamidine isethionate** 3 mg/kg by deep IM injection, every second day for a total of 10 injections***or***
- **sodium stibogluconate** 100 mg in 1 ml
  - adults: 6 ml per day IM or IV for 30 days
  - children less than 5 years: 2 ml per day
  - children 5-14 years: 4 ml per day

The course may be repeated if necessary.

20. SEXUALLY TRANSMITTED DISEASES

- Sexually Transmitted Diseases (STDs) are major public health problem. If left untreated infections can lead to a number of serious complications.
- They cause acute morbidity in adults and may result in long-term complications such as urethral stricture, infertility, ectopic pregnancy, cervical cancer, foetal wastage, prematurity, low birth weight, ophthalmianeonatorum and congenital syphilis.
- Their control is the corner stone in improving reproductive health and reducing Human Immunodeficiency Virus (HIV) infections.
- Comprehensive management of STDs is important and comprises prompt and effective case detection and treatment.
- However, owing to the lack of laboratory equipment and manpower in primary care facilities where most patients first present, an accurate diagnosis is often not possible.
- Also with most STDs, one cannot usually tell which organism is causing the infection from the history and physical examination alone.
- Multiple infections also occur, with each needing to be treated. Failure to treat one infection adequately may result in the development of serious complications.
- Differential diagnosis of STDs is best based on laboratory investigations.
- When this is not feasible, treatment must be based to a more practical approach: ***'syndromic diagnosis'*** which identifies all STDs that could cause a particular

symptom or sign and provide treatment for each of them simultaneously.

The common clinical syndromes associated with STDs include:

- urethral discharge,
- vaginal discharge,
- lower abdominal pain,
- inguinal lymphadenopathy (buboes) and,
- Ano-genital ulcers.

In dealing with patients with STD, privacy and confidentiality, especially with the history taking and examination, are paramount.

- Education and counselling of STD patients and concurrent management of their partners provide additional opportunities to reduce the risk of STD in the community.
- Studies in **Eritrea** show that non-specific urethritis and gonococcalurethrits are commonly-occurring (STDs). Genital ulceration and more extensive forms of genital tract infections such as chlamydial infections are also frequent.

General Management

1. Goals of Early Treatment

It is important to treat STDs as early as possible in order to:

- Alleviate the patient's symptoms
- Reduce the risk of complications
- Reduce the time that a person is infectious to others

- Decrease the possibility of transmission of HIV.

In addition to drug treatment, all patients being seen for suspected sexually transmissible disease should receive health education about the four '**C's**, These are:

1 **Compliance:** it is very important that patients complete the entire course of drug treatment prescribed
2 **Counseling:** patients should be told about the disease, about how to avoid catching an STD again, and about HIV/AIDS
3 **Contact tracing:** all sexual partners should be encouraged to be examined and to receive treatment
4 **Condoms:** the proper use of condoms as a way to prevent STDs should be encouraged for all sexually active individuals with more than one partner.

20.1 Urethral Discharge

Causes

- Neisseria gonorrhoea (Gonococcalurethrits)
- Chlamydia trachomatis (Non-gonococcal urethritis)
- Mycoplasma genitalum

Signs and Symptoms

- Urethral discharge (gentle milking of the urethra may reveal the discharge if it is not initially visible)
- Dysuria or discomfort on urination
- Genital sore

Invstigations

- Urethral swab culture and sensitivity (if available)

Pharmacological Treatment

For <u>Gonorrhoea</u>:

- **Ciprofloxacin**, oral, 500 mg stat or Ceftriaxone, IM, 250 mg stat **Plus**

For <u>Chlamydia and Mycoplasma</u>:

- **Doxycycline,** oral, 100 mg 12 hourly for 7 days **OR**
- **Erythromycin,** oral, 500 mg 6 hourly for 7 days

Note - Patients have to be counselled to complete treatment even when symptoms subside. All sexual partners of the patient within the last 3 months need to be seen and treated. If the urethral discharge persists after treatment, repeat treatment and counsels the patient if it is due to non-adherence to therapy or re-infection.

Persistent or Recurrent Urethral Discharge

This may occur due to drug resistance, poor treatment compliance or re-infection following treatment for an STI. In some cases persistence of urethral discharge may be due to infection with Trichomonasvaginalis.

Causes

Neisseria gonorrhoeae,
Chlamydia trachomatis or Mycoplasma genitalum following drug resistance, poor compliance or re-infection after treatment

Treatment

Trichomonasvaginalis

• Metronidazole, oral, 400 mg 12 hourly for 7 days **OR**
•Metronidazole, oral, 2g stat **OR**

•Tinidazole, oral, 2g stat
Note - The treatment regimen with metronidazole or tinidazole assumes that effective therapy for gonorrhoea, chlamydia and mycoplasma has been taken in full by the patient.

Refer
In cases of treatment failure, refer the patient to a health facility where microbiological culture and antimicrobial sensitivity tests can be done on the urethral discharge.

20.2 Vaginal Discharge

- Sexually transmitted disease (STD)-related vaginal discharge is defined as a change in colour, odour and/or an increase in the amount of vaginal secretion attributable to vaginal or cervical infection.
- Vaginal discharge may be accompanied by pruritus, genital swelling, dysuria, and lower abdominal or back pain.
- The discharge may be purulent or offensive. Occasionally it can be caused by a forgotten tampon.
- A careful risk assessment (see note below) of women with a vaginal discharge may help identify appropriate treatment regimens based on the most likely aetiology of the vaginal discharge.
- Otherconsiderations for selecting treatment include pregnancy status and patient discomfort.

Causes

1. **STD-related**
    - Neisseria gonorrhoea

- Chlamydia trachomatis
- Trichomonasvaginalis green or yellow, smelly, bubbly or frothy discharge associated with itching
- Herpes simplex virus following extensive first episode of infection

2. **Non STI-related**
   - Candidiasis - white, lumpy or thick discharge associated with itching
   - Bacterialvaginosis grey or white, fishy smelling discharge, especially after sexual intercourse
   - Gardnellavaginalis
   - Foreign bodies like forgotten tampon
   - Herbal preparations

Signs and Symptoms

- Vaginal discharge -change in colour, odour, consistency or amount
- Vulval itching, vulval swelling
- Vulval erythema
- Lower abdominal or back pain
- Pain on urination
- Lower abdominal tenderness
- Cervical excitation tenderness
- Cervical mucopus or erosions (on speculum examination)

Investigations

- High vaginal swab for microscopy, culture and sensitivity (if available)

Treatment objectivesare to:

- identify and treat non-STI vaginitis
- assess STI risk and treat STI-related infections appropriately
- prevent complications and sequelae
- treat both partners simultaneously as much as possible

Non-pharmacological treatment

- Ensure good peri-anal and genital hygiene
- Encourage use of loose cotton underwear
- Keep underwear dry
- Avoid douching with herbal or chemical preparations
- Avoid medicated soaps

Vaginal discharge can have two causes:

- Vaginitis (inflammation of the vagina) **or**cervicitis (inflammation of the cervix).They can exist together.

Vaginitis can produce a copious and foul-smelling discharge, and is unpleasant for the patient; it usually has few, if any, consequences for the patient.

Vaginitis is usually due to trichomoniasis, bacterial vaginosis, or candidosis.

<u>Cervicitis</u> is a more dangerous disease –

- It can lead to permanent damage of the reproductive tract.
- It is frequently accompanied by little, if any, discharge and this can be obscured by the discharge caused by vaginitis. Cervicitis is most frequently caused by gonococci and/or by chlamydia.
- To distinguish between the two conditions, it is important to assess the risk of cervical infection in a given patient.
- A risk assessment is considered to be positive either when the patient's sexual partner is also symptomatic or when the 2 of the following are present:

Risk Assessment

Parameters used in the risk assessment for cervicitis are:

1) Patient's partner is symptomatic (i.e. partner has a urethral discharge)
2) Patient is less than 21 years old
3) Patient is single
4) Patient has more than one sexual partner
5) Patient has had a new sexual partner in the last 3 months

If the risk assessment is said to be positive and treatment: For ***<u>cervicitis</u>*** is recommended if

• The answer to (1) is yes or

• The answer to any 2 of items (2 - 5) is yes.

- If a woman has a vaginal discharge with no positive risk factor, treat for vaginitis alone.
- If she has a vaginal discharge, and a positive risk factor, treat for both vaginitis and cervicitis.
- If the risk factor is negative treat for vaginitis only as follows;

*For **Vaginitis**:*

Treatment for trichomoniasis and bacterial vaginosis

1. **Metronidazole**, oral, 500 mg 8 hourly for 5 days (contraindicated during the 1st trimester of pregnancy) **OR**
2. **Metronidazole**, oral, 2 g stat (contraindicated during the 1 st trimester of pregnancy)

Treatment for candidiasis

2. **Clotrimazole,** vaginal tablets, 200 mg inserted into vagina at night for 3 days **or**
3. **Clotrimazole cream**, applied twice a day (for vulval irritation)

If risk factor assessment is positive, treat for vaginitis as above and for cervicitis;

For Cervicitis:

1 Treatment for gonorrhoea

• **Ciprofloxacin,** oral, 500 mg stat. (avoid in pregnancy) **OR**

2 Treatment for chlamydia

• **Doxycycline**, oral, 100 mg 12 hourly for 7 days (avoid in pregnant and nursing mothers)**or**

• **Erythromycin**, oral, 500 mg 6 hourly for 7 days

Refer:

- All cases of recurrent vaginal discharge and/or treatment failures to a health facility where speculum examination can be carried out and microbiological culture and antimicrobial sensitivity tests can be done on the vaginal discharge.
- The above represent the treatment guidelines for situations in which neither a physical examination using a speculum nor laboratory facilities are possible. Where these are available, a more specific diagnosis can be made.
- Guidelines for the treatment of specific conditions causing vaginal discharge are given below.

Cervicitis (Gonococcal and Chlamydial Infection)

Treat as for urethral discharge, see above

Trichomoniasis

Trichomonas vaginalis causes a greenish, malodorous vaginal discharge.

Pharmacological Treatment

•**Metronidazole** 2 g orally, as a single dose

If there is no satisfactory response to a single dose treatment, or if the patient does not tolerate this high dosage, use:

- **Metronidazole** 500 mg orally, every 12 hours for 7 days.This should also clear any local coincident bacterial vaginosis infection.

Trichomoniasis is a sexually transmitted disease and men most commonly are asymptomatic, but often harbor the parasite - therefore, male sexual contacts should be treated with:

- **Metronidazole 2g** orally, as a single dose

NB. Metronidazole is contraindicated in the first trimester of pregnancy**.**

Candidiasis

An infection caused by yeast, *Candida albicans* which generally causes a white, cheesy discharge.

The infection occurs more frequently in patients taking antibiotics, oral contraceptives, patients with diabetes, and pregnant women.

- Correct the underlying cause, if applicable.
- Hygiene is of highest importance during therapy.
- Male and female patients should frequently change their under clothing.
- Condoms should be used during intercourse.

Pharmacological Treatment

- Treat the woman with **Nystatin pessaries**, 2 inserted each night for 2 weeks
- The male partner, if he shows symptoms, should apply:

Gentian violetpaint 0.5% topically, to the penis every 12 hours for 2 weeks.

20.3 Genital Ulcer Disease

A genital ulcer is a break in the continuity of the skin of the genitalia. They may be painful or painless and are frequently accompanied by inguinal lymphadenopathy. They increase a patient's susceptibility to HIV infection.

Causes

- Herpes simplex
- Treponemapallidum (syphilis)
- Haemophilusducreyi (chancroid)
- Calymmatobacteriumgranulomatis (granuloma inguinale)
- Lymphogranulomainguinale
- Secondarily infected post-traumatic ulcers

In the absence of laboratory confirmation, which itself can be difficult in the early stages, these two conditions can be readily confused with each other and with a number of other conditions, such as genital herpes virus infection.

In the primary health care setting

- If no laboratory facilities are readily available, the syndromic approach is essential.
- After taking a careful history, the health worker should examine the genital region of the patient.

- If an ulcer is present, the patient should be treated for both syphilis and chancroid
- A thorough examination will therefore require for careful inspection of the glans penis, coronal sulcus, frenum and urethral meatus.
- Latex gloves must be worn at all times during examination of genital ulcers.

Signs Symptoms

- Genital ulcer
- Urethral discharge

1 **.Herpes simplex**

Multiple, recurrent vesicular lesions (Herpes simplex)

2**. Syphilitic ulcers**

- Often single, painless and indurated lesions with a clear base and well-defined edges
- Occasionally multiple, painful, non-indurated or have a purulent base
- Discrete, firm, painless, inguinal lymphadenopathy a week after the primary lesion
- Primary ulcer usually heals within six weeks, usually without leaving a scar.

3**. Syphilis** develops in three stages:

3.1 **Primary syphilis**:

- Usually presents as a small painless sore in the genital area in women or as a small painless ulcer on the penis or scrotum in men.
- The lesion will appear 2-5 weeks after sexual contact with an infected individual and will spontaneously disappear after a few days, sometimes without being noticed although the disease develops to the secondary stage.

3. 2 **Secondary syphilis**

- May develop after several weeks.
- The patient may have fever, a sore throat and a rash. The rash is commonly found on the palms of the hands and soles of the feet and the infection can spread to others through skin contact.
- These symptoms will also disappear even if not treated but the disease continues to develop in the body.

3.3 **Tertiary syphilis:**

- Develops after one to four years. It includes heart disease, tumours, and disease of the spinal cord and brain, which can lead to paralysis

4 **Chancroid**

- Painful with undermined ragged edges
- The base is covered with a purulent exudate and easily bleeds to touch
- Several ulcers may coalesce to form serpiginous lesions

- Lymphadenopathy is usually unilateral and may become fluctuant

5 **Granuloma inguinale**

- Begins with a small papule that progresses into anenlarging granulomatous ulcer
- Ulcer usually painless, indurated and beefy red and easily bleeds with trauma
- Edges are well defined
- Healing is not spontaneous and is accompanied by extensive scarring

If the ulcer worsens or does not improve after treatment refer to a health facility with microbiology support to exclude other causes.

Investigations

- VDRL (if available) if not **refer**

Treatment objective

- To treat small ulcers and vesicles, especially if recurrent for Herpes simplex
- To direct initial management of all ulcers at both syphilis and chancroid
- Keep lesions dry and clean

Pharmacological Treatment

For Herpes simplex:

- **Acyclovir,** oral, 400 mg 8 hourly for 7 days (this drugs is available only at level 3, so refer)

Plus

- Povidoneiodone, or Gentian violet solution, topical, to paint lesions

For Syphilis

Primary and secondary syphilis are treated with

- **Benzathine Penicillin G,** IM, 2.4 million Units (mega units) in 2 divided doses during one clinic visit;Give one injection in each buttock OR
- **Aqueous Procaine Penicillin**, IM (by deep injection), 1.2 million units (mega units) daily, for 10 days

Alternative Treatment (for persons allergic to penicillin):

- **Doxycycline,** oral, 100 mg 12 hourly for 14 days

or

- **Erythromycin,** oral, 500 mg 6 hourly for 14 days

Tertiary syphilis includes cardiovascular and neurosyphilis and should be referred to a specialist for appropriate inpatient management. A recommended regimen is:

- **Benzylpenicillin** 2.4 to 4.8 MILLION IU, IV, every 4 hours for 15 days.

Syphilis during Pregnancy and Congenital Syphilis

- Pregnant patients are treated the same way as non-pregnant patients at all stages of pregnancy.
- Patients hypersensitive to penicillin should be referred to an appropriate specialist. If the mother received adequate treatment during pregnancy, and was not re-infected, the risk of congenital syphilis occurring in the baby is low but the mother and baby should be referred to an appropriate specialist for investigation.
- Pregnant patients with syphilis who are allergic to penicillin should be given **Erythromycin** 500 mg by mouth four times dailyfor 15 days.
- These women should be followed up after completion of therapy and again after delivery of the child.

For Chancroid:

- First line : **Co-trimoxazole** oral 960 mg twice daily for 10 days
- Second line : **Erythromycin**oral500 mg 6 hourly for 10 days
- Third line : **Ciprofloxacin**oral, 250 mg 8 hourly for 7 days

20.4 Pelvic Inflammatory Disease (PID)

Lower abdominal pain in a woman may have several causes. These include:

- pelvic inflammatory disease (PID),
- ruptured ectopic pregnancy, and,

- Septic abortion.

The latter two are surgical emergencies which require extreme urgency in their management (See sections on 'Ectopic Pregnancy' and 'Abortions').

Acute PID is an infection

- Of the upper genital tract and involves the endometrium, fallopian tubes and adjacent pelvic structures.
- It is a frequent result of sexually transmissible disease and *Neisseria gonorrhoea* and *Chlamydia trachomatis* are most commonly involved, although many other bacteria can contribute to the syndrome.
- PID can have very serious long-term consequences, including infertility. PID typically causes lower abdominal pain, and vaginal discharge, painful urination, and low-grade fever can also be present.

For the woman complaining of lower abdominal pain, a careful history should be taken.

- If the most recent menstrual period is overdue or,
- if thewoman has recently given birth or,
- if there is rebound tenderness or,
- vaginal bleeding,

She should be referred to hospital. A bimanual pelvic examination should be performed if possible.
If there is pain when the cervix is moved, the patient should be treated for PID.

However, after excluding ectopic pregnancy, STI-related organisms are the most likely cause of lower abdominal pain in a sexually active woman who has not recently delivered a baby, or has no past or recent history of uterine instrumentation.
The presence of intrauterine contraceptive devices favours the development of PID particularly in the month following insertion.

Causes

-STI-related

- Neisseria gonorrhoea
- Anaerobic bacteria
- Chlamydia trachomatis

-Non STI-related

- Ectopic pregnancy
- Septic abortion
- Post partum sepsis
- Foreign body including IUD

Signs and Symptoms

- Fever
- Lower abdominal pain
- Pain with sexual intercourse (dyspareunia)
- Vaginal discharge
- Dysuria or urethral discomfort
- Lower abdominal tenderness
- Tenderness on moving the cervix (cervical excitation) on bimanual vaginal examination
- Adnexal masses and or tenderness

Investigations

- Pelvic ultrasound
- High vaginal swab culture and sensitivity

Treatment objectives

• To treat for gonorrhoea, chlamydia and anaerobic bacterial infection
• To relieve pain and inflammation

Non-pharmacological treatment

• Remove IUD, if present, 3 days after initiation of drug therapy

Pharmacological Treatment

Out-Patients

• **Ciprofloxacin,** oral, 500 mg 12 hourly for 3 days**Plus**
• **Doxycycline, oral**, 100 mg 12 hourly for 14 days **Plus**
• **Metronidazole, oral**, 400 mg 12 hourly for 14 days

In-Patients

• **Ceftriaxone, IM**, 250 mg daily for 3 days**Plus**
• **Doxycycline, oral**, 100 mg 12 hourly for 3 days **Plus**
• **Metronidazole, oral**, 400 mg 12 hourly for 3 days

Followed by

• **Doxycycline, oral**, 100 mg 12 hourly for 14 days**Plus**
• **Metronidazole, oral**, 400 mg 12 hourly for 14 days

Adjunctive Treatment

Pain relief

- Diclofenac, oral, 50 mg 8 hourly

Note: The patient should return after 3-5 days for follow-up. If any of the following are present, she should be referred to hospital:

- the patient is obviously sick and in pain, withfever and peritoneal signs
- There has been little or no response to treatment.
- Excessive vomiting prevents completionof the course of oral medication.
- a mass is detected in the pelvic area
- pregnancy is suspected

20.5 Infections of the Male Genital Organs

20.5.1 Balanitis

- Balanitis presents as inflammation of the glans penis and isusually associated with poor hygiene.
- *Candida albicans* is the usual causative organism and responds to treatment with topical antifungal agent.
- Clean the area thoroughly and use;:
    - **clotrimazole cream** 1% topically, every 8 hours for 10 days

20.5.2 Prostatitis

- Acute prostatitis presents with lower urinary tract symptoms associated with fever, pain and tenderness of the prostate. It usually responds to antibacterials.
- Use **nitrofurantoin** 50 mg orally, every 6 hours for 5 days

- If there is no response the patient must be referred to a higher level.

20.5.3 Scrotal Swelling

Scrotal swellings can be caused by trauma, torsion of the testis, infections, (e.g. Epididymitis, orchitis) or tumours.Infective causes of scrotal swelling may be STI-related which can lead to infertility if not effectively treated.

- Testicular torsion is a surgical emergency and has to be excluded by a careful history and physical examination.
- If present this requires immediate surgical referral (Also see section on 'Scrotal Masses').

Causes

- *STI-related*
  - Chlamydia trachomatis
- Neisseria gonorrhoea
  - Treponemapallidum (very rarely)
- *Non STI-related*
  - Torsion • Tumours
  - Mumps virus (mumps orchitis)
- Tuberculosis

Symptoms

- Scrotal pain
- Scrotal swelling
- Dysuria
- Urethral discharge
- Frequency of micturition
- Fever

Signs
- Scrotal tenderness
- Fever
- Scrotal swelling, edema and/or erythema
- Urethral discharge

Investigations
- Urethral swab for culture, ultrasound scan of the scrotumand urine culture and sensitivity

TreatmentThe objectivesare to:
- provide pain relief
- identify and treat STI and non-STI related causes appropriately

Non-pharmacological treatment
- Bed rest
- Scrotal support until inflammation and fever subside

Pharmacological Treatment

For Gonorrhoea

Ciprofloxacin, oral, 500 mg stat

For Chlamydia
- Doxycycline, oral, 100mg 12 hourly for 7 days **Or**
- Erythromycin, oral, 500 mg 6 hourly for 7 days

Adjunctive treatment

Pain relief
- Diclofenac, oral, 50 mg 8 hourly

REFER

Refer all cases of testicular torsion, scrotal trauma and tumours urgently to a surgical specialist or urologist.

All STI related causes not responding to treatment should be referred to a urologist.

20.5.4 Inguinal Bubo

- Inguinal and femoral buboes are localized enlargement of lymph nodes in the groin area, which are usually painful and may be fluctuant.
- They are sexually transmitted and must be distinguished from non-sexually transmitted local or systemic infections which may cause inguinal lymphadenopathy.
- Inadequate treatment of buboes can lead to rupture with formation of chronic fistulae and scarring. When associated with genital ulcers appropriate treatment for the latter must also be provided (See section on 'Genital Ulcers').

Causes

- Chlamydia trachomatis (Lymphogranulomavenereum)
- Haemophilusducreyi (Chancroid)

Signs and Symptoms

- Painful or painless inguinal swelling(s)
- Inguinal swellings
- unilateralor bilateral
- tender or non-tender
- fluctuant
- suppurating
- Genital ulcer

Investigations

- No investigations required, in view of the syndromic approach

Recommended in managing STIs

Treatment objectives are to:

- relieve pain and swelling
- treat for lymphogranulomavenereum and chancroid

Non-pharmacological treatment

- Aspiration of fluctuant buboes using a wide bore needle through adjacent healthy skin every second or third day. An incision and drainage should not be attempted. If buboes persist, the patient should be referred.
- Sequelae such as strictures and/ or fistula may require surgery.

Pharmacological treatment

For LymphogranulomaVenereum (LGV) and Chancroid

- **Doxycyclin**e, oral, 100 mg 12 hourly for 14 days
  Or
- **Erythromycin,** oral, 500 mg 6 hourly for 14 days

REFER

Refer patients with sequelae such as strictures and fistulae to a surgical specialist. Also refer all patients with persistent or recurrent buboes.

20.5.5 Genital Warts

Genital warts are flesh-coloured, painless, lesions that may be very small and even flat, or may appear in large clusters with several finger-like projections.

- In women, genital warts can grow on the vulva and walls of the vagina, in the ano-genital area and the cervix.
- In men, they may occur on the tip or shaft of the penis, the scrotum or the anus.
- Genital warts can also develop in the oral cavity of a person who has had oral sexual contact with an infected person.
- Certain types of the virus causing genital warts have been found to cause carcinoma of the cervix.

Genital warts are highly infectious. Latex gloves must be worn at all time during examination of genital warts. Suspicious lesions should be painted withweak acetic acid solution (vinegar).This turns the warts whitish on the background of the normal skin. Although useful, this is not a specific test.

Causes

- Human papilloma virus

Signs and Symptoms

- Small, flesh-coloured swellings in affected area, several together have a cauliflower shape
- Usually no symptoms
- Small swellings in the ano-genital region
- Itching or discomfort in the genital area

- Rarely bleeding after sexual intercourse in women

Investigations
- Acetic acid solution (vinegar) test

Non-pharmacological treatment
- Electrosurgery
- Surgical removal of the wart

Pharmacological Treatment

- **Podophyllin** 10-25% tincture, topical, applied directly to the warts avoiding normal skin tissue. Repeat treatment at weekly intervals until complete resolution.
- External genital and perianal warts should be washed thoroughly 1 to 4 hours after application of Podophyllin. Protect normal skin withVaseline (obtainable in general shops) while applying Podophyllin.

Note: Do not use TCA during pregnancy and lactation. Do not use Podophyllin or TCA oncervical warts.

Refer: All patients with cervical warts and those not responding to treatment must be referred for specialist consultation.

21. SKIN DISEASES

21.1 Skin infections

Skin infections can be bacterial, viral or fungal and also include skin infestations suchas scabies.

21.1.1 Impetigo

It is bacterial infection of subcorneal layer of epidermis with characteristic honey-colored serous crusts. It is usually caused by a staphylococcus aureus. It occurs commonly in school children, usually starting on the face, especially around the mouth or nose. May form bullous lesions (bullous impetigo) characteristically flaccid.

Pharmacological Treatment

- Wash with soap and water.
- Keep infected areas clean and prevent spread to others (care with towels, clothes, beddings; change frequently)
- Remove crusts and clean the lesion with:
  - **chlorhexidine l solution** 15% + 1.5%, diluted 1 in 20**OR**
  - **hydrogen peroxide solution 3%,**
  - Wet dressings:
- **Gentian violet solution** 0.5% every 12 hours.
- **Salicylic acid ointment 5%** every 12 hours.

Remove crusts if possible.

If severe, or systematic symptoms are present (e.g. pyrexia) add an oral antibiotic.

1. P**henoxymethylpenicillin**oral, for 7-10 days,
   Adults: 250 – 500mg every six hours,
   Children: 25mg/kg/24 hrs every six hours **OR**
2. **Erythromycin oral**, for 7-10 days

Adult: 250 – 500mg every 6 hours
Children: 25-50mg/kg/24 hrs in 4 divided doses,

21.1.2 Folliculitis

It is the inflammation of the hair follicle. The most common forms are caused by invasive staphylococcus but other bacteria, viruses, and fungi may also be responsible. Mechanical irritation is also a factor, such as prolonged sitting. Deep follicular inflammation often occurs in the bearded areas of the face (Sycosis barbae).

Treatment

- Suspected irritants should be avoided
- Use of suitable disinfecting and cleansing agents should be encouraged
- Appropriate anti-infective skin preparations: **Neomycinsulphate bacitracin** ointment, **OR** **Benzoyl peroxide 5%** wash can be used

If severe or systematic symptoms are present (e.g. Pyrexia) because most folliculitis is from S. aureus, add: **Flucloxacillin** 500mg 6 hourlyfor 7 -10 days

21.1.3 Furunculosis

It is deep follicular infection that starts as a firm red nodule which rapidly becomes painful and fluctuant in a

few days. Healing with scarringt follows over several weeks. In some individuals it is chronic and recurrent.

Treatment

- Usually resolves spontaneously, but is improved by placing hot compresses over the boil until it breaks
- In a healthy person, review after 2 days, if not improving consider surgical incision and drainage

Note: If the boil causes swollen lymph nodes and fever, consider systemic antibiotics

Pharmacological Treatment

Erythromycin, oral

Adults:500mg, 8hrly for 7-10days;

Children: 25-50mg/kg/every 8 hours in a day.

OR

Flucloxacillin oral 500mg four times daily for 7 -10 days;

Children: 50-100mg/24hrs every 6hours in equal doses

For recurrent furuncles (furunculosis): Give systemic antibiotics ***often clindamycin*** 300mg B.D. for 7–10days),

21.1.4 Erysipelas

It is bacterial infection of upper half of dermis with lymphaticvessel involvement, due to streptococcal infection Group A B Hemolytic Strep (Group C, G and B). The disease begins as a small break in the skin or umbilical stump (infants). The affected area has growing redness, accompanied by high fever and pains.

Non-pharmacologicalTreatment

- Bed rest

- Lifting the affected part

Pharmacological Treatment
Potassium permanganate solution 1:4000 **OR**
Phenoxymethylpenicillin or Amoxicillin oral, 500mg 6hrly for 7-10 days. Children: oral, 25-50mg/kg 6hourlyfor 7-10 days

Note: Erysipelas has a tendency to recur in the same area, especially if there are predisposing factors such as chronic lymphatic oedema. In recurrent episodes, increase the duration of antibiotics to 10 – 14 days

21.1.5 Acute Cellulitis

It is a deep inflammation involving lower half of dermis and subcutaneous tissue most commonly caused by streptococci or staphylococci. Acute cellulitis should be differentiated from erysipelas as follows:

- Raised, sharply demarcated margins from uninvolved skin erysipelas;
- Indistinct borders – acute cellulitis and accompanied with systemic symptoms

Treatment
•Immobilise
•Limb elevation
Pharmacological Treatment
Ibuprofen or other NSAIDs

Erythromycin (oral) 500mg 8hourly for 10-14days, Children (0) 25-50mg/kg/every 8 hours in a day for 10 - 14days

Note: Acute cellulitis can be serious if not treated early (spreads through lymphatics and bloodstream).
Refer to dermatologist.

21.1.6 Acne

It is a multifactorial disease primarily of teenagers with follicular plugging and inflammation.
Polymorphic lesions include open and closed comedones, papules, and pustules nodular and cystic lesions involving the face, chest, shoulders and back.

Treatment

- Seek underlying cause e.g. stress, overuse of ointments on skin, steroids or anticonvulsant drugs etc.
- Encourage a healthy lifestyle – exercise, sunshine, diet, etc.
- Use ordinary soap (harsh antibacterial cleansers or iodine-containing preparations may aggravate the acne)

Pharmacological Treatment

- Benzoyl peroxide 2.5% gel topically at night for 3-6 months

Plus

- Doxycycline 100 mg once daily for 2-4 months.

If unresponsive **refer t**o specialist for oral retinoids and further assessment.

Note: The acne may initially worsen with treatment. If too irritant, use every second or third night. Patients should be encouraged to persist with treatment.

21.1.7 Paronychia

It is inflammation of the nail fold characterized by painful red swellings of the nail folds which may be due to bacteria or yeast.

Acute Paronychia

Pharmacological Treatment

Tenderness and presence of pus indicates the need for systemic antibiotics

Phenoxymethylpenicillin oral 500mg 6hrly for 7-10 days **OR**

Flucloxacillinoral, Adults: 500mg 6hrly for 7-10 days

Children oral, 25-50mg/kg every 6hrs for 7-10days

Chronic Paronychia

Often it is a fungal infection, due to candida. Avoid excessive contact with water, protect from trauma and apply:

Miconazole or Clotrimazole cream, apply twice daily for 7-10days **OR**

Fluconazole oral, 200mg-400mg weekly for 3-6months (pulse therapy)

Treat secondary infection with antibiotics as above

Note: For both acute and chronic paronychia, incision and drainage may be needed

21.2 Fungal Skin Infections

21.2.1 Dermatophytosis (Ringworm)

It is a chronic fungal infection determined by the nature of the dermatophyte, by the tissue it invades i.e. skin, hair or nails and by the degree of host response. Infections with dermatophytes are usually called **tinea;** for further description, the anatomical site is added. The clinical infection usually starts from an inoculation site and spreads peripherally hence the annular lesions with an active border. It is sometimes accompanied by loss of hair, itching and pustules.

1. **Tinea Corporis (Body Ringworm)**

Annular, characteristic ring-shaped expanding lesions with central healing and expanding peripherallywith a raised border, with a tendency to clear centrally distinct borders on the body or face. A fine scale may be present.

Pharmacological Treatment

1. **Compound benzoic acid** (Whitfield's ointment) applied two times a day for up to 4 weeks. OR
2. **Clotrimazole cream1%** applies thinly two times a day, continue for 5 to 7 days after clearing of lesions OR
3. **Miconazole cream 2%,** and apply thinly two times a day. Continue for 5-7 days after clearing of lesions.

2. **Tinea Capitis (Scalp Ringworm)**

In this case, the fungus has affected the hair follicle. Topical treatment is not effective.

Pharmacological Treatment

- Shave or cut hair short on and around the lesions.
- Clean scalp with soap and water, dry and, apply:
- **Whitfield's ointment** for 2 weeks or longer if necessary **OR**
- **Miconazole 2%** cream.

Administer systemic treatment as local treatment alone does not cure

- **Griseofulvin**oralfor 6 weeks (up to 8 to 12 weeks)
- Children ≤ 12 years: 10 to 20 mg/kg/day in 1 or 2 divided doses (max. 500 mg/d)
- Children > 12 years and adults: 500 mg to 1 g/day in 1 or 2 divided doses

3. **Tinea cruris:**

Ringed lesion starts from the crural fold (groin) and extends over the adjacent upper inner thigh. Lesions may be complicated by the effects of scratching, or secondary bacterial infection.
The most important measure is to maintain hygiene by drying infected part(s) of the body and (if feet are involved) avoiding to walk on bare feet.
Instruct patients on the importance of treatment compliance in order to eradicate the infection. Otherwise treat as follows:

Pharmacological Treatment
For wet lesions (especially in skin folds or toe webs), apply:

- **Gentian violet** paint 0.5% every 12 hours.

For dry lesions (ie when wet lesions dried up or if they were initially dry) apply:

- B**enzoic acid + salicylic acid 6%/3%** (Whitfield's) ointment sparingly every 12 hours until 1 week after the lesions have cleared.
- If oozing lesions, use **miconazole 2%cream** only

In severe or extensive cases, not responding to topical treatment, add

- **Griseofulvin** 500 mg (children 10 mg/day) orally, in 4 divided doses, daily for 14 - 28 days (best to be taken after food).

Pityriasis Versicolor
Common fungal infection caused by yeast.
Hypopigmented/hyperpigmented confluent patches of varying size with fine scale on the chest, back, arms and occasionally neck and face.
Pharmacological Treatment

- Apply: **Whitfield ointment** or Miconazole or Clotrimazole cream into scales twice daily for 2 weeks
- **Selenium sulphate 2% shampoo**

Tinea versicolor differs from the other tinea infections in that it is caused by yeast and does not respond to drugs commonly used for fungal skin infections. It is common in young adults and characterised by multiple, usually painless, patches of lesions varying in colour from white to brown.

4. **Tinea Pedis (Athlete's Foot)**

This is a very common fungal infection and is often the source of infection at other sites.
Advisse: Frequent change of socks/footwear, use of cotton socks, thorough drying between toes after bathing, separating the opposing skin surfaces (e.g. with a piece of gauze) will help speed up healing.

Pharmacological Treatment
Treat any bacterial super infection first:

- **Whitfield's** lotion twice daily for 2 weeks **OR**
- **Clotrimazole cream** 1% twice daily for 2 weeks.
  OR
  If severe
  Terbinafine oral

If no improvement, **refer** to a dermatologist.

21.2.2 Candidiasis

It is caused mainly by candida albicans. Clinical features depend on the site of infection. The skin lesions are characterized by an erythematous, moist exudate in the skin folds. Patients may develop subcorneal and satellite pustules.

Involvement of the nails lead to painful swelling of the nail bed and folds which may discharge pus and is made worse by contact with water. There may be destruction of the nail plate.
Oral lesions are characterized by white, adherent mucosal plaques in buccal cavity including tongue which may be forcibly removed. May extend to oesophagus and lower GIT.
Vulval-vaginal candidiasis is characterized by itchy, curd-like whitish vaginal discharge, dysuria and dyspareunia.
Candidiasis is usually precipitated by prolonged use of contraceptive pills, pregnancy, diabetes, prolonged antibiotic and corticosteroid use AND immunosuppressive treatment.

Pharmacological Treatment

I. Gastrointestinal Tract (G.I.T) candidiasis

- **Nystatin** oral suspension- gurgle and swallow 4 times a day

  -Newborns: 200,000-400,000 Units/day

  -<2 years old 400,000-1,000,000 Units/day

  ->2 years old 1,000,000-2,000,000 Units/day **OR**

- Fluconazole 200mg once daily for 14 days in adults

For angular cheilitis-
Nystatin cream or ointment 12 hrly for 2-4 weeks

II. Vaginal infections

- **Nystatin vaginal** pessaries; insert 1 at night for 14 days OR
- **Clotrimazole vaginal** pessaries;insert 1 at night for 6 days OR
- Fluconazole 150mg oral stat

Referral
If recurrent or unresponsive to treatment, refer to specialist

21.2.3 Deep fungal infections

The common clinical entities of deep fungal infections are Nocardiosis and Madura foot which may be a Mycetoma or and actinomycetoma. Mycetoma is caused by madurella mycetomatis and Actinomycosis by actinomyces. The clinical features depend on the infected site and can last months to years.

- First lesion: nodule
- Localization: feet, legs, arms, buttocks, scalp, trunk
- Discharging sinuses: Grains may be visible usually black for Eumycetomas and white yellow for Actinomycetomas. Patients usually experience pain before rupture of discharging sinus.

Treatment
For Actinomycetomas

- **Co-trimoxazole** 960mg every 12 hours **Plus**
- **Rifampicin** 300mg every 12 hours for 2-4 months

Alternative drugs for Adults:
Phenoxymethylpenicillin oral 500 mg every 6 hours 2-4 months; for Children:25 mg/kg body weight 6 hourly for 2-4 months.

NOTE: Regular blood examination must be done when Co-trimoxazole is used for more than 14 days

Referral

- For Radical surgery, refer to the specialist for the initial management
- In complicated cases of eumycetoma refer to specialist for further management.
  Surgery is often necessary and includes wide margins, sometimes amputation.

Alternative drug for Nocardiosis
Adult:
Dapsone 100 mg every 24 hours for 2-4 months
Children: 25 – 50 mg every 24 hours for 2-4 months

21.3 Parasitic Infections

21.3.1 Scabies

Scabies is an intensely pruritic and highly contagious infestation of the skin caused by a mite *Sarcoptes scabie* burrowing into the skin; affecting humans and other animals.
Norwegian scabies presents with extensive crusting (psoriasi-formlike lesions) of the skin with thick, hyperkeratosis scales overlying the elbows, knees, palms, and soles.
Scabies is a parasitic skin disease and most often related to poor hygienic standards. Secondary infections are

common and may mask the condition. The whole family and any other close contacts have to be treated, and all contaminated clothes, bedding and towels need to be washed after treatment. Wash the whole body with mild soap and water, preferably at night, and dry the body. Then apply to the whole body (from the neck down)

Pharmacological Treatment

Permethrin (5%lotion or cream):

Child > 2 months and adult: one application, with a contact time of 8 hours, then rinse off.

Permethrin is easier to use (no dilution required), and preferred over benzyl benzoate inchildren, and pregnant/lactating women. One application may be sufficient, but a second application 7 days later reduces the risk of treatment failure

Benzoyl Benzoate Lotion 25% (12.5% for children) apply every 12 hours for 3 days. Repeat treatment after 1 week.

Note

- Treat all close contacts, especially children in the same household ,
- Wash clothes and beddings, leave in the sun to dry followed by ironing.
- Secondary bacterial infection, (septic scores") treat with antibiotics as in impetigo for 5 days.
- Explain that the itch may continue for several weeks after treatment. In case of itching apply steroid

21.3.2 Pediculosis (Lice)

Head lice and pubic lice can be treated with***Permethrincream*5% or lotion**. One part of the cream is diluted with 4 parts of clean water and this lotion is applied to dry affected hair (scalp, pubis or occasionally other areas) for at least 10 minutes; water is then added to form a good lather and to rinse.
Nits should be removed with a special comb or tweezers. After treatment, wash all contaminated clothes, bedding and towels.

21.4 Viral Infection

21.4.1 Herpes Simplex

It is an acute viral infection characterized by superficial vesicles containing clear fluid in the skin and mucous membranes, particularly of the buccal area, on the conjunctiva, corneasor genitalia. It is caused by the herpes virus homines. The main clinical features are: prodromal symptoms of tingling discomfort or itching, followed by vesicular formation.
Symptomatic treatment for adults

- ***potassium permanganate*** solution 0.03% (1 tablet $KMnO_4$ 300 mg in 1 litre of water), or
- ***Gentian violet*** paint 0.5%, every 12 hours.

Treatment

- Acyclovir (oral) 400mg 8 hourly for 7 – 10 days, **Note**: Use of systemic Acyclovir is optimum when given within the first 48
- Corticosteroids (topical or systemic) should NOT be used in varicella (chickenpox) or herpes simplex.

21.4.2 Herpes Zoster (Shingles)

It is due to the resurgence of the varicella-zoster virus which also causes chickenpox. Severe burning pain precedes the appearance of grouped vesicles overlying erythematous skin and following a dermatome; does not cross the midline. The disease may heal with scarring.
For pain relief: give:

- ***acetylsalicylic acid*** 500 mg orally, every 6 hours as required, preferably after food (not for children; max 4 g perday, **OR *indomethacin 25-50*** mg orally, every 6-8 hours OR
- ***Ibuprofen 400-600 mg*** orally, every 6-8 hours after food with plenty of water.

In cases of severe pain: give ***morphine sulfate 15 mg orally***, every 4 hours as required for 2-3 days.

Treatment to cure

- Acyclovir cream 5% applied until vesicles disappear. **Plus**

- Acyclovir oral, 800 mg 5 times a day until no new lesions appear
- **Chlorhexidine topical solution** 0.5% for wound care; otherwise wash them gently with **soap** and **water**.
- Then apply **potassium permanganate solution**0.03% (1 tablet $KMnO_4$ 300 mg in 1 litre of water), or **gentian violet** 0.5%, every 12 hours.

For Secondary infection (bacterial) apply 12 hrly topical

- Gentamycin 1% ointment

Post-Herpetic Neuralgia

- After the lesions have resolved:
- Amitriptyline (O) 25 mg at night, may be increased to 150 mg at night **OR**

Carbamazepine oral, 100 mg at night; may be gradually increased to twice a day according to response.
CAUTION: Refer if there is no improvement of severe neuralgia.

Refer immediately in case of herpes zoster ophthalmicus for atropinization

21.4.3 Chicken Pox

Chicken pox like herpes zoster is caused by the varicella zoster virus. Lesions are preceded by fever and characteristically vesicular in different stages of development. It is self-limiting.

Treatment complications
Adult

- Paracetamol 1 g every 8 hours **Plus**
- Calamine lotion , apply over the whole body every 24 hours

Children

A: Paracetamol 10 mg/kg body weight every 8 hourly **Plus**

A: Calamine lotion as in adults

21.5 Allergic Reactions

21.5.1 Allergic Contact Dermatitis

It is a delayed hypersensitivity following skin contact with a particular chemical (dye, perfume, rubber, nickel or drugs, skin preparations containing lanolin, iodine, antihistamines, neomycin, vioform etc.).

Management

Avoid contact if allergic.

21.5.2 Eczema (Dermatitis)

Atopic Dermatitis/Eczema: Often a personal or family history of atopic disease (asthma, hay fever or atopic dermatitis). Exact cause is not known. These persons are also more susceptible to herpes simplex and vaccinia (but not varicella-zoster).

Before treatment, try to establish the *stage* of the eczema:

- Acute: sudden eruption with erythema, vesicles and sometimes bullae, often with serous exudate (wet appearance)
- Chronic: develops after months/years, thickened dry and scaly skin, lichenification, deep cracks (can bleed), scratch marks, sometimes infected.

Eczemas are often secondarily infected (impetigo). In such cases, treat as Bacterial Skin Infection.

Principles of treatment of eczema:

- Tell patients not to expect total recovery as most eczema may recur.
- Remove any obvious precipitating factors (allergic or contact eczema).
- Avoid soaps, detergents, cosmetics, etc.
- Advise the patient to avoid scratching, which makes the condition worse.
- Cover itchy areas with dressings, and cut nails short in children

The clinical form may differ according to age

I. Infantile eczema ("milk crust"): usually appears at 3 months of age with oozing and crusting affecting the cheeks, forehead and scalp.

IMPORTANT: If generalized exfoliative dermatitis develops, refer to a specialist

II. Flexural eczema: starts at 3-4 years, affecting the flexure surface of elbows, knees and nape of neck (thickening and lichenificaiton). In adults, any part of the body may be affected with intense itching, particularly at night.

Note: Eczema may evolve through acute (weepy), sub-acute (crusted lesions), and chronic (lichenified, scaly) forms.

Treatment of Eczema

- Remove any obvious cause e.g. skin irritants or allergens (avoid irritants e.g. medicated soap, wool and extremes of temperature).
  - Apply Emulsifying ointment such as vaseline
- Treat itching with an oral antihistamine:
  - Chlorpheniramineoral 4-16 mg at night **OR**
  - Promethazine (O) 25mg at bedtime increased to 50mg if necessary

  OR

  - Cetrizine 10mg

CAUTION: Never use topical antihistamines

- Treat any infection (usually bacterial, but occasionally viral). Choice of skin preparations depends on whether lesions are wet (exudative) or dry/lichenified (thickened skin with increased skin markings).
- If eczema is "weepy", use saline baths or bathe in:
- Potassium permanganate 1:4000 (0.025%) solution once daily for 2-4 days until dry.
- Where large areas are involved give a course of antibiotics for 5-10 days (as for impetigo)

- After the lesions have dried, apply an aqueous cream for a soothing effect. A topical corticosteroid cream may be useful in the acute phase. Use the mildest topicalcorticosteroid which is effective, start with:
  - Hydrocortisone 1% cream for wet, ointment for dry skin. Apply thinly, initially, two times a day.

CAUTION: Only use 1% hydrocortisone on the face unless prescribed by a specialist
Note: Potent topical corticosteroids may cause harmful cutaneous and systemic side effects especially if use is prolonged or involves extensive body surface. Striae, acne, hyperpigmentation and hypopigmentation, hirsutism and atrophy may result. Avoid long term use; don't use on weepy or infected skin. Advise patients NOT to use them as cosmetics

- If the skin starts scaling (condition becomes chronic), add/apply an ointment or liquid vaselin

21.5.3 Urticaria

It may be allergic, toxic or physical in origin. In many cases the cause is unknown (idiopathic).
Allergic urticaria may be caused by: drugs (e.g. penicillin), infection, contact with plants, pollen, insect bites, or foodstuff
(e.g. fish, eggs, citrus fruits, nuts, strawberries, tomatoes). Physical urticaria may be caused by mechanical irritation, cold, heat, sweating.

Signs and symptoms

- Extreme pruritis

- Wheals on affected areas

Treatment
If acute (existing for less than 3 months), exclude drug reactions (e.g. Penicillin), or infection, give oral antihistamines:
Chlorpheniramine oral 4-16 mg once at night OR

- Promethazine oral, if sleeplessness is a feature: Adults, 25 -50 mg at night OR
- Cetrizine oral, 10mg once daily
- Children0.1 – 0.2 mg/kg 2-4 times a day or 0.5 mg/kg at bedtime
- Deworm patients with Albendazole oral, 400mg stat in adults.

Note: Warn about drowsiness. If no improvement after 1 month or chronic problem, **refer** to specialist for combination therapy (H1, H2 inhibitors).

21.5.4 Psoriasis

An inherited inflammatory condition of the skin characterized by thick, silvery white scaly plaques affecting mainly scalp and extensor body surfaces usually symmetrically distributed with a chronic relapsing course.

Note: Exclude precipitating factors e.g. alcohol, deficiencies of B12 or folate, stress, infections have to be excluded.

Signs and symptoms

- Onset is gradual and usually in patients 25-40 years old
- Maculopapular scaly eruptions on plaques are either due to psoriatic skin disease and/or psoriatic arthritis
- Worsening psoriasis may lead to total erythroderma
- An extra-articular feature is pitting or thickening of nail plate with accumulation of debris under the nail plate
- Inflammatory psoriatic arthritis (5-10% of patients) involves the distal interphalangeal joints

Differential diagnosis

- Fungal infection, lichen planus (papules, tend to occur on flexor surfaces)
- Mycosis fungoides
- Seborrhoeic dermatitis
- Medicine-induced eruptions
- Investigations
- Blood: Serum uric acid, rheumatoid factor, and anti-nuclear factor

Treatment

For mild conditions, treatment other than reassurance and an emollient may be unnecessary.

Sun exposure to the lesions for half an hour once daily may be of benefit

To reduce scaling, apply:

Salicylic acid 5% topical solution once daily in the evening

In resistant cases add:

- **Crude Coal tar 5%** in the morning **Plus**
- **Salicylic acid 5%** in to descale **Plus**
- **Betamethasone ointment 0.025**% in the evening.

Then expose affected area to sunlight
Alternatively:

- Dithranol 0.1% once a day

Take care to apply dithranol only to the lesions. Wash hands wel after the application.
Note:. If not responding well, refer to specialist for appropriate systemic treatment with **methotrexate**, **cyclosporine, azathioprine etc.**

21.6 Other Skin Diseases

21.6.1 Pellagra

Syndrome caused by deficiency of a variety of specific factors, nicotinic acid being the most important. Cardinal signs: diarrhea, dermatitis (sites exposed to sun and pressure) and dementia.
Important skin findings include:

- Casal's necklace; hyperpigmented scaling involving the neck region
- Hyperpigmented scaly lesions on sun exposed areas

Treatment
Treat both adults and children with:
Vitamin B complex, tablet and syrup .
Advice on Diet: The diet should be rich in protein.

21.6.2 Vitiligo

It is a condition that causes patches depigmentation of skin. It occurs when melanocytes, the cells responsible for skin pigmentation die. Clinical features include depigmentation of patches of skin that occurs on the face, neck, trunk and extremities

Treatment
There is no cure for Vitiligo, but there are a number of treatments that improve the condition.
Treatment options generally fall into three groups:

- Skin camouflage
- Corticosteroids
- Depigmentation

Note: Counsel the patient about the condition
Refer to a dermatologist

21.6.3 Lichen Planus

It is a chronic inflammatory skin condition, extremely pruritic. Primary lesions are characterized by violaceous, shiny flat topped papules which may coalesce and evolve into scaly plaques distributed over inner wrists, arms and thighs as well as sacral area. Post inflammatory hyper pigmentation is common. Scarring alopecia may result from lichen planopilaris (severe)
Treatment

- Chlorpheniramine oral, 4mg 6 hourly **Plus**
- Betamethasone valerate ointment 0.1% twice daily

Referal: In severe case refer to specialist for systemic corticosteroid and topical application under occlusion

21.6.4 Pruritic papula eruptions (PPE)

This is a skin condition characterized by itchy popular eruptions on the extensor area of the upper and lower limbs which is associated with HIV infection.

Treatment

- Betamethasone valerate 0.025% 12 hourly for 3-4 weeks **OR**
- Dapsone 100mg once a day for one month

21.6.5 Albinism

Albinism is an inherited condition present at birth, characterized by a lack of pigment that normally gives color to the skin, hair, and eyes. Many types of albinism exist, all of which involve lack of pigment in varying degrees. The condition, which is found in all races, may be *accompanied by eye problems* and *may lead to skin cancer* later in life if not well prevented at early childhood.

Diagnosis

It's not always easy to diagnose the exact type of albinism a person has; there are two tests available that can identify only two types of the condition
The specific type of albinism a person has can be determined by taking a good family history and examining the patient and several close relatives.

Prevention
-Genetic counseling is very important to prevent further occurrences of the condition.
-Mechanical preventions such as long sleeved-shirt, bouze, skirt and trousers and wide briam hat to prevente skin cancers

Treatment
There is no treatment that can replace the lack of melanin that causes the symptoms of albinism. For the eye problems that often accompany the lack of skin color, **glasses** which are tinted should be worn to ease pain from too much sunlight.
There is no cure for involuntary eye movements (nystagmus), and treatments for focusing problems (surgery or contact lenses) are not effective in all cases.
For further counseling refer to a dermatologist

21.6.6 Senile Pruritus

Itching associated with degenerative changes that occur in aging skin.
Treatment
Skin lubrication twice daily with Glycerin

21.7 Drug Reactions

Drug reactions can be classified in many ways. One useful approach is to separate predictable reactions occurring in normal patients from unpredictable reactions occurring in susceptible patients.
Predictable adverse reactions

- Over-dosage (wrong dosage or defect in drug metabolism)
- Side-effects (sleepiness from antihistamines)
- Indirect effects (antibiotics change normal flora)
- Drug interactions (alter metabolism of drugs; most commonly the cytochromeP-450 system)

Unpredictable adverse reactions

- Allergic reaction (drug allergy or hypersensitivity; immunologic reaction to drug; requires previous exposure or cross-reaction).
- Pseudoallergic reaction (nonimmunologic activation of mast cells).
- Idiosyncratic reaction (unexplained reaction, not related to mechanism of action, without known or suspected immunologic mechanism).

Note:

- Although we will concentrate on cutaneous drug reactions, remember that every organ system can be affected.
- Almost every drug can cause almost every type of reaction. Clinically, one must learn which reactions are most likely to produce certain findings.
- 80% of allergic and pseudoallergic drug reactions are caused by β -lactam antibiotics, aspirin, NSAIDs, and sulfonamides

Types of Drug Reactions

The most common types of drug reactions are macular and maculo-papular exanthems along with urticaria and

angioedema; Fixed drug eruption and erythema multiform/toxic epidermal necrolysis.

I. Exanthemous Reaction

Main differential diagnostic consideration is viral exanthem or on occasion acute exanthem such as guttae psoriasis or pityriasis rosea.

Drugs commonly responsible are: Ampicillin, amoxicillin, aminoglycosides, allopurinol, barbiturates, benzodiazepines, carbamazepine, co-trimoxazole, gold salts, penicillin, phenytoin, and piroxicam.

II. Fixed drug Eruption.

It is a cutaneous drug reaction that recurs at exactly the same site with repeated exposure to the agent.Clinical features include typically red-brown patch or plaque; occasionally may be bullous. Most common sites are genitalia, palms, and soles, aswell as mucosa.Lesions typically 5–10cm in diameter appear but can be larger; often multiple. It starts as edematous papule or plaque; later becomes darker. Frequently resolves with post inflammatory hyperpigmentation. It is uncommon in children.

Note: When confronted with hyperpigmented macule on genitalia, always think of fixed drug eruption

Management: Avoidance of triggering agent; topical corticosteroids may speed resolution

III. **Severe Skin Reactions**

A. **Erythema multiforme**

Most erythema multiforme is caused by herpes simplex virus, especially if recurrent.

The classical clinical findings are iris or target lesions, most often on the distal limbs. Lesions caused by mycoplasma or especially drugs are moreoften on the trunk and less like to have a target pattern. We prefer the term erythema multiforme–like for such lesions, which carry the risk of developing into severe skin reactions.

B.Stevens Johnson Syndrome (SJS)

It is a combination of erythema multiforme with mucosal lesions as well as systemic signs and symptoms whereby more than 90% of the skin area is involved

Clinical features:

- Patients almost invariably have prodrome with fever, malaise, or arthralgias.
- Abrupt development of erythema multiforme
- Mucosal involvement
  - Mouth (100%): Erosions, hemorrhage and crusts on lips, and erosions in mouth covered by necrotic white pseudo-membrane.
  - Eyes (70–90%): Erosive conjunctivitis, can lead to scarring.
  - Genitalia (60–70%): Painful erosions.
  - When mycoplasma is triggerred, pulmonary involvement is possible (20%).

Management

- Short burst of systemic corticosteroids helpful in many cases but two problems:
  - Exclude or treat underlying infection, which could be worsened by immunosuppression.

- Routine topical care: disinfectant mouth washes, antibiotic or corticosteroid eye drops (after ophthalmologic consultation).

C. Toxic epidermal necrolysis

It is a severe life-threatening disorder with generalized loss of epidermis and mucosa

Clinical features:

- Prodrome depends on underlying disease and triggering drug
- Sudden onset of either diffuse maculae (erythema multiforme–like drug reaction) or diffuse erythema without maculae
- Then prompt progression towards widespread erythema and peeling of skin; skin lies in sheets and folds on the bedding.
- Extensive mucosal erosions.
- Possible loss of hair and nails, as well as extensive post inflammatory hypopigmentation.
- Multiple systemic programs because of fluid and protein loss, difficulties in temperature regulation, fever, leukocytosis, and risk of secondary infections.

Treatment

Systemic corticosteroids, if employed, should be used early to

Attempt to abort the immunologic reaction. Later in the course, they probably increase risk of infection and slow healing.

- Prednisolone 80–120mg daily.

Note: Ophthalmologic monitoring is essential, as risk of scarring and blindness is significant

22. KIDNEY AND UROLOGICAL DISORDERS

22.1 Urinary Tract Infection (UTI)

Urinary tract infections may involve the upper or lower urinary tract. Infections may be complicated or uncomplicated. Uncomplicated cystitis is a lower UTI in a non- pregnant womanof reproductive age and who has a normal urinary tract. All other UTIs should be regarded as complicated.

Differentiation of upper from lower urinary tract infection in young children is not possible on clinical grounds.
Upper UTI is a more serious condition and requires longer and sometimes intravenous treatment.
Features of upper UTI (pyelonephritis) that may be detected in adults and adolescents include:

- ✓ flank pain/tenderness
- ✓ temperature 38^{o} C or higher
- ✓ other features of sepsis, i.e.:
- ✓ tachypnoea
- ✓ confusion
- ✓ tachycardia
- ✓ hypotension, and,
- ✓ vomiting

In complicated, recurrent or upper UTIs, urine should be sent for microscopy, culture and sensitivity.

Features of urinary tract infections in children

- Signs and symptoms are related to the age of the child and are often non-specific.
- Uncomplicated urinary tract infections may cause very few signs and symptoms.
- Complicated infections may present with a wide range of signs and symptoms.

Neonates may present with:

- » fever
- » poor feeding
- » vomiting
- » failure to thrive
- » hypothermia
- » sepsis
- » prolonged jaundice
- » renal failure

Infants and children may present with:

- failure to thrive
- persisting fever
- dysuria
- abdominal pain
- enuresis or urgency
- diarrhoea

In any child with fever of unknown origin, the urine must be examined, to assess whether a urinary tract infection is present.
If a bag specimen reveals the following, a urine specimen must be collected aseptically for culture and sensitivity:

- positive leukocytes or nitrites on dipstix in freshly passed urine
- motile bacilli and increased leukocytes or leukocyte casts on urine microscopy

Urine dipstix should be performed on a fresh urine specimen.

- If leucocytes and nitrites are not present, a urinary tract infection is unlikely.
- If leucocytes are present on a second specimen, a urinary tract infection must be suspected.

General Measures

- Women with recurrent UTIs should be advised to:
- Void bladder after intercourse and before retiring at night
- not postpone voiding when urge to micturate occurs
- change from use of diaphragm to an alternative type of contraception

Pharmacological Treatment

Empirical treatment is indicated *only if there are*:

- positive leucocytes and nitrites on freshly passed urine, or leucocytes or nitrites with symptoms of UTI, or
- Systemic signs and symptoms.

Alkalinizing agents are not advised.

22.2 Acute Cystitis

Acute cystitis is an acute inflammation of the bladder. Women are affected 10 times more than men due to the shortness of their urethra compared to that of men. 40%-50% of all women will develop cystitis in their lifetime.

The ascending faecal-perineal-urethral route is the primary mode of infection. Occasionally sexually transmitted organisms are involved. If the patient has been recently married, suspect honeymoon cystitis.

Causes

E coli (about 80%)

- ✓ Klebsiella
- ✓ Gonococcus
- ✓ Enterococci
- ✓ Proteus
- ✓ Staphylococcus saprophyticus

Investigations

- Urinalysis
- Mid-stream urine for culture and sensitivity
- Imaging of urinary tract in recurrent or persistent cases to exclude anatomical abnormalities, lower urinary tract obstruction etc.
- Fasting Blood glucose
- Urethrocystoscopy in selected cases

Treatment objectives are to:

- eradicate infection
- prevent recurrence and complications
- relieve pain

Non-pharmacological treatment

- Liberal oral fluids to encourage good urinary output
- Pre-coital and post-coital emptying of the bladder
- Personal hygiene and proper cleaning after defaecation

Pharmacological Treatment

Uncomplicated cystitis

Adults

•**Ciprofloxacin,** oral, 500 mg 12 hourly for 5 days.

Complicated cystitis

Adults

•**Ciprofloxacin,** oral, 500 mg 12 hourly for 7 days. Or

•**Nitrofurantoin**, oral, 50-100 mg 6 hourly for 3-5 days.

For pregnant women and adolescents:

•**Amoxicillin/clavulanic** acid 875/125 mg, oral, 1 tablet 12 hourly for 7 days.

Children ≤ 35 kg who do not meet criteria for urgent referral:

•**Amoxicillin/clavulanic** acid oral, 15–25 mg/kg/dose of amoxicillin component, 8 hourly for 7 days.

Children > 35 kg and adults who do not meet criteria for urgent referral:

•**Amoxicillin clavulanic** acid, oral, 875/125 mg, oral, 1 tablet 12 hourly for 5 days.

22.3 Acute pyelonephritis

Outpatient therapy is only indicated for women of reproductive age, who do not have any of the manifestations requiring referral (see referral criteria below). All other patients should be referred.

•**Ciprofloxacin,** oral, 500 mg 12 hourly for 7–10 days.

Refer Urgent

- Acute pyelonephritis with: vomiting,sepsis and diabetes mellitus
- Acute pyelonephritis in:
  - pregnant women
  - women beyond reproductive age
  - men
  - Children > 3 months of age who appear ill.
  - Children < 3 months of age with any UTI.
  - Pregnant women and adolescents allergic to penicillin.

In patients awaiting transfer
Ensure adequate hydration with intravenous fluids.

Non-urgent
- All children for urinary tract investigations after completion of treatment.
- No response to treatment.

- UTI > 3 times within a one-year period in women, and > 1 time in men.
- Recurrent UTI in children for assessment.

22.4 Chronic Kidney Disease (CKD)

Structural or functional kidney damage present ***for > 3 months***, with or without a decreased glomerular filtration rate (eGFR)

Markers of kidney damage include:

» abnormalities in urine e.g. proteinuria or haematuria

» abnormalities in blood e.g. serum creatinine or low eGFR

» abnormalities in imaging tests e.g. small kidneys on ultrasound

» abnormalities on pathological specimens e.g. glomerular disease on renal biopsy

Common causes of chronic kidney disease include:

» hypertension » polycystic kidney disease

» diabetes mellitus » HIV/AIDS

» glomerular diseases

Chronic kidney disease can be entirely asymptomatic, BUT early detection and management can improve the outcome of this condition.

<u>Treatment and prevention strategies according to stages</u>

Estimation of the degree of kidney damage and staging is important to guide management and further prevent adverse outcomes of chronic kidney disease.

Note:

» Adults with early CKD i.e. stages 0–3 can all be managed at primary care level once the cause and plan for care has been established.

» *All children should be referred for investigation and initial management*.

Staging of kidney disease is essential for adequate management of CKD

CKD Stage. Glomerular filtration rate (mL/Min/1.73^2)	Description	Action Includes actions from preceding stages
Stage 0 or eGFR >90	At increased risk for CKG e.g. -D.M, Hpn, Glomerular disease, and HIV	Screening for CKD and CVD disease CKD risk reduction i.e. Treat hypertension, Diabetes and HIV
Stage 1 or eGFR >90	Kidney damage with normal eGFR	» Diagnose and treat comorbid conditions. » Slow progression. » CVD risk reduction. (Watch for stage 2).
Stage 2 or eGFR 60-89	Kidney damage with mild eGFR	Refer to determine causes and develop care plan. While on a care plan monitor the eGFR in these patients and ensure kidney function is not worsening rapidly. (Watch for stage 3).

Stage 3 or eGFR 30-59	Moderate decrease eGFR	Refer.
Stage 4 or eGFR 15-29	Severe decreases eGFR	Refer.
Stage 5or eGFR <15	Kidney failure requiring renal replacement therapy. End stage renal disease	Refer.

Send blood annually for measurement of creatinine in all patients at increased risk. (eGFR will be calculated by the laboratory, based on the serum creatinine).

General Measures

- Reduce salt intake.
- Low protein diet is indicated in the presence of CKD stage 4 and 5.
- Reduce cardiovascular disease risk factors.

See section: Prevention of ischaemic heart disease and atherosclerosis.

- Avoid nephrotoxic medicines e.g. NSAIDs.
- Screen for proteinuria.

- If urine dipstick 1+ or greater, repeat on a properly collected midstream urine specimen on another occasion.

- If proteinuria persists quantify protein with aspot urine protein creatinine ratio.
- Significant proteinuria = spot urine protein creatinine ratio of > 0.1 g/mmol.

Note: Proteinuria is screened for differently in diabetics.Diabetic nephropathy.
Treat underlying conditions.
Proteinuria
Measure serum potassium at baseline.

Pharmacological Treatment
Adults: ACE-inhibitor, e.g.: **Enalapril**, oral, start with 5 mg 12 hourly.

- Titrate up to 20 mg 12 hourly, if tolerated.
- Start with low dosage of ACE-inhibitor and titrate up to the maximum dose or until the proteinuria disappears – whichever comes first. Ensure BP remains in normal range and no side effects are present.

- Monitor creatinine and potassium:
  - 1–2 weeks after treatment initiation, if eGFR < 60 mL/min and after 4 weeks, if eGFR > 60 mL/min.
  - If creatinine increases by > 20% from the baseline,stop ACE-inhibitor and refer.
  - If stable, monitor thereafter at regular clinic visits.

- ACE-inhibitors are contraindicated in, amongst others:
  - hyperkalaemia
  - known hypersensitivity to an ACE-inhibitor or an ARB
  - bilateral renal artery stenosis
  - pregnancy
  - severe renal impairment (eGFR < 30 mL/min)
  - Hyperlipidaemia

If hyperlipidaemia is a co-existent risk factor, manage accordingly. See Prevention of ischaemic heart disease and atherosclerosis.

Diabetes mellitus

- Indiabetics, optimize control accordingly (Type 2 Diabetes mellitus, in adults).
- Replace oral sulphonylureas with insulin when eGFR < 60 mL/min, because of an increased risk of hypoglycaemia.
- Stop metformin when eGFR < 30 ml/min, because of the potential risk of lactic acidosis.
- Insulin is preferred to control blood glucose in patients with eGFR < 30 mL/min.

Hypertension

Treat if present. See Section on: Hypertension.

Fluid overload

Treat fluid overload if present and refer.

Adults
Furosemide, slow IV or oral, 40–80 mg, 12 hourly.
• If poor response, repeat after 1 hour.
• Do not give IV fluids – use heparin lock or similar IV access.

Children
Furosemide, IV, 1 mg/kg, over 5 minutes.
Do not put up a drip or run in any IV fluids.
Note: Exclude heart failure in patients with persistent pedal oedema.
REFERRAL

- All cases of suspected chronic kidney disease stages 3–5 for assessment and planning.
- All children.
- All cases of CKD with:
  - haematuria,
  - significant proteinuria with urine protein creatinine ratio of **> 0.1 g/mmol**
  - eGFR< 60 mL/min for initial assessment and planning
  - eGFR< 30 mL/min
  - Uncontrolled hypertension/fluid overload.

CKD associated with hyperlipidaemia.
- No resolution of proteinuria with ACE-inhibitor therapy.
- If ACE-inhibitor is contra-indicated.

- If ACE-inhibitor is not tolerated.

Patients who might qualify for dialysis and transplantation or who have complications should be referred early to ensure improved outcome and survival on dialysis, i.e. as soon as eGFR drops < 30 mL/min, or as soon as diagnosis is made/suspected.

22.5 Acute Kidney Injury

The proposed classification or staging system for AKI is now based on the RIFLE (Risk, Injury, Failure, Loss of kidney function, End stage disease) criteria, as follows:

- An abrupt reduction (within 48 h) in kidney function manifesting as an absolute increase in serum creatinine level of >26.4 micromol/L (0.3mg/dl),**or** a percentage increase in serum creatinine level of > 50% (1.5 - fold from baseline),**or** a reduction in urine output (documented oliguria of <0.5 ml/kg/h for > 6 h)
- These criteria should be applied in the context of the clinical presentation and following adequate fluid resuscitation where applicable.
- Studies have shown that preventive therapy or medical interventions performed during the early stages of AKI provide the greatest chance for minimising the extent of injury. Hence early preventive treatment and early diagnosis of

AKI are imperative for patients with AKI regardless of the cause.
This is (potentially) reversible kidney failure, commonly as a result of:

- hypovolaemia and fluid loss
- acute tubular necrosis
- medicines/toxins
- acute glomerulonephritis
- urinary tract obstruction

It is often recognised by:

- fluid overload (e.g. pulmonary oedema)
- decreased or no urine output
- abnormalities of serum urea, creatinine and/or electrolytes
- convulsions in children

General Measures

- Give oxygen, and nurse in semi-Fowlers' position if patient hasrespiratory distress. Early referral is essential. If fluid overloaded: stop all IV fluids
- If dehydrated or shocked: treat immediately as in shock section.
- Avoid any nephrotoxic medicines e.g. NSAIDs, aminoglycosides.
- Nutrition: Give protein of high biological value at 40 g protein/day

- Strict fluid input and output chart
- Daily weighing
- In adults restrict fluid intake to 600 ml plus previous day's output
- Beware of hyperkalaemia - avoid potassium containing foods e.g. banana

1 **Treatment of fluid losses**

- Correct fluid losses vigorously and early with appropriate fluid replacement as follows
- 0.9% Sodium Chloride, IV, in cases of diarrhoea and vomiting
- Blood transfusion in severe bleeding
- Plasma replacement in cases of severe burns
- give Furosemide (Frusemide), IV, 80mg when fluid volume has been replaced adequately

2 **Treatment of hyperkalaemia**

•**Calcium gluconate** 10%, IV, 10-20 ml over 2-5 minutes

• **Sodium Bicarbonate**, IV, 8.4% 44 mEq, IV, over 5 minutes

Note: Do not mix calcium gluconate and bicarbonate in the same delivery system

• **Regular Insulin, IV,** 10 units in 50-100 ml Glucose 50%

3 **Treatment of hypertension crises/encephalopathy**
Children <**6 years of age:**
>120 mmHg systolic BP or >90 mmHg diastolic BP

- **6–15 years:** >130 mmHg systolic BP or >95 mmHg diastolic BP
  - **Nifedipine, oral**, 0.25–0.5 mg/kg squirted into mouth.

  - Withdraw contents of 5 mg capsule with a 1 mL syringe:

10–25 kg:	2.5 mg
25–50 kg	5 mg
> 50 kg:	10 mg

4 If there is respiratory distress (rapid respiration, chest indrawing):

•**Furosemide, IV**, 1 mg/kg, over 5 minutes. Do not put up a drip or run in any IV fluids.

Adults

5 If diastolic blood pressure > 110 mmHg or systolic blood pressure > 180 mmHg:

•**Amlodipine,** oral, 5 mg as a single dose AND
•**Hydrochlorothiazide**, oral, 25 mg (if eGFR ≥ 30 mL/min) **OR**
•**Furosemide**, oral, 40–80 mg (if eGFR < 30 mL/min)

5 If there is respiratory distress (rapid respiration, orthopnoea):

•**Furosemide**, as an IV bolus, 80 mg.
•Do not put up a drip and do not give a fluid infusion.

Refer all cases

All patients with clinical indications for dialysis e.g. those with:

- Congestive heart failure
- Electrolyte abnormalities (hyponatraemia, hyperkalaemia) not controlled by conservative means
- Severe metabolic acidosis (bicarbonate less than10 mmol/L after bicarbonate treatment)
- Real or impending uraemic symptoms (seizures, pericarditis)
- Hypertensive Crises/Encephalopathy

22.6 Glomerular Disease (GN)

Glomerular disease may be a result of a primary condition of the kidney, or may be secondary to a systemic disorder. It can present with any, or a combination of the following:

- Proteinuria
- reduced eGFR (and its effects)
- Haematuria
- Hypertension and oedema

Approach to care is outlined under the syndromes which follow.

Diabetic nephropathy

See Section in Diabetic nephropathy.

Refer

- Unexplained haematuria on two to three consecutive visits.
- Proteinuria > 1 g/24 hours or PCR > 0.1 g/mmol.
- Nephritic syndrome.
- Nephrotic syndrome.
- Chronic kidney disease.

Note: Where facilities are available, investigation should be done e.g. Urea, creatinine and electrolytes to calculate the eGFR or PCR.

22.7 Nephritic Syndrome

Presents with a varied combination of:

- painless macroscopic turbid, bloody or brownish urine
- peripheral and periorbital oedema
- pulmonary oedema (circulatory overload)
- hypertension or hypertensive encephalopathy with impaired level of consciousness or convulsions
- little or no urine excretion

In children, this is commonly due to acute post streptococcal glomerulonephritis.

Gneral measures

- Give oxygen, and nurse in semi-Fowlers position if patient has respiratory distress.

- Early referral essential, especially if patient had a hypertensive episode or fluid overload.
- If dehydrated or shocked: Treat immediately.

Pharmacological Treatment

Children

Fluid overloads (rapid respiration, chest indrawing)

•**Furosemide, IV,** 1 mg/kg, over 5 minutes.

•Do not put up a drip or run in any IV fluids.

If hypertension present:

<6 years of age: > 120 mmHg systolic BP or > 90 mmHg diastolic BP

6–15 years: > 130 mmHg systolic BP or > 95 mmHg diastolic BP

•**Nifedipine**, oral, 0.25–0.5 mg/kg squirted into mouth.

•Withdraw contents of 5 mg capsule with a 1 mL syringe:

10–25 kg:	2.5 mg
25–50 kg:	5 mg
>50 kg:	10 mg

Adults

Fluid overload

•**Furosemide,** as an IV bolus, 80 mg.

•Do not put up a drip and do not give a fluid infusion.

If hypertension present:

Diastolic BP > 100 mmHg or systolic BP is > 150 mmHg:

•**Amlodipine,** oral, 5 mg as a single dose. **AND**

•**Hydrochlorothiazide**, oral, 25mg (if eGFR ≥ 30 mL/min). **OR Furosemide, oral**, 40–80mg (if eGFR < 30 mL/min).

Refer all cases.
The definitive treatment of nephritis depends on the cause – an assumption of acute post streptococcal nephritis or any other disease cannot be made without specific investigation which may include renal biopsy.

22.8 Nephrotic Syndrome

Glomerular disease characterised by:
•severe proteinuria defined as:

- Children: > 3 + proteinuria on dipstick test or urine protein creatinine ratio (PCR) > 0.2 g/mmol on spot urine sample
- Adults: ≥ 2.5 g/day, as determined by a spot urine protein measurement, i.e. PCR > 0.25 g/mmol

and resultant 'classic' clinical picture (not always present) which includes:

- Oedema, hypoalbuminaemia and hyperlipidaemia.

CAUSES

- Primary Glomerular Disease
- Minimal change disease (MCD); - supposedly common in children,
- Focal and segmental glomerulosclerosis (FSGS)
- Membranous nephropathy

- Membranous proliferative glomerulonephritis (MPGN)
- **Infections:**
  - Viral-Hepatitis B and C, HIV, Infectious mononucleosis, Cytomegalovirus
  - Bacterial (Post streptococcal infection)
  - Parasitic (Plasmodium malariae malaria, Schistosoma mansoni, Filariasis)
- **Associated with Systemic Disease**
  - Diabetes mellitus,
  - Systemic Lupus Erythematosus
  - Amyloidosis
  - Vasculitides
- **Drug Related**

Gold, Mercury, Lithium, Captopriland Diamorphine (Heroin)

Signs and Symptoms

- Early morning facial puffiness,
- generalized body swelling,
- Foamy appearance of urine,
- Weight gain (unintentional) and Poor appetite
- Periorbital, peripheral, genital oedema, Ascites and Pleural effusion
- Protein malnutrition particularly in children with long standing diseases

Investigations

- Urinalysis,
- Plasma proteins,
- Serumlipids,
- Fasting blood

- glucose Serology –
- Hepatitis B, C, HIV and Hb electrophoresis

Objectives of Treatmentare to:
- relieve symptoms
- treat of underlying condition
- prevent and manage complications
- delay progressive kidney damage

General measurest
- Restrict salt intake
- Adequate protein diet; 0.6-0.8 g/kg body weight of high class protein per day

Pharmacological treatment
Furosemide (Frusemide), oral, 40 mg daily, increasing to 2 g daily in divided doses in adults **Plus**
enalaprilil, oral,5mg at night**Plus**
Corticosteroids in children and selected adults with minimal change nephrotic syndrome. (This treatment should be given by specialists).
Accurate diagnosis requires a renal biopsy.
Refer all cases.

22.9 Prostitis

It is an infection of the prostate caused by urinary or STI pathogens.

Clinical features include:

- perineal, sacral or suprapubic pain

- Dysuria and frequency
- varying degrees of obstructive symptoms which may lead to urinary retention
- sometimes fever
- acutely tender prostate on rectal examination

The condition may be chronic, bacterial or non-bacterial, the latter usually being assessed when there is failure to respond to antibiotics.

Pharmacological Treatment
Acute bacterial prostatitis
Ciprofloxacin, oral, 500 mg 12 hourly for 14 days.

Refer:
•No response to treatment.
•High fever
•Urinary retention
• Chronic/relapsingprostatitis

22.10 Hematuria

Bleeding from the urinary tract, this can be from the kidneys, collecting system, bladder, prostate and urethra.

- Glomerular disease is suggestedif proteinuria, red blood cell casts and/or dysmorphic red blood cells are present on microscopy.
- Exclude schistosomiasis (bilharzia), a common cause of hematuria.

- When hematuria is accompanied by colicky pain a kidney stone should be excluded.

Note: The presence of blood on the urine test strips does not indicate infection and should be investigated as above.

Pharmacological Treatment
If there is evidence of schistosomiasis treat accordingly.
If symptoms of UTI; leucocytes and/or nitrite test positive in urine, treat as UTI.
If haematuria does not resolve rapidly after treatment, referral for formal investigation will be required, i.e. next 48 hours.

Refer

- All cases not associated with schistosomiasis or UTI.
- All cases not responding to specific medicine treatment.
- When glomerular disease is suspected.

22.11 Benign Prostatic Hyperplasia (BPH)

- BPH is a noncancerous (benign) growth of the prostate gland.
- May be associated with both obstructive (weak, intermittent stream and urinary hesitancy) and irritative (frequency, nocturia and urgency) voiding symptoms.

- Digital rectal examination reveals a uniform enlargement of the prostate.
- Urinary retention with a distended bladder may be present in the absence of severe symptoms, therefore it is important to palpate for an enlarged bladder during examination.

General Measures

Note: <u>All patients diagnosed with BPH should be referred to the regional referral hospital and above.</u>

- Annual follow-up with digital rectal examination
- For patients presenting with urinary retention, insert a urethral catheter as a temporary measure while patient is transferred to hospital.
- Remove medicines that prevent urinary outflow e.g. tricyclic antidepressants, neuroleptics.
- The two main risk factors are aging and the presence of testosterone.
- There is no correlation between sexual activity and the aetiology.
- Depending on the severity of symptoms, treatment may be pharmacological (drug therapy) or surgical.

Investigations

- FBC
- Blood urea, electrolytes and creatinine
- Prostate specific antigen (PSA)
- Urinalysis

- Urine (mid stream) for culture and sensitivity
- Abdominal and pelvic ultrasound
- Transrectal ultrasound (TRUS) of the prostate if available

Treatment objectives

- identify and correct associated complications which may be life- threatening
- relieve the obstruction to urinary flow

General Measures

- Patients with very mild symptoms which are not bothersome may be put on a programme of monitoring (watchful waiting) through regular checkups.
- *For acute retention of urine*do urethral catheterization, and suprapubic cystostomy if urethral catheterisation fails. **Then refer.**

For definitive treatment

- Prostatectomy

Pharmacological treatment

Patients with mild symptoms:

• Finasteride, oral, 5 mg daily (This drug is a level Scategory and may be available only in the tertiary hospitals.)

<u>Refer patients with moderate to severe symptoms to a Urologist or Surgical specialist.</u>

22.12 Prostate Cancer

- Usually occurs in men > 50 years of age and is most often asymptomatic.

Symptoms,
Weight loss, bone pain, etc. occurs in 20% of patients.
- Obstructive voiding symptoms and urinary retention are uncommon.
- The prostate gland is hard and may be nodular on digital rectal examination.
- As the axial skeleton is the most common site of metastases, patients may present with back pain or pathological spinal fractures.
- Lymph node metastases can lead to lower limb lymphoedema.
- Serum prostate specific antigen (PSA) is generally elevated and may be markedly so in metastatic disease.

REFERRAL
All patients with suspected cancer

22.13 Enuresis

Enuresis is bed-wetting that occurs in ***children > 5 years of age***.It is a benign condition which mostly resolves spontaneously.
It is important, however, to differentiate between nocturnal enuresis and daytime wetting with associated bladder dysfunction.
Secondary causes of enuresis include:

- diabetes mellitus

- urinary tract infection
- physical or emotional trauma

Note:
- Clinical evaluation should attempt to exclude the above conditions.
- Urine examination should be done on all patients.

Geneal Measures
- Motivate, counsel and reassure child and parents.
- Advise against punishment and scolding.
- Spread fluid intake throughout the day.
- Diapers are not advised, as this will lower the child's self-esteem.

Refer
- Suspected underlying systemic illness or chronic kidney disease.
- Persistent enuresis in a child > 8 years of age.
- Diurnal enuresis.

22.14 Impotence /Erectile Dysfunction

It is the inability to attain and maintain an erect penis with sufficient rigidity for penetration.
Organic causesinclude:

- neurogenic,
- vasculogenic,
- endocrinological (e.g. diabetes mellitus)
- many systemic diseases and medications, and,

- psychogenic causes: anxiey, depression, stress and mariatal coflict.

The condition may be classified as ***primary*** (never been able to attain and/or maintain an erection for satisfactory sexual intercourse) or ***secondary***, where impotence occurs in men who have previously had a satisfactory sexual performance.

Signs and Symptoms

- Inability to achieve erection
- Reduced sexual desire
- Inability to sustain erection
- Features related to underlying causes
- Hypogonadal features e.g. gynaecomastia,
- lack of male sexual characteristics
- Penile plaques (Peyronies disease)

Investigations

- FBC and sickling status
- Lipid profile
- Urinalysis
- Fasting blood glucose
- Serum prolactin
- Serum LH, FSH and estosterone

General Measures

- Thorough medical and psychosexual history
- Physical examination should rule out gynaecomastia, testicular atrophy or penile abnormalities.
- Consider the removal of medicines that may be associated with the problem.
- A change in lifestyle or medications may resolve the problem, e.g. advise cessation of smoking and alcohol abuse.

Treatment objectives are to:

- determine causative factors and treat appropriately
- restore sexual potency

Treatment

- Patients should avoid excessive alcohol consumption, cigarette smoking, recreational drug abuse and excessive weight gain
- Psychosexual counseling
- Treatment should be directed at underlying cause. e.g. change or discontinue medication, if found to be the cause, in consultation with the patient's physician
- Drugs for erectile dysfunction e.g.Sildenafilmust only be used under specialist care.

REFER to a specialist centre is necessary for proper evaluation and management in most cases.

22.15 Male Infertility

- Infertility is the failure of a couple to achieve conception within 12 months of adequate unprotected coitus.
- About one third of cases of infertility result from pathologic factors in men, one third from factors in both men and women and one third from factors in females.
- Male causes therefore account for 50% of infertility.
- About 15% of all married couples experience reproductive difficulties.
- Patients usually complain of their wives' inability to give them a child.
- Such patientsa are quite often very apprehensive, frustrated and reluctant to undergo investigations.

Causes

For practical purposes the main causes can be divided into three:

- Treatable causes
- Potentially treatable causes
- Untreatable causes

Signs and Symptoms

Symptoms suggestive of history of STI, UTI, mumps, genital, pelvic or inguino-scrotal surgery and injuries.
Absence of male secondary sexual characteristics
Gynaecomastia
Examine external genitalia to assess:

- Testes: presence or absence, size and consistency
- Epididymis: thickening
- Vas deferens: absence, thickening
- Varicoceles
- Inguinoscrotal region: scar from previous herniorrhaphy
- Penis: size, curvature, hypospadias, epispadias
- Urethra: discharge, meatal stenosis, stricture

Investigations

- FBC and sickling
- Semen analysis
- Urinalysis
- Fasting blood glucose
- Specific investigations relating to various causes e.g. scrotal ultrasound
- Specialised investigations e.g. hormonal profile done by specialists
- Evaluation of female partner by gynaecologist

Non-pharmacological treatment

- Sexual counselling
- Smoking cessation
- Reduction in alcohol intake
- Avoid local (scrotal) exposure to excessive heat, cold and chemicals
- Avoid tight underwear. Use of boxer shorts andcotton briefs (not silk/nylon) is recommended. (This reduces heat around the testes to promote spermatogenesis)

Refer all cases that require special investigation, pharmacological or surgical treatment to specialist.

22.16 Scrotal Masses

These are swellings found in the scrotum.

CAUSES - These could be divided into two:	
Painless scrotal swellings	**Painful Scrotal Swellings**
Testicular tumour	Testicular torsion
Inguinoscrotal hernia	Acute epididymitis (STI or non-STI related)
Hydrocele	Acute epididymoorchitis
Hydrocele of spermatic cord	Strangulated inguinoscrotal hernia
Spermatocele/epididymal cysts	Testicular tumour (usually painless except rapidly growing type or tumour necrosis)
Varicocele	Varicoceles are occasionally accompanied by pain/discomfort
Epididymal tumours	
Chronic epididymoorchitis	

Signs and Symptoms

- Swelling and/or pain of scrotum or its contents
- Sudden onset e.g. torsion of testis
- Gradual onset e.g. spermatocele, hydroceles
- Gradual onset becoming suddenly painful e.g. obstructed hernia

- Fever, may be present in infections e.g. Acute epididymitis and acute epididymoorchitis
- fever may be present in infections
- Transillumination for cystic swellings e.g. hydroceles and spermatoceles
- Hard swelling e.g. Tumour

Investigations
- Ultrasound scan with or without colour doppler
- Laboratory investigations are tailored towards cause and specific treatment

Treatment
For sexually transmitted infection, **Doxycycline,** oral, 100 mg 12 hourly for 10 days **OR**
Surgery: elective or emergency (whetre there is access to a surgeon). Emergency surgery within 6 hours is required for testicular torsion to salvage the testis

Refer all those who show no improvement, emergency cases and those suspected to be tumours to a urologist or surgical specialist

22.17 The Empty Scrotum

- This refers to the absence of testis (es) in the scrotum/hemiscrotum.
- 10% of cases are bilateral.
- 75%t of full term infants with undescended testes, and,

- 90% of premature infants would have spontaneous descent of testes from the intra-abdominal site by the age of one year.

- Persistent undescended of the testis is associated with an increased risk of malignancy. All health workers who see neonates and children should do routine examination of the scrotum and testis to prevent late presentations and complications.

Signs and Symptoms

• Absence of one or both testes in both supine and upright positions in children, parents or the health worker may notice this at birth

Investigations

• Ultrasound scan of abdomen, pelvis and inguinal canal (Currently, this can only be done at the tertiary hospital)

Treatment objectives

• To decrease potential for cancer
• To improve fertility
• To repair hernia
• To decrease risk of torsion
• To avoid social and psychological complications

Surgical- intervention before two years of age. (All ectopic testes should be operated because they will not descend)

Treatment

• Human chorionic gonadotropin (HCG) for undescended testis in neonates/infants. This is contraindicated in ectopic testis.

Refer patients aged over one year with no evidence of testicular descent to a urologist or surgical specialist

22.18 Priapism

- This refers to a spontaneous, prolonged, persistent, usually painful erection which is unwanted.
- It is commonly seen as a prolongation of nocturnal penile tumescence (NPT) or early morning erection.
- Patients are usually shy and reluctant to come to the hospital due to stigmatisation.
- Late presentation is therefore common and herbal medicine applications and spiritual remedies may have been tried to relieve symptoms prior to being seen in hospital.
- Early reversal within 24-48 hours may reduce the high impotence complication rate of 50%.
- Although the occurrence is usually in adults, it may periodically occur in older children.

Causes:

- Idiopathic or unknown in 60% of cases
- Other causes are:
    - Leukaemia
    - Sickle cell disease and thalassaemia
    - Spinal cord injury
    - Penile trauma
    - Pelvic infections
    - Pelvic tumour

- Iatrogenic e.g. Intracavernosal prostaglandin E for impotence,
- Sildenafilcitrate,
- psychotropics e.g. chlorpromazine
- Drugs e.g. marijuana and herbal concoctions

Symptoms
- Painful persistent erection
- Erect, tender penis
- Clinical signs of sickle cell disease

Investigations
- FBC, blood film comment
- Urinalysis
- Sickling status - Hb electrophoresis

Treatment objectives
- To relieve pain
- To ensure early relief of penile congestion
- To prevent complications

Non-pharmacological treatment
- Maintain adequate hydration
- Surgery

Pharmacological treatment
- **Sodium Chloride** 0.9%, IV, Adults, 1 L 6 hourly and liberal oral fluids; Children, 500 ml 6 hourly and liberal oral fluids
- **Pethidine,** IM, Adults, 100 mg 8 hourly if required Children, 1 mg/kg 8 hourly if required

And

Diazepam, IV, Adult, 10 mg stat (given slowly over 13 minutes) then refer

Children, 0.03 mg/kg stat (given slowly over 13 minutes) then refer

REFER

Patients not responding to conservative management should be promptly referred to an urologist or surgical specialist.

22.19 Posterior Urethral Valves

- These valves or folds of tissue are congenital obstructing membranes within the lumen of the urethra. It affects between 1 in 5,000 - 8,000 males.
- It is the commonest cause of congenital bladder outlet obstruction.
- They obstruct urinary outflow from the bladder but permit easy urethral catheterization.
  Because the condition is congenital, secondary changes in the bladder and upper urinary tract are advanced at birth.
- Some patients may be born with severe renal impairment or develop one soon after birth if recognition is delayed.
- Most patients present as neonates or infants.
- Occasionally presentation is late in childhood.
- All male newborn babies should be closely watched to ensure good stream of urine.
- Prenatal diagnosis is possible using ultrasound.

Causes

- Congenital valves or folds within the lumen of the urethra

Signs and Symptoms

- Voiding dysfunction
- Straining to void with dribbling of urine, poor urinary stream
- Crying while voiding
- Failure to thrive, retardation
- Fever
- Poor feeding
- Abdominal distension
- Palpable bladder and kidneys
- Respiratory distress
- Signs of sepsis e.g. Fever
- Azotaemia

Investigations

- FBC ; Blood urea, electrolytes and creatinine
- Urinalysis; Urine culture
- Abdominal ultrasound; Micturating cysto-urethrogram

Treatment objectives

- To prevent and treat renal failure
- To remove obstructing valves
  - Prompt bladder decompression and continuous drainage to protect the upper tract from back pressure damage.

- This is preferably done by vesicostomy in most infants

In-dwelling catheters should be avoided in most cases due to complications and death from septicaemia

Surgical removal or destruction of the valve
- Treatment of urinary tract infections (see appropriate section)

Refer immediately after diagnosis for specialist evaluation and treatment

22.20 Urinary Tract Calculi

It is a kidney stone or calculus which has formed in the renal tract i.e. pelvis, ureters or bladder as a result of urine which issupersaturated with respect toa stone-forming salt. They consist mainly of mineral salts i.e. crystal forming ions.
Some of the common stone-types include calcium oxalate, calcium phosphate, magnesium ammonium phosphate and uric acid.
Majority of stones less than 5 mm in diameter will pass spontaneously.

Clinical features of obstructing urinary stones may include:
- Sudden onset of acute colic, localized to the flank, causing the patient to move constantly,
- nausea and vomiting,

- referred pain to thescrotum or labium on the same side as the stone moves down the ureter.

INVESTIGATIONS	
Urinalysis	Ultrasound scan of abdomen
Urine culture	Intravenous urogram
Blood urea, electrolytes and creatinine	Retrograde ureteropyelogram
Serum uric acid, calcium	CT scan
Plain X-ray of abdomen	Stone analysis

Pharmacological Treatment
Adults:

- Analgesia for pain, if needed:
- **Morphine** 10 mg diluted with 10 mL of water for injection or sodium chloride 0.9%, slow IV (Doctor initiated).
  - Start with 5 mg; thereafter slowly increase by 1 mg/minute up to 10mg.
  - Can be repeated after 4–6 hours if necessary, for pain relief. Beware of hypotension. **OR**
- **Pethidine,** IM, 100 mg 4 hourly as required, **OR**
- **Diclofenac**, IM, 75 mg or by suppository, 100 mg 12 hourly, and
- **Hyoscine butylbromide**, IV,20 mg 8 hourly

Encourage oral fluid intake (2-3 L daily in an adult) and avoid dehydration

• Avoid low calcium diet (it encourages increased oxalate excretion)
• Diet-therapy
• Manage acute urinary retention due to bladder or urethral stones by urethral catheterisation or suprapubic cystostomy respectively

Refer
All patients!

22.21 Urethral Stricture

This refers to a narrowing or complete obstruction of the urethral lumen due to fibrosis (scarring). It is the second commonest cause of retention of urine and the most common in young males usually resulting from previous inadequately treated STI.
The commonest site is the anterior urethra i.e. bulbar and penile urethra in males. It may be complicated by periurethral abscess, superficial extravasation of urine and urethrocutaneous fistulae.

Causes
• Gonococcal or non-gonococcal urethritis
• External trauma e.g. road traffic injuries, falls.
• Urethral instrumentation e.g. catheterisation, endoscopy.
• Congenital strictures (rare)

Signs and Symptoms

- Lower Urinary Tract Symptoms [LUTS] e.g. poor urinary stream, split stream, frequency and dysuria, post-void dribbling, incomplete emptying of bladder
- Urinary (overflow) incontinence
- Urinary retention (acute or chronic)
- Bladder may be palpable if there is retention
- Kidney may be palpable in hydronephrosess
- Localized induration may be felt along the urethra
- Failure of catheterization; this heightens the suspicion of a stricture

Investigations

- Urinalysis
- Urine culture and sensitivity
- Blood urea, electrolytes and creatinine
- Retrograde urethrogram
- Antegrade urethrogramprovided a suprapubic catheter is in place
- Urethrocystoscopy
- Uroflowmetry

Treatment objectives

- To relieve symptoms and prevent complication
- To treat underlying cause

General Measures

- Try catheterization; a gentle attempt is made to pass a urethral catheter, which will be held up, at the site of stricture. Confirmation of site ofobstruction is still needed

- If catherization fails and patient in acute retention, suprapubic cystostomy or suprapubic needle puncture and aspiration (try this procedure if facilities for suprapubic cystostomy are lacking).
- Aspirateasmuch urineas possibletodecompress the bladderand relieve pain before referral
- Definitive treatment is surgical. In most cases referral to a specialist centre will be necessary

Refer to specialist for further investigations prior to definitive treatment

22.22 Acute Epididymo-orchitis

This is an acute inflammation of the epididymis and testis usually due to a bacterial infection. It may follow ascending infection from the urethra (including STIs), instrumentation /catheterization and genito-urinary surgery. It is a known complication of mumps. Poorly managed acute epididymo-orchitis may be complicated by septicaemia, abscess formation, chronic epididymo-orchitis, secondary hydrocele, infertility and Fournier's gangrene.

Causes

Mumps virus	Escherichia coli
Chlamydia	Streptococcus
Gonococcus	Pseudomonas
Staphylococcus	Mycobacterium tuberculosis

Signs and Symptoms

- Fever
- Scrotal /testicular pain

- Malaise
- Scrotal swelling
- Urethral discharge
- Dysuria
- Fever
- Tender and swollen hemiscrotum
- Inflamed epididymis and testis
- Secondary hydrocele
- Positive Prehn's sign (lifting of scrotum towards pubic symphysis in the palm relieves pain)

Investigations

- Urinalysis
- FBC and ESR
- Blood culture and sensitivity
- Scrotal ultrasound/MRI (to be don at the tertiary hospital)
- Urine culture and sensitivity first catch of urine preferred to midstream urine

Treatment objectives

- To relieve symptoms
- To prevent recurrence
- To eradicate the infection
- To prevent complications e.g. abscess and sterility

General Measures

- Bed rest
- Trace and treat sexual contacts
- Scrotal support

- Surgical drainage of abscess
- Avoid unprotected sex until treatment and follow up

Pharmacological treatment

- **Ciprofloxacin,**oral,

Adult

500 mg 12 hourly for 7-10 days

Children

5-15 mg/kg 12 hourly for 7-10 days

Plus

- **Doxycycline**, oral, 100 mg 12 hourly for 4 weeks in cases of sexually transmitted infections **OR**

Adult: 500 mg daily for 3 days

Children: 10mg/kg daily for 3 days

Alternative treatment

- **Diclofenac sodium**, oral, 50 mg 8 hourly **OR** **Ibuprofen**, oral, 400 mg 8 hourly

Referall cases of persistent fever and complications to the surgical specialist or urologist.

22.23 Testicular Torsion (torsion of Spermatic Cord))

- This is cessation of blood supply to the testis due to twisting of the cord.
- It is a *medical emergency* that needs to be recognized before the cardinal signs and symptoms are fully manifest as prompt surgery saves the testes.
- Delay in treatment could result in testicular atrophy, abnormal sperm count leading to infertility/sterility.
- It can be classified:

- Intra-vaginal torsion which constitute more than 95% and
- Extra-vaginal torsion which is usually found in infants.

- About 50% of torsion occurs during sleep and early in the morning.
- It is rare in older children and adults but common in children under 15 years.

Causes

- Undescended testis
- Spasm of cremaster muscles
- Long mesorchium
- Bell-clapper malformation
- Trauma
- Horizontal lie of testis/inversion of testis

Signs and Symptoms

- Swollen, tender and abnormal position of testis and epididymis.
- Shortened and twisted cord.
- Oedema/reddening of scrotal wall
- Right testis -twisted clockwise
- Left testis -twisted anticlockwise
- Prehn's sign is absent (elevation of scrotum in the palm towards the Pubic symphysis does not relieve pain)
- Sudden onset of acute severe pain in one testicle orrecurrent pain which resolves spontaneously (recurrent torsion and detorsion)
- Lower abdominal pain on affected side
- No fever

- Nausea and vomiting
- No urinary symptoms

Distinguishing between Torsion and Epididymoorchitis		
Parameter	Torsion	Epididymoorchitis
Age	<15years	>15 years/sexually active
Onset of pain	Sudden/early morning	Gradual
History of coitus	Usually absent	Usually present
Fever	Absent	Present
Urinary symptoms	Absent	Present
Urethral discharge	Absent	Present in STIs
Position of testis	Changed	Unchanged
Swelling	Testis	Epididymis and testis
Prehn's sign	Absent/negative	Present/positive
Blood supply: doppler test	Reduced	Normal or increased
Treatment	Surgical	Non surgical

Treatment objectives

- To have surgical intervention within 6 hours of onset
- To surgically explore all doubtful cases
- To prevent testicular loss

General Measures

- Emergency surgery is the standard treatment
- If surgery is delayed then manual detorsion should be carried out carefully to prevent loss of testis.

- Manual detorsion procedure-under localanaesthesia and standing at the foot of bed untwist: Right testis anticlockwise, Left testis- clockwise
- Emergency surgery should follow this procedure as soon as possible.

Pharmacological treatment

• **Lignocaine** 1%, into the spermatic cord on both sides - for cord block anaesthesia 10-20 ml

Refer as soon as possible (if surgical intervention is not available) to a surgeon or urologist. Beware testicular torsion has potential medico-legal implications.

22.24 Fouriere Gangrene

It is an acute fulminant polymicrobial necrotising fascitis or gangrene affecting the scrotum and sometimes extending to the perineum, penis and lower abdomen. It is also called idiopathic gangrene of the scrotum.

The synergistic infections of anaerobic and aerobic bacteria coupled with obliterative arteritis results in the extensive gangrene. The risk factors include:

- diabetesmellitus,
- HIV/Immunosuppression,
- perineal abscess/infection of scrotum and contents,
- trauma,
- extravasation of urine,
- Periurethral abscess and urethral stricture/calculi.

The complicationsof Fournier's gangrene include septicaemia, extravasation of urine, exposure of testes and fistula formation

Causes:
- Staphylococcus
- Fusibacteria
- MicroaerophilicStreptococcus
- Bacteroides
- E. coli
- Clostridium welchii

Signa and Symptoms
- Fever
- Presence of risk or predisposing factors
- Prostration
- Urinary extravasation
- Rapidly progressing gangrene
- Testis is usually spared
- Fetid odour
- Crepitus on palpation of affected tissue
- Sharp demarcation between 'dead' tissue and healthy tissue

- Acute onset of painful anterior scrotal swelling in previously healthy tissue
- Fever

Investigations
- Wound culture and sensitivity
- HIV screening
- Serum culture and sensitivity

- FBC and ESR
- Urinalysis
- Fasting blood glucose
- Grouping and cross-matching
- Plain X-ray of pelvis will reveal gas in affected tissue

Treatment objectives

- To resuscitate patient • To prevent/treat complications
- To treat the infection • To salvage the testes
- To manage concomitant risk factors

General Measures

- Surgical intervention
- Radical Debridement
- Reconstructive Surgery:
- Testis Buried In Upper Thigh Temporarily
- To Prevent Dessication
- Skin Grafting and reconstruction of scrotum.
- Myocutaneous Flaps
- Nutrition Supplement
- Wound Care
- Management of diabetes mellitus if present

Pharmacological treatment

- IV fluids and haemotransfusion
- **Gentamicin**, IV, 80 mg 8 hourly **PlusAmpicillin,** IV, 500 mg 6 hourly**Plus Metronidazole,** IV, 500 mg 8 hourly OR
- **Hyperbaric Oxygen**

Refer all cases with septicaemic shock to specialist after resuscitation and all those who require reconstructive surgery.

23. VACCINATION GUIDELINES

This schedule is Guidelines for health workers
Refer to the latest MOH guidelines on EPI.

23.1 Immunisation Schedule

1. Any medical incident that takes place after immunisation causes concern and if believed to be caused by immunisation should be reported.
2. Every clinic day is an immunisation day.
3. Never miss a chance to immunise – never turn a child away if an immunisation is needed, even if it means opening a multidose vial for just one child.
4. Check every time the child visits the clinic, and give missed immunisations. These should be given according to the catch-up schedule.
5. Mild illnesses are not a contra-indication to immunisation – most children who are well enough to be sent home, are well enough to be immunised. Do not immunise a sick child if the mother seriously objects, but encourage her to bring the child for immunisation on recovery.
6. Give an extra dose if in doubt whether a child has had a certain dose or not, as extra doses are not harmful.
7. All vaccines listed in the table can be given safely at the same time, but should not be mixed in the same syringe.
8. Serious adverse events following immunisation are uncommon. All adverse events other than mild systemic symptoms (irritability, fever > 39°C)

and minor local reactions (redness/swelling at infection site) should be reported.

There are very few contra-indications, but many missed opportunities.

23.2 Adverse events requiring reporting

Local reactions

- Severe local reaction (swelling extending > 5 cm from the injection site or redness and swelling for > 3 days).
- Lymphadenitis.»Injection site abscess.

Systemic reactions

- All cases of hospitalisation (thought to be related to immunisation).
- Encephalopathy within 7 days.
- Seizures within 3 days.
- Collapse or shock-like state within 48 hours.
- Fever of more than 38°C within 48 hours.
- All deaths (thought to be related to immunisation).

Conditions that are not contraindications to any of the standard EPI vaccines

- Family history of any adverse reactions following vaccination.
- Family history of convulsions.
- History of jaundice after birth.
- Previous convulsions. » Preterm birth.

- Previous measles, mumps, rubella or pertussis-like illness.
- Stable neurological conditions such as cerebral palsy and trisomy .
- Contact with an infectious disease.
- Minor illness (without systemic illness and with a temp.<38.5°C).
- Treatment with antibiotics.
- Recent or imminent surgery.
- Asthma, eczema, hay fever or 'snuffles'.
- Treatment with locally acting (inhaled or low-dose topical) steroids.
- Child's mother is pregnant.
- Child being breastfed.
- Underweight, but otherwise healthy child.
- Over the age recommended in vaccination schedule.

23.3 Childhood Immunisation Schedule in Eritrea

Age of child	Vaccine
At birth	OPV0 BCG
6 weeks	OPV1 RV1 Hexavalent (DTaP-IPV-HB-Hib)1 PCV 1
10 weeks	Hexavalent (DTaP-IPV-HB-Hib)2 PCV2
14 weeks	RV2 Hexavalent (DTaP-IPV-HB-Hib)3 PCV3

9 months	Measeles1
18 months	Measeles2
6 years	Td
12 years	Td

Note:

Children with HIV should receive the full schedule of vaccines with the exception of Symptomatic HIV. infected children (WHO Stage 3 or Stage 4) should not be administered BCG vaccine.

23.4 Vaccines for Routine Administration

Vaccine	Dose	Route	Recommended site	Age
BCG	0.05 mL	Intra-Dermal	Right upper arm,at the delitoid muscle	Birth
OPV	2 drps	Oral	Oral	Birth,6 wks
RV	1.5 mL	Oral	oral	6, 14 wks.
DPT	0.5 mL	IM	<1yr,lateral aspect of the thigh >1yr right left upper arm	6.10.14 wks. 18 mn.
Measles	0.5 mL	IM	<1yr,lateral aspect of the left thigh >1yr right left upper arm	9,18 mn.
PCV	0.5 mL	IM	lateral aspect of the left thigh	9, 14 wks, 9 mn.

Td	0.5 mL	IM	Left arm	5-7 yrs,>12yrs.

Donot use vaccines that have expired missed the cold chain or that VVM has reached dischard points.
Keep the frige temperature between 2-8^{0}c.

Note: All vaccines with a “T” in the name are sensitive to freezing-TT, Td, LiquidHip-Type b, RoTavirus, HepaTiTis B and diluent.

24. POISONING

24.1 Introduction and General Measures

Poisoning is defined as 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 and medicines (in excessive amounts)

Note:

- If possible, **refer/admit** all patients showing signs of poisoning to hospital.
- Send a note of what is known 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
- Modified-release products

Even though it may not be possible to identify the poisonand the amount taken, it is usually not important because:
- 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 anticipatethe likely effects on the patient.

General Measures

1. **Respiration:**

- Often impaired in unconscious patients
- Ensure the airway is cleared and maintained
- Insert an airway if available
- Position patient semi-prone to minimize risk of inhalation of vomit
- Assist ventilation if necessary

2. **Blood pressure**

- Hypotension is common in severe poisoning with CNSdepressants. A systolic BP <70mmHg may cause irreversible brain or renal damage.
- Carry the patient head down on the stretcher and nurse in this position in the ambulance
- Give oxygen to correct hypoxia
- Set up an IV normal saline
- Fluid depletion without hypotension is common after prolonged coma and after aspirin poisoning due to vomiting, sweating, and hyperpnoea.

- Hypertension is less common but may be associated with sympathomimetic poisoning, e.g. amphetamines, cocaine.

3. **Heart**

Cardiac conduction defects and arrhythmias may occur in acute poisoning, especially with tricyclic antidepressants, but these often respond to correction of any hypoxia or acidosis.

4. **Body temperature**

Hypothermia may develop in patients with prolonged unconsciousness, especially after overdose of barbiturates or phenothiazines, e.g. chlorpromazine, trifluoperazine.

- It may be missed unless temperature is monitored
- Treat by covering the patient with a blanket

5. Convulsions

- Do not treat single brief convulsions

If convulsions are prolonged or recur frequently: give:

- **Diazepam** 10mg rectally repeated if necessaryChild: 400 micrograms (0.4mg)/kg per dose **OR**
- **diazepam 10mg slow IV** repeated if necessary Max: 30mg . child: 200 micrograms (0.2mg)/kg. Do not give IM. If IV route is not possible, remove the needle of the syringe and give the dose rectally

Removal and Elimination of the Poison

- Removal from the stomach
- Balance the dangers of attempting to empty thestomach with the likely toxicity of any swallowed poison as determined by the type of poison and amount swallowed.

1 **Gastric lavage**

- Only useful if done within 2 hours of poisoning (except with salicylates when it may be of usewithin 4 hours)
- Seldom practicable or necessary before the patient reaches hospital
- Do not attempt in drowsy or comatose patients because of the risk of inhaling stomach contents(unless there is a good cough reflex or the airway can be protected with a cuffed endotracheal tube)
- Do not attempt with corrosive or petroleum products

2 **Prevention of absorption of the poison**

- **Oral activated charcoal** can bind many poisons in thestomach 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)

- It is safe and especially useful for poisons toxic in small amounts, e.g. antidepressants
- If patient unable to swallow the **charcoal/water mixture** (slurry), give by gastric lavage tube
- Give activated **charcoal** 50g**,** Child: 25g (50g if severe)Grind these into a fine powder before mixing with 100-200mL of water (50g = 200 tablets of 250mg)

3 **Active elimination of the poison**

Repeated doses of activated charcoal increase elimination of some medicines after they have been absorbed, e.g. acetylsalicylic acid, carbamazepine, phenobarbital, quinine, theophylline

- ✓ Give activated charcoal 50g repeated every 4 hours
- ✓ Treat any vomiting as this may reduce the effectiveness of the charcoal In case of intolerance,
- ✓ Reduce dose and increase frequency, e.g. 25g every 2 hours or 10g every hour

24.2 Acute Organophosphate Poisoning

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. rat poison

- Intended poisoning, i.e. suicidal or homicidal
- Occupational hazard, e.g. agricultural workers

Symptoms and Signs

- Patient may smell of the chemicals
- Constricted pupils
- Cold sweat, anxiety, restlessness
- Abdominal pain, diarrhea, and vomiting
- Twitching, convulsions
- Bradycardia
- Excessive salivation, difficulty in breathing

Differential diagnosis

- Other causes of poisoning
- Other causes of convulsions
- Acute infection

Management

- Remove contaminated clothing
- Wash contaminated skin with lots of cold water
- Establish and maintain the airway; artificial respiration with air or oxygen may berequired during the first 24 hours after poisoning
- Perform gastric lavage if the poison was ingested

Pharmacological Treatment

Atropine 2mg IM or IV (according to the severity of the poisoning); child: 20 micrograms/kg per dose

- Repeat dose every 20-30 minutes until signs of atropinization occur (pupil dilatation, hot dry skin, dry mouth, fast pulse)

In moderate to severe poisoning only and if not responding to atropine, add **pralidoximemesylate** 30mg/kg IM.

Refer

Follow by 1-2 more doses at 4-6 hour intervalsdepending on the severity of the poisoning and response to treatment

In very severe poisoning**:**

- The initial dose of pralidoxime may be doubled
- Usual maximum dose: 12g/24 hours
- The dose can also be given by slow IV (over a 5 minute period) by diluting 1g in 10-15mL of water for injection or by IV infusion (up to 500mg/hour may be required)
- Give **IV fluids** e.g. normal saline prn for dehydration, hypervolemia, and shock (refer to18.6 Fluid and electrolyte imbalance)

Note:

Pralidoxime: Only effective if given within 24 hours of poisoning

Prevention: important

- Label agricultural and domestic pesticides properly
- Store such products away from children
- Wear protective clothing when using the products

24.3 Parafin and Petroleum products Poisoining

These Include paraffin, petrol, paint thinners, organic solvents.

Cause
Accidental or intentional ingestion

Symptoms and Signs
- Patient may smell of paraffin/other petroleum product
- Burning sensation in mouth and throat
- Patient looks pale (transient cyanosis)
- Vomiting, diarrhea
- Cough, dyspnea

Differential diagnosis
- Other causes of poisoning
- Acute infections

Management
- Treatment is supportive and symptomatic
- The main danger is damage to lung tissue
- Avoid gastric lavage or use of an emetic as this may
- lead to inhalation of the gastric contents, causing pneumonitis
- Give plenty of oral fluids (preferably milk)
- **Activated charcoal** may be used:

- 50g repeated prn every 4 hours
- Or 25g repeated prn every 2 hours

Refer if complications occur, e.g. pulmonary oedema, pneumonia

Prevention
Store paraffin, etc. safely (e.g. in a locked cupboard)

24.4 Acetylsalicylic Acid (Aspirin) Poisoning

Symptoms and Signs

- Hyperventilation
- Tinnitus, deafness
- Vasodilation
- Sweating
- Coma (if very severe poisoning)
- Complex acid-base disturbances

Management

- **Gastric lavage**: Worthwhile up to 4 hours after poisoning as stomach emptying is delayed
- **Activated charcoal** 50g repeated as needed every 4 hours or 25g repeated prn every 2 hours
- To delay absorption of any remaining salicylate; Fluid and electrolyte monitoring and management
- To correct acidosis, hyperpyrexia, hypokalaemia, and dehydration (See 18.6 "Fluid and electrolyteimbalance")
- Look out for and treat hypoglycaemia: **Glucose** 50% as IV bolus, Adult: 20mL, Child: 1mL/kg
- Anticipate and treat convulsions with IV diazepam, 10mg prn

24.5 Paracetamol Poisoning

Symptoms and Signs

- As little as 10-15g (20-30 tablets of 500mg) may cause severe hepatic and renal damage
- Nausea and vomiting (usually settle within 24 hours)

Management

- If poisoning took place <2 hours before treatment:
- Empty the stomach to remove any remaining medicine using gastric lavage or an emetic
- Despite few significant early symptoms, transfer patients to hospital urgently
- Maximal liver damage occurs 3-4 days afterpoisoning
- if poisoning took place <12 hours before treatment: Also give:

- **methionine 2.5g;** Repeat 3 times at 4 hourly intervals
- **Acetylcysteine, 200mg**/mL injection in 10mg ampoule.Adult and child: Initially 150g/kg over 15 min, then 50mg/kg over 4 hours, then 100mg/kg over 16 hours Administration of acetylcysteine: Dilute the required dose in **5 % glucose** as follows:

Adult and child >12 years: 200mL/kg over 15 minutes, then 500mL over 4 hours, then 1 litre over 16 hours
Child >12 years with body weight over 20kg: Initially 100mL/kg over 15 min, then 250mL over 4 hours, then 500mL over 16 hours
Child < 12 years with body weight under 20kg: Initially 3mg/kg over 15 min, then 7mL/kg over 4 hours, then 14mL/kg over 16 hours

24.6 Iron Poisoning

Symptoms and Signs

- Most common in children
- Nausea, vomiting, abdominal pain, diarrhoea
- Haematemesis

- Rectal bleeding
- Later: Hypotension, coma, hepatic necrosis

Management

Deferoxamine15mg/kg/hour by continuous IV infusion in sodium chloride 0.9% or glucose 5% infusion

- Max dose: 80mg/kg/24hours
- Dissolve initially in water for injections (500mg in 5mL) then dilute with infusion fluid

24.7 Carbon Monoxide Poisoning

It is 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.

Symptoms and Signs

- All due to hypoxia
- Headache, nausea, vomiting
- Weakness, collapse, coma, death

Management

- Remove person to fresh air
- Clear the airway
- Give oxygen 100% as soon as possible

- Give artificial respiration as required; continue until adequate spontaneous breathingstarts
  - Admit to hospital due to possibility of delayedcomplications

In severe poisoning:

Anticipate cerebral oedema and treat with:

Mannitol 20% 1g/kg by rapid IV infusion

24.8 Barbiturate Poisoning

Symptoms and Signs
- Appropriate history of taking e.g. phenobarbitone
- Patient will be drowsy

Management
- Monitor vital signs
- Gastric lavage
- **Activated charcoal** 50mg may be used to absorb thepoison; Child: 25g (50 if severe)

24.9 Narcotic Poisoning

Symptoms and Signs
- Respiratory depression
- Pinpoint pupils
- Coma

Management
Naloxone 800 microgram-2mg IV
Child: 10 microgram/kg IV
If respiratory function does not improve, ,
Repeat dose of naloxone every 5 minutes to amaximum of 10mg total dose for adult, and for childe one subsequent dose of 100 micrograms/kg
If respiratory function still does not improve
- *Question the diagnosis*

Note
Use IM or SC route if IV not possible
- Onset of action will be slower

Naloxone: Doses used in acute poisoning may not be suitable for treating opioid-induced respiratorydepression and sedation in palliative care and in chronic opioid use

24.10 Warfarin

Warfarin is an ingredient of some rat poisons.
Over use for long period of time to treat deep venous thrombosis can lead to bleeding tendency

Symptoms and Signs

- May not present with clinical features
- Could be having bleeding from mucosa e.gastroinstestinal bleeding, Haematuria

Management

- Empty the stomach
- Give **activated charcoal** 50mg, Child: 25g (50g if severe); it absorbs any remaining poison

If there is major bleeding, give
Phytomenadione (vitamin K) 5mg IV, very slowly

24.11 Methyl Alcohol Poisoning

Methanol is used as an industrial solvent and is an ingredient of methylated spirits.

Symptoms and Signs

- Similar to alcohol intoxication/poisoning but milder
- Symptoms do not usually appear until 12-24 hoursafter ingestion and may include headache, dizziness, nausea, vomiting, vasomotor

disturbances, CNS depression, and respiratory failure

- Toxic metabolites may cause severe acidosis and retinal/optic nerve damage

Management

Gastric aspiration and lavage

- Only use if done within 2 hours of ingestion

Correct metabolic acidosis with **oral sodiumbicarbonate solution5%**

- Leave the solution in the stomach

In severe cases

Give**sodium bicarbonate** 8.4% 50mL by slow IV

- Monitor plasma pH

Give 30-35mL of **alcohol 40%** (e.g. areki, whisky) in 100mL of water every 3 hours until the acidosis has been corrected.This delays oxidation of methanol to toxic metabolites

- Keep the patient warm
- Protect the eyes from strong light
- Refer to hospital for further management

24.12 Ethyl Alcohol (beverage alcohol) Poisoning

Ethyl Alcohol poisoning may be acute or chronic.

1 Acute alcohol poisoning

Symptoms of alcoholic poisoning following ingestion of 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)

Symptoms and Signs

- Smell of alcohol on the breath
- Excessive sweating
- Dilated pupils
- 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

- Maintain a clear airway
- Take measures to reduce the special hazard of aspiration of stomach contents
- Check blood glucose level; If indicated, treat hypoglycaemia with **glucose 50%** 20-50mL IV bolus; Child: 1mL/kg
- Assess clinical and biochemical response over the next minutes and repeat glucose 50% IV prn
- Monitor hourly blood glucose levels; Repeat **glucose 50% IV**prn until the patient wakes up.
- If IV glucose is not available, give glucose 50% or sugar solution 50% by NGT
- Once patient wakes up, continue with oral glucose or sugar solution as required until the patient can eat a meal

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