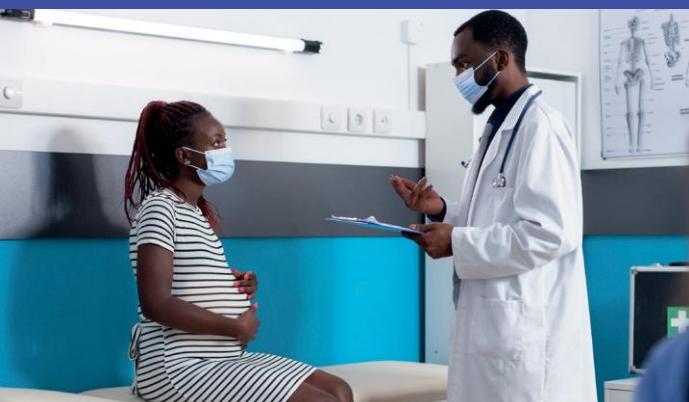




Accelerating Progress Towards Universal Health Coverage

**Clinical Guidelines for
Management and Referral of
Common Conditions at Level:**

Level 2: Dispensaries/ Medical Clinics
**Level 3: Health Centres/ Nursing
Homes**



Volume



2

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List of Abbreviations

ACT	Artemesinin combination treatment
AIDS	Acquired immune deficiency syndrome
APGAR	Appearance, pulse, grimace, activity, respiration
ART	Antiretroviral therapy
ATLS	Advanced trauma life support
ARV	Antiretroviral drug
BCC	Behaviour change communication
CBO	Community-based organization
CHEW	Community health extension worker
CHW	Community health worker
CRHS	Child and Reproductive Health Services
CSPHP	Comprehensive school health programme
CSOM	Chronic suppurative otitis media
DCT	Diagnostic counselling and testing
DEH	Division of Environmental Health
DLTLD	Division of Leprosy, Tuberculosis and Lung Diseases
DOMC	Division of Malaria Control
DON	Department of Nursing
DOTS	Directly observed therapy,short course
FP	Family planning
GOK	Government of Kenya
GORD	Gastro-oesophageal reflux disease
GUD	Genital ulcer disease
GYN	Gynaecology
HAART	Highly active anti-retroviral therapy
HAPAC	HIV/AIDS Prevention and Care Project
HFA	Health For All
HIV	Human immunodeficiency virus
HSV	Herpes simplex virus
IEC	Information, education and communicatio
INH	Isoniazid
ITN	Insecticide treated net
IUCD	Intrauterine contraceptive device
IUFD	Intrauterine foetal death
JRA	Juvenile rheumatoid arthritis
KCCT	Kaolin cephalin clotting time
KEPH	Kenya Essential Package for Health
KMC	Kangaroo mother care
KOH	Potassium hydroxide solution
LBW	Low birth weight
MDGs	Millennium Development Goals
MDR-TB	Multiple drug resistant TB
MOA	Ministry of Agriculture

MOEST	Ministry of Education, Science and Technology
MOH	Ministry of Health
MOPW	Ministry of Public Works
MOU	Memorandum of understanding
MOWI	Ministry of Water and Irrigation
NASCOP	National AIDS/STD Control Programme
NCD	Non-communicable disease
NGO	Non-government organization
NHSSPII	Second National Health Sector Strategic Plan 2005–2010
OB	Obstetrics
PEP	Post-exposure prophylaxis
PHC	Primary health care
PID	Pelvic inflammatory disease
PLWHA	Person/people living with HIV/AIDS
PMTCT	Prevention of mother to child transmission (of HIV)
POP	Plaster of paris
PSC	Patient support centre
PTI	Prothrombin Time Index
SFP	School feeding programme
SHN	School health and nutrition
SHP	School health programme
STI	Sexually transmitted infections
TAH	Total abdominal hysterectomy
TB	Tuberculosis
TOF	Tracheoesophageal fistula
TT2	Tetanus toxoid
TURP	Transurethral resection of the prostate
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
UTI	Urinary tract infection
VCT	Voluntary counselling and testing
WHO	World Health Organization

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Preface



These guidelines summarize current medical knowledge, weigh the benefits and harms of diagnostic procedures and treatments, and give specific recommendations based on credible information. In addition, these guidelines aim at supporting the clinical decisions of health care professionals on interventions for specific clinical conditions, discouraging inappropriate practices and improving coordination between different providers. This updated edition of the guidelines takes cognizance of the Kenya Essential Package for Health (KEPH), emphasizing distinct levels of care – including the community – to be provided to defined cohorts of the human life cycle. Specifically, the guidelines have been updated in relation to the following:

- ☒ Defining care protocols by the service delivery level, recognizing that the skills and facilities for care differ at the different levels of health care.
- ☒ Providing greater elaboration of the identification and preparation for referral of clients in case the presenting condition or state doesn't allow for management at the level where the client has presented.
- ☒ Updating management protocols to address current conditions and potential threats to the health of Kenyans.
- ☒ Including a process for monitoring and reviewing the guidelines.

For ease of reference and use, the guidelines are presented in 3 volumes:

Volume 1: Management Guidelines for Level 1 (Community)

Volume 2: Management Guidelines for Levels 2 and 3 (Primary Care)

Volume 3: Management Guidelines for Levels 4–6 (Hospitals).

The healthcare sector hopes that these guidelines will serve the users well as a guide for the appropriate care expected to be delivered at each level in the health system, thus facilitating the realization of Universal Health Coverage (UHC). Any information that could improve the management protocols is welcome and can be provided directly to the Office of the Director General for Health.

This collaborative effort has brought together health workers from all sectors - our universities, private and government facilities. We look forward to health workers using these guidelines to improve the quality of care given to all Kenyans as we strive towards a healthy and productive nation

**Dr Patrick Amoth,EBS
Director General for Health**

A handwritten signature in blue ink, appearing to read "Dr. Patrick Amoth, EBS".

Acknowledgement



These Clinical Guidelines for the management and referral of common clinical conditions have been developed through the contribution of many individuals and institutions committed to improving health outcomes. In particular, we are grateful to the Heads of Directorates, Departments, Divisions and programmes, and the County Health Management Teams that provided support.

The Ministry of Health wishes to thank all the contributing authors, led by the National Medicines and Therapeutics Committee (NMTC) and the Technical Working Group (TWG), for their expertise and time in writing these guidelines.

I take this opportunity to appreciate the effort of the secretariat and the team of experts indicated in the list of contributors.

I acknowledge the tremendous support the World Health Organization (WHO) provided towards finalizing these guidelines.

Finally, the Ministry would like to thank all those we have not enumerated who were either consulted during the development and review of the clinical guidelines or who contributed to this process in one way or another. This work would not have been possible without their contributions, and we are greatly indebted.

A handwritten signature in black ink, appearing to read "Charles Kandie".

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Introduction

The main objective of the health sector in Kenya is to prevent ill health. However, when this objective is not met, the medical and social implications of the resulting ill health are addressed. Clinical management relates to this objective by ensuring efficient and effective management of the impact of ill health. Clinical management complements public health services by ensuring that a specified quality of essential medical care is made available as needed, when needed, and in appropriate amounts.

Rationale for Revision of Clinical Guidelines

The last time clinical guidelines in the health sector were revised was in 2002. Back then, the guidelines defined management approaches for the key conditions expected to affect the Kenyan population. However, the guidelines in 2002 had some weaknesses, including the following:

- ♦ The health sector lacked a clear, comprehensive, evidence-based approach to service delivery. Such an approach is crucial as it provides the overall guidance for the services the sector intends to provide, plus the process for delivering the services.
- ♦ The mechanism for monitoring and updating the clinical guidelines was not clear. As a result, new management protocols that have come up since the guidelines were developed have not been incorporated. Examples of these protocols include such as for avian influenza, management of multi-drug-resistant tuberculosis (MDR/XDR TB), use of artemisinin combination treatment (ACT) for management of malaria, use of anti-retroviral drugs (ARVs) in HIV management, non-communicable diseases, and injuries/violence management, among others.
- ♦ Guidelines for the preparation and management of clients for referral were not included.

Besides these innate shortcomings, the clinical guidelines predicated the approach to service delivery grounded in the framework of 6 life-cycle cohorts and 6 levels of care, as set out in the Kenya Health Sector Strategic Plan (KHSSP – 2018–2023). Thus, the 2002 guidelines did not consider the new approach that calls for different capacities and functions at the different service levels in the country. Significantly, there was no guidance on the management of services at community level, and the lack of a referral framework is a drawback that has become more apparent as the care-level approach has become institutionalized. The current updated guidelines attempt to address these shortcomings. In addition, they are aligned with the comprehensive, multilevel service delivery approach defined by the Essential Package for Health (KEPH).

Comprehensive Service Delivery Approach

The review of the Kenya Health Sector Strategic Plan (KHSSP 2018-2023) highlighted stagnating or downward trends in health indicators, especially in key maternal, newborn, and child health areas. To respond to this worrying trend, the health sector in Kenya initiated an accelerated reform process to halt and reverse this trend.

The reform process is enshrined in the Kenya Health Policy (2014-2030) which states the midterm goal of the health sector as "To reduce health inequalities and reverse the downward trends in health-related outcome and impact indicators". The defined strategic objectives of the plan are to:

- ◆ ccc sector.

As part of the reform process, the sector elaborated clear operational approaches to achieve its strategic objectives and health service norms and standards.³ Investment plans now guide multi-year investment priorities for different key areas of the sector.⁴ The comprehensive service delivery approach is one of these operational approaches (refer to Figure A).

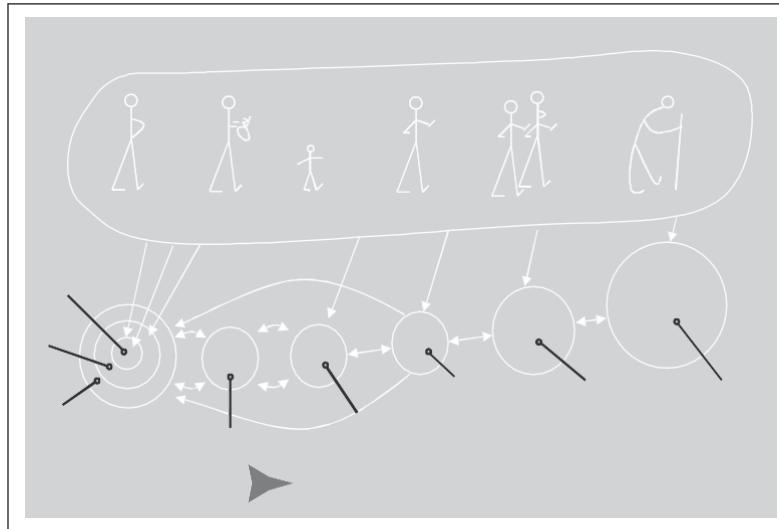
A comprehensive service delivery approach is based on the provision of guidance – at community, dispensary/health centre, and hospital levels of care – on services to be provided, service standards to be attained, service inputs (human resource, infrastructure, equipment) to be applied, and cross-linkages of services. This comprehensive approach guides the investment priorities for service delivery at the administrative level and the form and content of clinical management.

The services for each level of care are defined in the Kenya Essential Package for Health (KEPH). A particular focus of the package is the community level.⁵ The service linkages are defined in the Sector's Referral Strategy. These documents describe the overall strategic approach for the sector and are further elaborated.

The Kenya Essential Package for Health

KEPH is a life-cohort-based approach to the delivery of health care services. Its main focus is to define the priority services that will ensure a healthy population at 6 distinct levels of the health system—from the community level up to tertiary

Figure B: The KEPH system



hospitals – for each of 6 defined life cohorts. As a result, it describes, in a comprehensive manner, the services the sector is to prioritize to maintain health at all the different stages of life.

The diagram in Figure B illustrates the 6 life-cycle cohorts defined by KEPH: pregnancy and the newborn (up to 2 weeks); early childhood (to 5 years); late childhood (6–12 years); adolescence and youth (13–24 years); adulthood (25–59 years); and the elderly (60+ years). The diagram also illustrates the linkages of the 6 levels of care that KEPH defines:

- ◆ Level 1: Community: Village/households/families/individuals
- ◆ Level 2: Dispensaries/clinics
- ◆ Level 3: Health centres, maternities, nursing homes
- ◆ Level 4: Primary hospitals – County and subcounty hospitals
- ◆ Level 5: Secondary hospitals – Regional Referral hospitals
- ◆ Level 6: Tertiary hospitals – National hospitals

The expected services to be provided are described in Table A. The KEPH has the following key characteristics:

- ◆ It emphasizes health (rather than disease), rights (rather than needs), and community empowerment to exercise their rights.
- ◆ It identifies and redefines 6 distinct functional levels of care. The community level is the first level of care, where significant decisions are made, and interventions that have an immediate impact are done. The focus at the community level is on the promotion of family practices that preserve and promote health.

Table 1:1: KEPH Strategic Interventions, by Level and Life-Cycle Cohort

Level 1 (Community)	Level 2 (Dispensary/ clinic)	Level 3 (Health Centre)	Level 4 (Primary/county/ Subcounty hospital)	Level 5 (Secondary/ regional referral hospital)	Level 6 (Tertiary/ hospital)	national
Cohort 1: Pregnancy, delivery and newborn (to 2 weeks)						
Equip targeted communities with current knowledge and facilitate appropriate practices and attitudes leading to safe pregnancy and delivery of a healthy newborn	Ensure that health facilities are equipped to provide very basic ANC and refer all deliveries (regardless of risk analysis)	a) Ensure health centres are equipped to provide basic essential obstetric care b) Enhance health systems to support the delivery of quality obstetric and newborn care c) Establish a functional, supportive supervision system d) Develop outreach programmes to serve "hard-to-reach" populations	Ensure that facilities are equipped to provide essential comprehensive obstetric care	Ensure that facilities are equipped to provide essential obstetric care	Ensure provision of facilities to manage mothers and newborns referred from lower levels adequately	
Cohort 2: Early childhood (0–5 years)						
Equip the community and health care providers with knowledge about the prevention of common childhood diseases and disabilities; and facilitate appropriate practices and attitudes leading to healthy child growth and development	a) Develop an outreach programme for 'hard to reach' populations. b) Strengthen promotion/prevention of common childhood illnesses/disabilities c) Strengthen case management and surveillance of common childhood illness d) Establish supportive supervision systems to ensure quality assurance	a) Strengthen prevention of common childhood illnesses, and disabilities. b) Strengthen case management & surveillance of common childhood illnesses. c) Enhance the health systems support for the delivery of quality child health services d) Establish a functional supportive supervision system to ensure quality assurance e) Develop outreach programmes to serve the "hard-to-reach" populations	Ensure availability of facilities, diagnose and appropriately manage sick children	Recognize and appropriately manage a sick child	Ensure provision of facilities to adequately manage children referred from lower levels	

Table A continued

Level 1 (Community)	Level 2 (Dispensary/clinic)	Level 3 (Health centre)	Level 4 (Primary/county) subcounty hospital)	Level 5 (Secondary/ regional referral hospital)	Level 6 (Tertiary/ national hospital)
Cohort3: Late childhood 6–12 years)					
<p>Equip the child with relevant knowledge</p> <p>And skills that promote a healthy lifestyle, including psychosocial development</p>					
	<p>a) Develop an outreach programme to serve hard to-reach populations</p> <p>b) Strengthen the promotion and prevention of common illnesses, impairments, and disabilities in late childhood.</p> <p>c) Strengthen the case management and surveillance of common late childhood illnesses</p> <p>d) Establish a functional supportive supervision system to ensure quality assurance</p>	<p>Facilitate and support caregivers and community in the provision of a safe environment for child survival, growth and development</p>	<p>a) Ensure that the health regional team is able to recognize and appropriately manage a sick child and, where necessary refer.</p> <p>b) Facilitate rehabilitative care for disabilities and integration of children with disabilities</p>	<p>Strengthen hospitals to diagnose and manage complicated childhood medical and surgical conditions</p>	<p>Ensure the provision of facilities to adequately manage children referred from lower levels.</p>
Cohort4: Adolescence and youth (13–24 years)					
Equip the youth with knowledge and life skills, and facilitate creation of a supportive environment to	enhance adoption of healthy lifestyles for themselves and the community	Create an enabling environment for young people that discourages harmful practices, encourages psycho-social development, and	prevents disease and injuries	Create an enabling environment for young people that discourages harmful practices and prevents disease and injuries	<p>a) Ensure availability and access to quality youth-friendly services to encourage appropriate care seeking amongst the youth</p> <p>b) Ensure provision of</p>

rehabilitative services for substance abusers

- a) Ensure provision of comprehensive rehabilitative services for youth drug abusers
- b) Ensure access to quality youth-friendly referral services for management of complicated medical and surgical conditions

Ensure provision of facilities to adequately manage youth referred from lower levels

Continued

Table A continued

Level 1 (Community)	Level 2 (Dispensary/clinic)	Level 3 (Health centre)	Level 4 (Primary/ county/ subcounty hospital)	Level 5 (Secondary/ regional referral hospital)	Level 6 (Tertiary/ national hospital)
Cohort 5: Adulthood (25–59years)					
Equip adults with knowledge and skills to facilitate creation of a supportive environment to enhance adoption of healthy lifestyles for themselves and the village	Provide information on and Encourage utilization of recommended services for disease/injury prevention and facilitate creation of supportive environment to enhance adoption of healthy lifestyles	Equip health facilities with staff who can conduct general medical and reproductive care assessment, disease/injury prevention and refer complicated cases to the county hospital	Ensure accessibility to quality curative services for adults with acute and chronic conditions	Ensure access to quality services for the diagnosis and management of complicated and surgical	Ensure provision of facilities to adequately manage seriously ill adults referred from lower levels
Cohort 6: Elderly (60+years)					
Equip the elderly persons, the community and health care providers with relevant knowledge on common old age diseases, impairments, and disabilities in old age; and how to improve quality of life and enhance longevity	a) Provide information on and encourage utilization of recommended services for disease/injury prevention b) Refer complex cases to health centre	a) Provide information on and encourage utilization of recommended services for disease/injury prevention b) Refer cases to county hospital	a) Ensure early recognition and appropriate management of acute and chronic illnesses/injury as per recommended guidelines. b) Provide appropriate comprehensive and special rehabilitation to older persons with chronic illnesses and	disabilities at all levels	Ensure provision of facilities for the diagnosis and management of severe illnesses in old age

Ensure provision
of facilities to
adequately
manage seriously
ill older persons
referred from
lower level

- ◆ Its overall thrust is revitalizing health promotion and preventive care at the first 3 KEPH levels.
- ◆ It defines health needs at each level of human development – from birth to old age—and identifies comprehensive and cost-effective interventions required at each stage of the human life cycle.
- ◆ It recognizes the packages of health care services per level of care to be rendered by public and private health service providers.

KEPH is expected to improve the quality of services at levels 1–4 so that clients have confidence in these levels of care. This will result in increased client utilization of the lower-level health facilities. KEPH is also expected to improve the networking of providers and facilities at the different levels of the health system, thereby ensuring continuity of care for those who need the services provided at the higher levels of the system.

Sector Norms and Standards

Norms and standards defined to guide the provision of KEPH services are a statement of the human resource, infrastructure, equipment, and financing inputs. These services are necessary to ensure efficient and effective delivery of health care services to the Kenyan population. Service delivery standards relate to the expectations of each level of care concerning service delivery and the types of human resources needed to provide these expectations. Service delivery norms define the quantities of these resource inputs required to efficiently, effectively, and sustainably offer the service delivery package. These norms and standards are defined based on the following principles:

- ◆ ***Units of service delivery:*** The focus is on the function, as opposed to the physical level, as a higher-level facility may provide the function.
- ◆ ***Equity in access and utilization:*** All inhabitants of the country and its respective districts have an equal right to access health services and use them equally for equal needs.
- ◆ ***Relevance and acceptability:*** Healthcare must be rooted in the communities' cultural and social reality and include user satisfaction in the healthcare delivery equation.
- ◆ ***Continuity of care:*** Care should be viewed in a continuum, from the start of the illness or the risk episode until its resolution, irrespective of the level at which care is sought. This means that a functional referral and counter-referral system should exist to ensure services are available.
- ◆ ***Integration of care:*** Every contact is used to ensure that a comprehensive set of defined services is available.
- ◆ ***A comprehensive/holistic approach:*** Health services must consider all the dimensions of the persons and their environment and maintain a permanent interaction and dialogue with clients.

- ♦ **The involvement of individuals, households, and communities:**
Involvement is expressed in people taking up responsibility for their health; it provides them with a sense of ownership of all they undertake relating to their health

Process of Elaborating the Clinical Management Guidelines

The current revision of clinical management guidelines has been carried out through an extensive 3-year consultative process between 2018 to 2022. The process has been coordinated by the top management in Government in the Ministry of Health through the Director General for Health.

Technical coordination of the revisions was structured around the key disciplines of Medicine, Surgery, Obstetrics/Gynaecology, and Paediatrics. A lead technical specialist from each of these areas was in charge of coordinating the internal consultation process in each of these areas. In addition, specialists in pharmacy reviewed and guided the definition of the medicines and medical products included in the management protocols, ensuring that these protocols are harmonized with the Essential Medicines List.

Four stakeholder consultations were held over the 3 years to ensure that the management protocols being defined were in line with the overall policy direction from the programme and Ministry levels and that their implementation was feasible. This involved management and technical specialists from the public and non-public sectors in each respective area.

Description of the Revised Clinical Management Guidelines

In line with the process described above, this new addition to the clinical management guidelines is based on the latest orientation for each condition expected to afflict the population in Kenya. These are both for conditions in existence and conditions recognized as threats to the population.

Management descriptions are comprehensive, based on the expected capacity at each level of care. Descriptions of each condition are set out in terms of how it presents, physical and laboratory investigations for diagnosis, and the appropriate management, including when a referral has to be made.

The referral management includes:

- ◆ Identifying signs during client management that indicate referral should be considered.
- ◆ Preparing the client for a referral.
- ◆ Arranging the required logistics for a referral at the referring and receiving facility, plus during transport.
- ◆ Ensuring the receipt and emergency management of the client who has been referred.
- ◆ Managing the referred client by the referring facility when they return.

For relevance, alignment with the service delivery approach, and ease of use, the guidelines are presented in 3 volumes representing the major levels of care:

- ◆ Volume I: Clinical Management and Referral Guidelines for Community Care – Corresponding to level 1 of the health care system
- ◆ Volume II: Clinical Management and Referral Guidelines for Primary Care – Corresponding to levels 2 and 3 of the health care system
- ◆ Volume III: Clinical Management and Referral Guidelines for Hospital Care – Corresponding to levels 4–6 of the health care system

Referral Strategy

Categorizing KEPH into the 6 levels of care is primarily meant to rationalize the delivery of health services within the health system for efficiency in using existing resources. However, the implication is that a client in the health service delivery unit may have direct access to or be unable to adequately manage their health care needs. The referral system is intended to address this shortcoming. A referral system is defined as a mechanism to enable clients' health needs to be comprehensively managed using resources beyond those available where they access care. It is based on the premise that while capacity for health service delivery has to be rationalized around different levels of care, the services received by clients should not be determined only by the services available where they access care but rather by the full scope of care the health system can provide in the country.

An effective referral chain provides the linkages needed across the different health system levels – from level 1 (community) to level 6 (national hospitals). These linkages ensure that a given healthcare need of a client can be addressed irrespective of the level of the health system at which the client first physically accesses care. The referral system can thus be likened to an "elevator/lift" in a multistorey building: facilitating forwards and backward management of clients across different floors (levels of care).

The referral strategy thus guides the sector in building an effective referral system that responds to the needs of rural and poor populations, thereby contributing to the realization of Vision 2030 and the Sustainable Development Goals.

The community level consists of household caregivers, community health promoters (CHP) and community health assistants (CHAs) who are linked to a primary healthcare facility for referral. These providers are trained to identify illness, determine its severity and provide prompt management or referrals, when they cannot treat or if there is need for a continuum of care at higher-level health facilities. CHPs must refrain from carrying out procedures beyond their level of skill guided by their training.

The Process of Physical Referral

Critical Inputs to Have at the Facility to Expedite Referral

Input category	Type of input	Description of needs	Description Number
Equipment	Emergency tray		
Emergency room	4x4 ambulance		
Motorized bicycle			
Staff			
Supplies		Referral forms	3-month supply

Referral Instruments

- 1. Preparation of a client for referral**
 - 1.1 Referral for a pregnant mother
 - 1.2 Referral of a child with a medical problem
 - 1.3 Referral for a child with a surgical problem
 - 1.4 Referral for an adolescent, adult, or elderly patient for a medical problem
 - 1.5 Referral for an adolescent, adult, or elderly patient for a surgical problem

- 2. Handling of a client during referral**
 - 2.1 Referral for a pregnant mother
 - 2.2 Referral of a child with a medical problem
 - 2.3 Referral for a child with a surgical problem
 - 2.4 Referral for an adolescent, adult, or elderly patient for a medical problem
 - 2.5 Referral for an adolescent, adult, or elderly patient for a surgical problem

- 3. Receipt and emergency management of a client who has been referred**
 - 3.1 Referral for a pregnant mother
 - 3.2 Referral of a child with a medical problem
 - 3.3 Referral for a child with a surgical problem
 - 3.4 Referral for an adolescent, adult or elderly patient for a medical problem

3.5 Referral for an adolescent, adult or elderly patient for a surgical problem

4. *Follow up of a client who has been referred back*

4.1 Referral for a pregnant mother

4.2 Referral of a child with a medical problem

4.3 Referral for a child with a surgical problem

4.4 Referral for an adolescent, adult, or elderly patient for a medical problem

4.5 Referral for an adolescent, adult, or elderly patient for a surgical problem

PART I: Internal Medicine and Related Disciplines

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1. Acute Injuries, Trauma, and Selected Emergencies

1.1 Anaphylaxis

Anaphylaxis occurs as an allergic reaction to allergens facilitated by mediators in a sensitized individual. Drugs, food, sera, stings, and intravascular contrast media may be allergens.

Clinical Features

The clinical features of anaphylaxis include pruritus, urticaria, respiratory distress (due to laryngeal oedema, bronchospasm), and hypotension.

Management

Anaphylaxis is potentially life threatening and requires immediate management.

Follow the ABC algorithm

- ♦ **Airway protection:** use of airway devices like the oral pharyngeal airway, laryngeal mask airway (LMA) and administration of oxygen using non-rebreather mask at 10l/min.
- ♦ **Breathing:** make sure the patient is breathing. If the patient is not breathing, ventilate the patient through bag-mask ventilation or artificial ventilation.
- ♦ **Circulation:** establish IV access and give fluids, check the blood pressure .
- ♦ Adrenaline is the first-line treatment for anaphylaxis. Give intramuscular (IM) adrenaline early (in the anterolateral thigh) for Airway/Breathing/Circulation problems.
 - A single dose of IM adrenaline is well-tolerated and poses minimal risk to an individual having an allergic reaction. If in doubt, give IM adrenaline. Repeat IM adrenaline after 5 minutes if Airway/Breathing/Circulation if problems persist.
- ♦ Avoid offending agents.
- ♦ Provide high flow oxygen
- ♦ Nebulize with bronchodilators, e.g., salbutamol 2.5-5mg/2.5ml and ipratropium bromide 0.25-0.5mg if there is wheezing
- ♦ Antihistamine:
 - Chlorpheniramine 10mg IV slowly IM/SC then continued 10mg 8 hourly for 24–48 hours (children 0.1mg/kg)
- ♦ Patients with mild to moderate reaction, e.g., urticaria or mild bronchospasm, should be observed for at least 6 hours because attacks may recur after full recovery.

Refer

- ♦ Avoid offending agents
- ♦ All anaphylaxis for specialist allergy assessment.
- ♦ Any Severe reactions, e.g., causing hypotension, severe bronchospasm (especially with orally ingested antigens).

- ♦ Refractory anaphylaxis- Severe reactions require intravenous fluid replacement with normal saline and close monitoring especially of HR, BP and urinary output.

1.2 Cardiac Arrest

This is due to asystole, ventricular fibrillation, and cardiovascular collapse in extreme arterial hypotension. In such a case, there is absence of heart sounds and of carotid and femoral pulses. There may be associated apnoea and cyanosis.

~ Cessation of circulation requires immediate treatment

Optimal chances of survival are achieved when cardiopulmonary resuscitation begins within 4 minutes of the arrest. However, when it is advanced, cardiac life support should be considered including intubation, intravenous medications, and defibrillation started within 8 minutes.

Management

This includes the principles of ABCD

Airway:

- ♦ Open secure and maintain patent airway, use of airway devices like oral pharyngeal airway and laryngeal mask airway.

- ♦ Aspirate vomitus and secretions or remove with fingers or handkerchief.

♦ Breathing – ventilation

- ♦ Use bag mask ventilation even without oxygen, and if oxygen is available connect at 15l/min.

♦ Circulation:

- ♦ Establish IV access

- ♦ **Cardiac massage:** Carry out external cardiac massage (compressions) by applying appropriate pressure over the sternum. Five breaths should be interposed between every 4 to 5 cardiac compressions.

- ♦ **Defibrillation:** Use standard defibrillators delivering 150–200J. Automated fibrillation is commonly used nowadays.

♦ Drugs

- ♦ Intravenous adrenaline 1mg bolus, repeated every 3 to 5 minutes, **OR**

- ♦ Vasopressin 40IU by intravenous push, or amiodarone 300mg in 5% dextrose administered over 30 minutes.

- ♦ Thorough investigation and treatment of the underlying causes should be undertaken.

Refer

- ♦ Refer immediately for further investigations and treatment.

1.3 Shock

This is circulatory insufficiency and becomes irreversible if not promptly corrected. Shock may be either hypovolaemic shock or septic shock.

1.3.1 TYPES OF SHOCK

HYPOVOLAEMIC SHOCK

This condition is caused by the loss of intravascular fluid volume. Decreased blood and/or fluid leads to decreased diastolic filling pressure and volumes.

Causes

- ◆ Traumatic haemorrhage
- ◆ Non-traumatic haemorrhage (eg. Gastrointestinal bleeding, postpartum haemorrhage, epistaxis)
- ◆ Severe burns:
 - Rapid plasma loss from damaged tissues when over 25% BSA is burnt
 - Endotoxaemia makes matters worse
- ◆ Dehydration
- ◆ Vomiting and diarrhoea (cholera and enterocolitis)
- ◆ Septicaemia
- ◆ Intestinal obstruction (mechanical or paralyticileus)

Clinical Features

The patient becomes cold, clammy, drowsy, and tachypnoeic. There is cold sweat and restlessness, and blood pressure may become unrecordable. The skin is pale and cold with collapsed peripheral veins, with a tachycardia. The urinary output is an indicator of renal blood flow and will fall significantly.

Temperature is subnormal (less than 35 degrees C).

Investigations

- ◆ Hb and PCV
- ◆ Urea and electrolytes
- ◆ Blood sugar
- ◆ Group and cross-match blood
- ◆ Blood gas analysis If possible
- ◆ Blood cultures

Management

Appropriate and coordinated emergency management should be initiated by medical staff once a patient is suspected of having shock.

- ♦ Treat the primary problem, e.g., control haemorrhage, endotoxaemia, etc.
- ♦ Secure a large intravenous line; do a cut-down if there is no accessible peripheral line.
- ♦ Central venous pressure line is preferable if available.
- ♦ Start infusion of isotonic saline (normal saline) or run 2 litres fast in an adult.
- ♦ Group and cross-match blood before you give plasma expanders (dextran 70, etc.).
- ♦ Transfuse incase the shock is due to blood loss.

If shock is due to vomiting or diarrhoea, replace continuing fluid loss:

- Adults: 1 litre 6 hourly Hartmann's solution or even normal saline.
- Continue with IV fluids until shock is reversed and cause treated.
- ♦ Closely monitor vital signs.
- ♦ Monitor urinary output. It is important to catheterize the patient in order to measure the urine output.
- ♦ Continue maintenance until shock is reversed and the cause is reversed.
- ♦ Undertake surgical intervention as soon as patient is stable (i.e., laparotomy for intestinal obstruction) and broad-spectrum antibiotics for sepsis and burns.

Septic Shock

Clinical Features

Due to systemic sepsis resulting in hypotension or multiple organ failure. Initially “warm shock”: increased heart rate; diaphoresis; warm skin. Later “cold shock”: decreased cardiac output; cool vasoconstricted skin.

Complications

- ♦ Pulmonary oedema
- ♦ Renal failure
- ♦ Disseminated intravascular coagulopathy (DIC)

Investigations and Diagnosis at Levels 4-6

- ♦ Hb, WBC, platelets
- ♦ Urea and electrolytes, creatinine
- ♦ Blood sugar
- ♦ Culture and sensitivity (blood and body fluids)

Management – General

Resuscitate with normal saline or dextran 70. Large volumes may be required but watch for heart failure. An CVP line is useful at levels 4 and above. In addition:

Levels 2-3 – Primary Care

- ♦ Monitor pulse and BP hourly.
- ♦ Catheterize and monitor urine output hourly—if less than 20ml/hour after adequate fluid replacement then give frusemide 80mg IV STAT.
- ♦ Give oxygen via face mask.
- ♦ Determine and definitively treat cause.

Management – Pharmacological

- ♦ Start empirically on:
 - Ceftriaxone 1gm IV once daily **OR** benzyl penicillin 4 mega units IV every 6 hours and gentamicin 80mg 12 hourly with adequate fluid replacement and close monitoring of urea and electrolytes.
 - Metronidazole 500mg IV 8 hourly; hydrocortisone 200mg 8 hourly for 24–48 hours.
 - Vasopressor (dobutamine, dopamine and adrenaline) as and where indicated.
- ♦ Commence oral medication once the required course of IV antibiotics is completed. Choice of antibiotics depends on the source of infection and culture and sensitivity results.
- ♦ Commence resuscitation measures immediately the patient is seen.
- ♦ Refer from level 4 to levels 5 and 6 if complicated, especially if urinary output starts falling, serum urea, creatinine and potassium start rising, or if there is evidence of any other organ failure despite attention to adequate hydration with brisk electrolyte balancing, and antimicrobial administration.

Note: Always anticipate the onset of disseminated intravascular coagulopathy.

1.4 Stings and Bites

1.4.1 BEESTING

Bee stings cause sharp pain followed by intense itching. Signs subside within a few hours. In hypersensitive individuals, anaphylaxis may occur (see Section 1.1, anaphylaxis). Some patients may experience delayed reactions usually after 0–14 days.

1.4.2 BITE BY A SUSPECTED RABID ANIMAL (RABIES)

Any mammalian animal is capable of carrying the rabies virus. Saliva from a rabid animal contains large numbers of the rabies virus, which is inoculated through a bite or any laceration or break in the skin.

Symptoms

Incubation period is 1–2 months. Initial symptoms include malaise, fever, headache while local symptoms at site of bite include itching and paraesthesia. Full blown illness manifests with encephalitis, which may be demonstrated by agitation or drowsiness. There is also hydrophobia, which is a characteristic manifestation of the form of the disease with agitation, while paralytic manifestation of rabies is often missed.

Diagnosis

Based on high index of suspicion accompanied by clear history of stray animal bite or other physical findings and documentation of hydrophobia. Demonstration of basal ganglial lesions on MRI scans and autopsy findings help confirm the diagnosis.

Management

Immediate local care:

- ♦ Irrigate with copious amounts of normal saline.
- ♦ Cleanse with a soap solution.
- ♦ Debride the wound(s).
- ♦ Administer antibiotic.
- ♦ Administer tetanus toxoid.
- ♦ Infiltrate the wound with rabies immunoglobulin.

Indication for anti-rabies vaccine:

- ♦ Bites from wild animals.
- ♦ Bites from UNPROVOKED domestic animal.
- ♦ Bites from a sick looking domestic animal, whether immunized or not.
- ♦ Severe injury (multiple or deep puncture wounds) or any bites on the head, face, neck, hands, or fingers.
- ♦ Laboratory findings of Negri bodies in the brain of the involved animal.
- ♦ Persons at high risk of exposure.

Immunization

- ♦ Pre-exposure prophylaxis should be offered to persons at high risk of exposure such as laboratory staff working with rabies virus, animal handlers and wildlife officers.
 - Three full intramuscular doses of 1ml on days 0,7, and 28 should be given in the deltoid area.
 - Post exposure prophylaxis of previously vaccinated persons: local treatment should always be given. Post exposure prophylaxis should consist of 2 booster doses either intradermally or intramuscularly on days 0 and 3 if they have received vaccination within the last 3 years. Otherwise, full course of rabies vaccine.
- ♦ Post exposure prophylaxis:
 - Passive immunization: Human rabies immunoglobulin is given as a dose of 20IU/kg of body weight infiltrated around the wound and 20IU/kg given IM in gluteal region followed by a course of rabies vaccine.
 - Intradermal schedule: 1 dose (0.1ml) should be given at each of two sites, either the forearm or the upper arm, on days 0, 3, and 7 and one dose at one site on days 30 and 90.

Intramuscular schedule: 1 dose (1ml) should be administered on days 0,3, 7, 14 and 28. All IM injections should be given into the deltoid region or in small children into the anterolateral area of the thigh muscle.

Insect and animal bites can cause serious reactions, even death, and need to be treated with care.

Refer

Patients with history suggestive of rabies who develop symptoms.

1.5 Poisoning

This can be acute or chronic poisoning. Acute poisoning is often life threatening and should always be treated as an emergency even if the immediate threat to life does not appear real. Table 1.1 summarizes the clinical features and treatment of a number of common acute poisonings.

Clinical Monitoring

- ◆ Blood pressure measurement
- ◆ Urine output (1–2ml/kg/hr); catheterize
- ◆ Nasogastric suction in abdominal conditions
- ◆ Blood glucose levels
- ◆ Hb or PCV daily and correct appropriately

Treat renal complications appropriately. More importantly, treat the cause of the hypovolaemia to pre-empt these complications.

Refer in this very dire emergency.

Prevention

- ◆ Public education about farm or household chemicals known to cause accidental, para-suicidal, or suicidal poisoning.
- ◆ Parent education about NOT storing such substances in soft drink or juice bottles, and keeping them out of reach and sight of children.

Table 1. 1 Clinical Features and Treatment of Common Acute Poisonings

Substance	Clinical features	Recommended action
1. Household agents and industrial chemicals		
Kerosene (paraffin)	Nausea, vomiting, cough, pulmonary irritation, difficulty in breathing; headaches, loss of consciousness	<ul style="list-style-type: none"> • Remove contaminated clothing; wash exposed skin with water and soap. Activated charcoal. Maintain airways and respiratory support • DO NOT INDUCE VOMITING or perform gastric lavage
Carbon monoxide, e.g., car exhaust, charcoal jiko	Headache, dizziness, confusion, slurred speech, convulsions, coma; symptoms vary with percentage of carboxyhaemoglobin	• 100% oxygen
Corrosives, e.g., acids, alkalis hydrogen peroxide	Excruciating pain in the mouth, the pharynx, epigastric area;	

Hyperbaric oxygen	<ul style="list-style-type: none"> Liberal water or milk orally 	<ul style="list-style-type: none"> Analgesic injection to relieve pain DO NOT INDUCE VOMITING DO NOT PERFORM LAVAGE
Methanol	Intoxication, drowsiness, muscle weakness, blurred vision, photophobia, papilloedema blindness, coma, cerebral oedema, cardio-respiratory depression, seizures, DEATH	<ul style="list-style-type: none"> IV sodiumbicarbonate 10%Ethanol 5–10% dextrose as oral or IV infusion Loading dose 0.7g/kg over 1 hour. Maintain at 0.1–0.2g/kg/hour upto ethanol level of 100mg/dl
2. Pharmaceuticals		
Paracetamol	Nausea, vomiting, altered mental status, abdominal pain, evidence of liver failure (elevated transaminases)	<ul style="list-style-type: none"> Emesis Gastric lavage Desferrioxamine 1g IV 15/kg/hour max 80mg in 24hours
Chloroquin	Convulsions, cardiac arrhythmia, cardiac arrest	<ul style="list-style-type: none"> Do not give emetics Gastric lavage
Digoxin	Arrhythmias, ventricular fibrillation, anorexia, nausea, vomiting, confusion, ambylopia	
Iron tablets,e.g., FeSO ₄ ,vitamins withiron	Vomiting, abdominal pain, pallor, cyanosis, diarrhoea, shock	
Opiates, narcotics (drugs)	<p>Drowsiness, pinpoint pupils, shallow respiration, spasticity, respiratory failure</p> <ul style="list-style-type: none"> Antidotal therapy with N- Gastric lavage within 1 hour Activated charcoal Antidota l therapy with N-acetylcy steine for up to 72 hours Gastric lavage IV diazepam for convulsions Refer if in coma Discontinue drug, administer potassium Treat arrhythmias with lidocaine OR phenytoin Antidigoxin FAB fragments 	

Table 1.1, continued

Isoniazid	CNS stimulation, seizures, coma	<ul style="list-style-type: none"> Emesis, gastric lavage Diazepam Pyridoxine(1mg for 1mg ingested up to 200mg) Sodium bicarbonate for acidosis
Warfarin	Generalized bleeding, with intracranial haemorrhage being most serious	<ul style="list-style-type: none"> VitaminK 10mg IV STAT+OD for 5 days Transfuse fresh blood
3. Pesticides		
Organophosphates, e.g., diazinon, dimethoate	Headaches, weakness, vomiting, colicky abdominal pain, profuse cold sweating, hypersalivation, muscular twitching, fasciculations, diarrhoea, tenesmus, convulsions, dyspnoea with bronchoconstriction, meiosis, bilateral crepitans	<ul style="list-style-type: none"> Decontaminate (see above). Remove contaminated clothing; wash exposed skin with water and soap. DO NOT INDUCE VOMITING IV atropine 2–4mg STAT, repeat after 10–20 min until full atropinization (pulse 100–120, dilated pupils) and maintain on SC atropine 4–6 hours x 24–48hours. Pralidoxime (PAM) 1–2g (children 30mg/kg) STAT, repeat 4 hourly, 12–24 hours depending on response
Rodenticides, e.g., zinc phosphide	Severe abdominal pain, nausea, vomiting and diarrhoea; strong garlic smell; severe respiratory distress; myocardial injury	<p>Supportive:</p> <ul style="list-style-type: none"> Maintain airways Assist ventilation Observe for pulmonary oedema
Rodenticide (anticoagulant based)	Generalized bleeding, with intracranial haemorrhage being most serious	<ul style="list-style-type: none"> Vit. K 10mg IVSTAT Transfuse fresh blood
Acaricides, e.g., Amitraz	Weakness, difficulty breathing, convulsions, coma.	<ul style="list-style-type: none"> Remove contaminated clothing; wash exposed skin with water and soap. DO NOT INDUCE VOMITING IV sodium bicarbonate
Herbicides, e.g., Paraquat	Oral/pharyngeal inflammation, later multi-organ failure within hours or days depending on dose. Later interstitial pulmonary oedema and fibrosis. Multi-organ failure or pulmonary oedema invariably leads to death!	<ul style="list-style-type: none"> Lethal dose as low as 10ml Gastric lavage with 50–100 g activated charcoal 4 hourly until patient improves
Organochlorines, e.g., DDT, aldrin, dieldrin	Excitement, tremors, convulsions painted surfaces	<ul style="list-style-type: none"> IV diazepam for convulsions with respiratory failure due to convulsions
4. Others		
Lead: e.g., lead salts, solder, toys, paints, and		Thirst, abdominal pain, vomiting, diarrhoea, encephalopathy following ingestion of suspicious substance

• **Table 10t, if continued**

- Gastroesophageal reflux within 1 hour sour taste of poison often Chelation with Dimercaprol (BAL) Inj 4mg/kg and combination bine d with calcium Sodium edetate (EDTA) with close monitoring

- Elimination
-

Table 1.1 ,continued

		(EDTA) with close monitoring for renal function DMSA (oral succimer) Treatment over long periods (months to years)
Mercury	Acute: gastroenteritis,vomiting, nephritis, anuria, delayed GI motility Chronic: gingivitis, mental disturbances, neurodeficits, pneumonitis	<ul style="list-style-type: none">• Gastric lavage• Activated charcoal• Penicillamine• Haemodialysis for renal failure• Look out for GITperforation• Lungs: supportivecar

2. HIV/AIDS and Sexually Transmitted Infections

2.1 HIV/AIDS

HIV infection is caused by one of two related retroviruses: HIV-1 and HIV-2. The result of these two retroviruses leads to a wide range of clinical manifestations. Transmission requires contact with body fluids containing infected cells or plasma. HIV is present in blood, semen, vaginal secretions, breast milk, saliva, CSF, and wound exudates (see Table 2.1). The virus progressively destroys the body's immune functions, leading to opportunistic infections and tumours. It is these opportunistic infections and tumours that give the manifestations of this disease.

Table 2.1 Modes of transmission and preventive measures for HIV

Mode of transmission	Preventive measures
Sexual intercourse: vagina intercourse (majority of cases), anal oral sex	Practice abstinence Avoid risky sex practices like casual and or multiple partners Use condoms Treat STIs promptly and effectively STIs increase risk of HIV transmission
Mother to baby: Inutero, during childbirth, breastfeeding (30–40% transmission rate)	Advice counselling and testing Give ARVs to both mother and infant Ensure that all blood is screened before
Contaminated instruments: Needles, skin piercing instruments	Ensure that sterile needles are used at all times Ensure that instruments for ear piercing circumcision, tattooing, etc., are sterile. For needle, drug addicts, do not share needles

2.1.1 CLINICAL MANIFESTATIONS

These vary from asymptomatic carrier states to severe debilitating and fatal disorders related to defective cell-mediated immunity. AIDS (acquired immune deficiency syndrome) is the end stage of the spectrum of disease and it is characterized by life threatening opportunistic infections and neoplasms.

The manifestations of HIV infection are many and present in all disciplines of medicine. Some of these are skin, respiratory system, GIT, and nervous system.

SKIN

Dermatological manifestations are probably the commonest. The diseases may be infective (bacterial, fungal, viral), reactive (eczema, hypersensitivities), or neoplastic. The most common ones are:

- ◆ Herpes zoster(shingles)
- ◆ Seborrhoeic dermatitis
- ◆ Molluscum contagiosum
- ◆ HIV-associated pruritis
- ◆ Chronic Herpes simplex or HSV ulcers
- ◆ Psoriasis
- ◆ Kaposi's sarcoma

Management

- ◆ For treatment of dermatological conditions, refer to specific areas in these guidelines.
- ◆ For Kaposi's sarcoma, refer to treatment guidelines in level 4 and above.
- ◆ For chronic Herpes simplex or HSV ulcers, use/advise antiseptic soaps or saline baths and topical acyclovir cream or systemic acyclovir tabs, 800mg PO 5 hourly for 10 days. Administer antibiotics for secondary bacterial infections.

GASTROINTESTINAL TRACT

Candidiasis

Candidiasis is caused by yeast or fungus. The fungus candida albicans is the commonest agent. It is usually a normal inhabitant of mucosal surfaces but overgrows with increasing immune deficiency.

Presentation

Appears as white, milk-like, removable plaques on the oral mucosa – oral thrush – white coating on hard or soft palate and tongue; causes dysphagia if oesophagus involved; occurs in late disease.

Management

- ◆ Nystatin 100,000 units 4 times daily after food for 7days.
- ◆ Fluconazole 100mg QD for 7-14 days.
- ◆ Ketoconazole 200mg or 400mg OD for 7days.
- ◆ Diarrhoea of more than 1 month's duration is often caused by shigella, salmonella, or amoeba; can also be caused by the HIV itself (slim or wasting disease).

RESPIRATORY SYSTEM

Pulmonary tuberculosis (PTB) cases have increased since the advent of the HIV/AIDS epidemic. The risk of reactions to anti-TB therapy is higher in HIV positive patients, thus thiacetazone (in thiazina) is to be avoided (see Section 7.3.3, TB).

Pneumocystis carinii pneumonia is less frequent than in the western world.

Neurological Features

- ◆ Headaches (progressively worsening)
- ◆ Mental deterioration., seizures
- ◆ Meningitis including cryptococcal meningitis
- ◆ CMV encephalitis
- ◆ Sensory disturbances

General Features

- ◆ Fever, constant or recurrent
- ◆ Unexplained weight loss of >10% of body weight
- ◆ Chronic malaise or fatigue
- ◆ Enlarged lymph nodes at 2 or more extra-inguinal sites for more than 3 months

Investigations

- ◆ Rapid tests: 2 parallel tests with 2 different kits. A third kit can be used as tie breaker.
Alternatively, use a double ELISA.
- ◆ Routine screening for HIV: People should be encouraged through VCTs and DCT/
PITC to learn their serostatus – and what to do once they know.

2.1.2 HIV TESTING AND PATIENT EDUCATION

- ◆ Pre-test and post-test counselling: HIV test should not be done without first counsellling the patient, unless under emergency situations.
- ◆ Everyone should know:
 - How HIV is transmitted
 - How one can avoid getting infected
 - That HIV **CANNOT** be transmitted by shaking hands or touching people with AIDS; sneezing or coughing; eating food, drinking water or sharing utensils; from infected insect bites; from using contaminated toilets or latrines.

HIV-negative patients/clients need to know:

- ◆ That one can be in the window period (i.e. time between infection with HIV and development of detectable antibodies).
- ◆ That a negative result today does not mean that a person cannot acquire HIV if exposed.

HIV-positive patients need to know the following:

- ◆ They can transmit the infection to their sexual partner(s), and to their unborn baby in utero (if the patient is pregnant).
- ◆ Their health can deteriorate faster if they acquire other infections, including STIs.
- ◆ Their health can deteriorate faster if they take alcohol excessively, smoke, have poor nutrition, and have multiple sexual partners.
- ◆ Condoms, as generally used, are roughly 70–80% effective in preventing acquisition and transmission of HIV and other STIs. Proper education on condom use can increase the effectiveness of the condom to 90%.
- ◆ Pregnancy hastens the progression of disease and up to 40% of babies born to HIV infected mothers will acquire the infection. Contraceptive advice should be given. Intrauterine contraceptive devices (IUCD – the Coil) are known to predispose to pelvic inflammatory disease (PID) and hence are discouraged.

2.1.3 STAGING OF HIV/AIDS

The World Health Organization (WHO) defines 4 stages or phases in the progression of HIV and AIDS, as shown in Table 2.2.

Table 2. 2 WHO classification of HIV and AIDS clinical stages (adults and adolescents)

Clinical stage I – Asymptomatic

- Persistent generalized lymphadenopathy

Clinical stage II – Early (mild disease)

- Weight loss <10% body weight
- Minor skin infections
- Herpes zoster
- Recurrent upper respiratory infections

Clinical stage III – Intermediate (moderate)

- Weight loss >10% body weight, chronic diarrhoea, fever, oral candida, TB, severe bacterial infections.

Clinical stage IV – Late (severe disease)

- Wasting syndrome, CMV, Pneumocystis carinii pneumonia, toxoplasmosis
 - Kaposi's sarcoma, HIV encephalopathy
-

Table 2. 3: ARV standardized regimes in Kenya (adults and adolescents)

1st line: TDF+3TC+DTG

2nd line: Replace TDF with ABC if impaired renal function; replace DTG with EFV if not able to tolerate DTG

2.1.4 HIV TESTING SERVICES (HTS) AND LINKAGE TO TREATMENT AND PREVENTION

HIV testing should be voluntary and conducted ethically in an environment where consent, confidentiality, counselling, correct results and connection (linkage) are assured

To optimize access to testing services, HIV testing can be conducted in 3 different settings:

- ◆ Facility-based
- ◆ Community-based
- ◆ Self-testing

The package of HIV testing services consists of:

- ◆ A pre-test session
- ◆ HIV test
- ◆ Assessment for other health-related conditions or needs (while HIV tests are running)
- ◆ A post-test session (includes assisted partner notification services (aPNS and child testing).
- ◆ Referral and linkage to other appropriate health services (as part of the post-test session).

HTS providers should adopt the 6 approaches which are known to improve linkage to treatment and prevention:

- ◆ Provide information
- ◆ Support disclosure
- ◆ Address barriers to linkage
- ◆ Establish systems to facilitate linkage
- ◆ Coordinate and integrate service
- ◆ Document actions (using linkage registers)

2.1.5 INITIAL EVALUATION AND FOLLOW-UP FOR PLHIV

Initial clinical evaluation of PLHIV entails:

- ◆ Providing counseling, assessing for ART readiness, and providing/linking to psychosocial support.
- ◆ Taking a complete medical history.
- ◆ Conducting a thorough physical examination.
- ◆ Appropriate laboratory investigations, although laboratory assessment is not a prerequisite to ART initiation.
- ◆ CD4 monitoring, which is recommended for baseline investigation for all PLHIV.

- ◆ Any patient with suspected treatment failure.
- ◆ Any patient on fluconazole maintenance therapy or on dapsone as prophylaxis, to determine when prophylaxis can be discontinued.

Frequency of routine VL monitoring

- ◆ For PCR positive HEIs: at baseline at the time of ART initiation
 - Age 0-24 years old: at month 3 after ART initiation and then every 6 months
 - Age ≥ 25 years old: at month 3 after ART initiation, then month 12, and then annually.
- ◆ Pregnant or breastfeeding: at confirmation of pregnancy (if already on ART) or 3 months after ART initiation (if ART initiated during pregnancy/breastfeeding), and then every 6 months until complete cessation of breastfeeding.
- ◆ Before any drug substitution (if no VL result available from the prior 6 months).
- ◆ Three months after any regimen modification (including single-drug substitutions).
- ◆ PLHIV should receive differentiated care based on initial evaluation (advanced vs. well) and follow up (established vs not established on ART).

2.1.6 STANDARD PACKAGE OF CARE FOR PLHIV

It consists of 8 components:

Antiretroviral Therapy

- ◆ All PLHIV are eligible for ART irrespective of CD4 cell count or percentage, WHO clinical stage, age, pregnancy status, or comorbidities.
- ◆ ART should be initiated as soon as the patient is ready to start, preferably within two weeks from time of HIV diagnosis (except for patients with cryptococcal meningitis or TB meningitis).
- ◆ Positive Health, Dignity, and Prevention, GBV/IPV & Health Education and Counselling.
- ◆ All patients should be counselled and supported for disclosure of HIV status; partner/ family testing and engagement; condom use; family planning; sexually transmitted infections screening; treatment adherence services; and preexposure prophylaxis for HIV-negative sexual partners.
- ◆ All females aged 15-49 years and emancipated minors accessing HIV care services should be screened for Intimate Partner Violence (IPV) as part of the standard package of care.
- ◆ All PLHIV should be provided with HIV education and counselling.

Screening for and Prevention of Specific Opportunistic Infections

- ◆ All PLHIV should receive lifelong cotrimoxazole preventive therapy (CPT) unless they have allergy to sulfa drugs or develop toxicity from CPT.
- ◆ During pregnancy, CPT should be initiated irrespective of the gestational age and should continue throughout pregnancy, breastfeeding, and thereafter for life.
- ◆ When dapsone (as a substitute for CPT) is being used as PCP prophylaxis, it is only recommended for patients in WHO Stage 4 and/or absolute CD4 count ≤ 200

- cells/mm³ (or CD4% ≤ 25% for children ≤ 5 years old), and should be discontinued once a patient achieves viral suppression and a sustained CD4 count of > 200 cell/mm³ (or > 25% for children ≤ 5 years old) for at least 6 months.
- ◆ All PLHIV should be screened for TB at every visit using the Intensified Case Finding (ICF) tool and assessed for TB Preventive Therapy (TPT) if screened negative for TB.
 - ◆ All adolescent and adult PLHIV with a baseline CD4 count of ≤ 200 cells/mm³ should be screened for cryptococcal infection using the serum CrAg test.

Reproductive Health Services

- ◆ All PLHIV should be screened for STI at every clinic visit.
- ◆ Pregnancy status should be determined for all women of reproductive age at every visit and their contraception need determined and met.
- ◆ All HIV positive women between the ages of 18 - 65 years should be screened for cervical cancer.

Screening for and Management of Non-Communicable Diseases

- ◆ All PLHIV should be screened for hypertension, diabetes mellitus, dyslipidaemia, and renal disease.
- ◆ Lifestyle modifications are always the first line of prevention and management for hypertension, diabetes mellitus, and dyslipidaemia.

6. Mental Health Screening and Management

- ◆ All PLHIV should receive basic screening for depression before initiating ART, and annually thereafter, and whenever there is a clinical suspicion.
- ◆ All adults and adolescents should be screened for alcohol and drug use before initiating ART and regularly during follow-up.
- ◆ All caregivers should also receive baseline and follow-up screening for depression and alcohol/drug use.

Nutrition Services

- ◆ All PLHIV should receive nutritional assessment, counselling, and support tailored to the individual needs of the patients.
- ◆ All infants irrespective of HIV status should be exclusively breastfed for the first 6 months of life, with timely introduction of appropriate complementary foods after 6 months, and continued breastfeeding up to 24 months or beyond.

Prevention of Other Infections

- ◆ PLHIV (including children) should receive vaccinations as recommended by the National Vaccines and Immunization Program.

2.1.7 ADHERENCE PREPARATION, MONITORING AND SUPPORT

- ◆ The adherence preparation, monitoring, and support that a patient requires should be tailored to their level of adherence and the stage of ART initiation and follow-up.
- ◆ Whenever possible, follow-up should be provided by the same care provider or team of care providers (e.g. same clinician and counsellor) at every visit. This is particularly important during the first 3 months in care.
- ◆ For all children/adolescents, the level of disclosure should be assessed at the first visit.
- ◆ Ongoing care should include a plan for age-appropriate disclosure.
- ◆ All patients are at risk of new or worsening barriers to adherence, so adherence monitoring, counselling and support should continue despite viral suppression.
- ◆ Every service delivery point that is providing ARVs for patients (whether ART, PEP, or PrEP) must have a functional system for identifying patients who miss appointments and for taking action within 24 hours of a missed appointment.
- ◆ In patients failing ART, do not change regimens until the reason/s for treatment failure have been identified and addressed (which should be done urgently using a case management approach).

2.1.8 ANTIRETROVIRAL THERAPY IN INFANTS, CHILDREN, ADOLESCENTS, AND ADULTS

- ◆ The goal of ART is to suppress viral replication with the aim of reducing the patient's VL to undetectable levels.
- ◆ All individuals with confirmed HIV infection are eligible for ART, irrespective of CD4 count/%, WHO clinical stage, age, pregnancy or breastfeeding status, coinfection status, risk group, or any other criteria, provided that the individual is willing and ready to start AR.
- ◆ ART should be started in all patients as soon as possible (preferably within 2 weeks of confirmation of HIV status).
- ◆ Preferred first-line ART for infants, children, adolescents and adults
 - Birth to 4 weeks: AZT + 3TC + NVP
 - > 4 weeks and 3 kg – 29.9 kg body weight: ABC + 3TC + DTG
 - ≥ 30 kg body weight: TDF + 3TC + DTG
- ◆ Children and adolescents who are virally suppressed but are NOT on the preferred first line ART regimen should be assessed for transition to the preferred regimen.
- ◆ Treatment failure is suspected when a patient has a high VL ≥ 50 copies/ml after at least 3 months of using ART.
- ◆ Treatment failure is only confirmed when VL is $\geq 1,000$ copies/ml after assessing for and addressing poor adherence or other reasons for high VL, and then repeating VL after at least 3 months of excellent adherence to allow for viral re-suppression.
- ◆ Persistent low-level viremia (PLLV) is defined as having VL 50 - 999 copies/ml on two or more consecutive measures. These patients are at increased risk of progression to treatment failure, development of ARV resistance and death and

- therefore require a similar case management approach as patients with an initial VL \geq 1,000 copies/ml.
- ◆ All PLHIV with a detectable VL \geq 50 copies/ml: assess for and address potential reasons for viremia, including intensifying adherence support, repeat the VL after 3 months of excellent adherence. If the repeat VL is undetectable then continue routine monitoring.
 - ◆ If the repeat VL is \geq 1,000 copies/ml, prepare for change to an effective regimen.
 - ◆ If the repeat VL is 50 - 999 copies/ml, reassess adherence and other causes of viremia and repeat VL after another 3 months of excellent adherence.

2.1.9 TB/HIV CO-INFECTION PREVENTION AND MANAGEMENT

- ◆ All healthcare settings should implement TB infection control recommendations to reduce the risk of transmission of TB among patients, visitors and staff.
- ◆ Symptom-based TB screening using the ICF tool MUST be performed for all PLHIV at every clinic visit.
- ◆ Patients who screen negative should be evaluated for TB preventive therapy TPT).
- ◆ Patients who screen positive (presumptive TB) must complete definitive diagnostic pathways.
- ◆ The GeneXpert MTB/Rif test is the preferred test for diagnosis of TB and rifampicin resistance in all presumptive TB cases.
- ◆ TB-LAM can be used as an adjunct rapid point-of-care diagnostic test for all PLHIV: with advanced HIV disease (WHO stage 3 or 4 or CD4 count \leq 200 cells/mm³ (or CD4% \leq 25% for children \leq 5 years)) with presumed TB, or; any danger signs of severe illness, or; currently admitted to hospital.
- ◆ Those who are diagnosed with TB/HIV co-infection should be on CPT as part of the comprehensive package of care for TB/HIV co-infection.
- ◆ Patients diagnosed with TB/HIV co-infection should start anti-TB treatment immediately and initiate ART as soon as anti-TB medications are tolerated, preferably within 2 weeks (unless they have TB meningitis, in which case ART can be deferred for up to 8 weeks).
- ◆ Patients with TB/HIV co-infection who are already on ART should start anti-TB treatment immediately and continue ART, making any required adjustments to the ART regimen based on known drug-drug interactions.
- ◆ Always assess for ART failure in patients who develop TB after being on ART for \geq 3 Months.

2.1.10 HBV/HIV AND HCV/HIV CO-INFECTION PREVENTION AND MANAGEMENT

- ◆ All HIV positive adolescents and adults should be screened for HBV infection, using serum HBsAg, as part of initial evaluation; children who did not complete routine childhood immunizations should also be screened for HBV.

- ◆ PLHIV without evidence of hepatitis B infection (HBsAg negative) should be vaccinated against hepatitis B.
- ◆ The recommended first-line ART for adults with HIV/HBV co-infection is TDF + 3TC + DTG.
- ◆ HCV serology should be offered to individuals at risk of HCV infection.
- ◆ Direct acting antiviral therapies (DAAs) for treatment of HCV have simplified the management of HIV/HCV co-infection.

2.1.11 ARVS FOR POST-EXPOSURE PROPHYLAXIS (PEP)

- ◆ PEP should be offered as soon as possible (< 72 hours) after high-risk exposure.
- ◆ The recommended ARV agents for PEP are
 - < 30 kg: ABC + 3TC + DTG
 - ≥ 30 kg: TDF + 3TC + DTG

2.1.12 PRE-EXPOSURE PROPHYLAXIS (PrEP)

- ◆ PrEP should be offered to HIV negative individuals at substantial ongoing risk of HIV infection (including the seronegative partner in a discordant relationship).
- ◆ The recommended ARV regimen for use as oral PrEP is: TDF (300 mg) + FTC (200 mg) once daily.
- ◆ Event-driven PrEP (TDF/3TC before and after sexual intercourse) may be offered to MSM.
- ◆ PrEP does not eliminate the risk of HIV infection and it does not prevent STIs or unintended pregnancies.
- ◆ PrEP should only be offered after assessment to establish eligibility, readiness for effective use, required follow-up (including HIV testing every 3 months) and absence of contraindications to TDF and/or FTC.
- ◆ Other PrEP options which may become available include.
- ◆ Dapivirine vaginal ring replaced every 28 days.
- ◆ Cabotegravir as a long-acting intramuscular injection given every 8 weeks.

2.1.13 PEOPLE WHO INJECT DRUGS (PWID) AND HI

- ◆ PWID should be offered regular HIV testing and counselling and be linked to comprehensive HIV treatment and prevention services including harm reduction counselling and support.
- ◆ The recommended first-line ART for adult PWID is TDF + 3TC + DTG.
- ◆ PWID should be offered screening, diagnosis, treatment and prevention of STIs as part of comprehensive HIV prevention and care.
- ◆ PWID should have the same access to TB prevention, screening and treatment services as other populations at risk of or living with HIV.

- ◆ PWID should be screened for HBV (by HBsAg) and HCV (by HCV serology) at first contact.
- ◆ All PWID should be linked to Needle and Syringe Programs (NSP) to access sterile injecting equipment.
- ◆ All PWID should be linked to Medically Assisted Therapy (MAT).

2.2 Sexually Transmitted Infections (STIs)

These are communicable diseases and usually transmitted through sexual contact. Other forms of transmission of these diseases include vertical transmission from mother to child in utero, during birth or soon after birth. It could also be through blood transfusion, via contaminated needles, syringes, specula, gloves, and skin piercing and cutting instruments. Clinical manifestations of these conditions depend on the offending organism and are numerous.

- ~ **Accurate diagnosis and effective treatment of STI are essential and cost-effective HIV/AIDS prevention strategies.**

Management

- ◆ Give full course of appropriate drug therapy.
- ◆ Follow up the patient.
- ◆ Provide health education and counselling.
- ◆ Manage the sexual contacts, including contact tracing, diagnosis, treatment, health education and counselling.
- ◆ Refer to higher level for complications.

- ~ **Each and every treatment of STI must include the 4 C's.**

Patient Education

- ◆ Avoid multiple or anonymous partners, prostitutes or any other person with multiple sex partners.
- ◆ Use condoms correctly, e.g., avoid oil-based lubricants.
- ◆ Avoid alcohol or drug abuse, as these may lead to irresponsible sexual behavior.

THE 4 C's OF STI MANAGEMENT

Each and every treatment of STI must include the 4 C's:

- Compliance with the full drug course & follow-up
- Counselling on safer sexual behavior
- Condoms: Ensure proper use
- Contact tracing, partner treatment and notification

Clinical Features and Treatment Summary

For more detailed descriptions see clinical features of specific conditions below.

2.2.1 SYNDROMIC MANAGEMENT OF STIS

GONORRHOEA AND URETHRAL DISCHARGE

Clinical Features

Many people with gonorrhea have no symptoms but some will often experience a burning sensation during urination. Males may also experience:

- ♦ White, green, or yellow discharge from the penis.
- ♦ Pain or swelling in the testicles.
- ♦ Inflammation or swelling of the foreskin.

Females may also experience:

- ♦ Abnormal vaginal discharge and bleeding between periods.
- ♦ Rectal symptoms may also occur if a person has engaged in anal sex.
- ♦ Discharge per vagina.
- ♦ Itching around the anus.
- ♦ Soreness of the genitals.
- ♦ Bleeding per vagina.
- ♦ Pain during bowel movements (dyschezia)

If gonorrhea results from oral sex, the person may have a throat infection, but they might not notice any symptoms. If discharge or vaginal fluid containing this bacteria gets into the eyes, the patient may develop conjunctivitis.

Investigation

- ♦ Diagnosis in males is usually clinical but if confirmation is required a urethral smear is done. When attending to a patient who has been exposed to the infection from history and physical examination, the tests that will help confirm the diagnosis include:
 - Urine test – urinalysis and culture will help identify bacteria responsible
 - Swab of discharge from affected area – e.g. throat, urethra, vagina or rectum for Gram stain and culture.
 - Nucleic acid amplification test (NAAT) assay is the test of choice in well-established hospitals.

Management

- ♦ Anyone with gonorrhea needs prompt treatment to stop the infection from progressing. The treatment typically involves use of antibiotics that should be given as soon as possible. The recommended drugs include **a single dose of Ceftriaxone (Rocephin) 500mg IM and 1 gram of oral Azithromycin (Zithromax)**. Other different antibiotics may be used in case of resistance or allergy to penicillins.

- ♦ However, *Neisseria gonorrhoeae* often develops resistance to nearly all the antibiotics that have traditionally been used to treat it. The patient should come for follow-up appointments and avoid sex until recommended treatment period specified by a healthcare provider.
- ♦ During pregnancy, it is essential to be more cautious as the infection can spread to the baby during delivery, so the newborn will usually need antibiotics as prophylaxis. Some newborns develop conjunctivitis, and the symptoms usually appear 2–4 days after birth and include red eyes, thick pus and swollen eyelids.

Complications

Gonorrhoea has a number of severe complications. For this reason, it is important to receive treatment as soon as possible. In females, gonorrhea can lead to pelvic inflammatory disease, chronic pelvic pain, infertility, and ectopic pregnancy which is a medical emergency.

Other complications in pregnancy and during delivery if not treated, includes an increased risk of preterm labor or stillbirth. Apart from eye infections, gonorrhoea in new borns can lead to joint infection, loss of vision, or bacteremia, a life-threatening blood infection. In males, gonorrhea can lead to epididymitis, which can lead to loss of fertility. Untreated gonorrhea can lead to a disseminated gonococcal infection a life-threatening condition. Some signs and symptoms include:

- ♦ dermatitis, which usually involves a rash or itchy, dry skin
- ♦ fever
- ♦ arthritis
- ♦ tendonitis

People with gonorrhea also have a higher risk of contracting or transmitting HIV. One reason is that either infection can cause open sores, which make it easier for viruses and bacteria to enter the body.

Prevention

Methods of preventing gonorrhea include:

- ♦ avoiding sexual activity if there is the possibility of infection
- ♦ using a barrier method of protection, such as condoms, during vaginal or anal intercourse including using condoms or dental dams during oral intercourse
- ♦ only having sexual activity with a mutually monogamous partner who does not have the infection



Algorithm to manage common STIs Syndromes: Urethral discharge in Male

History of urethral discharge or symptoms

Take history and examine

**Urethritis treatment and
4Cs**

Cefixime 400mg stat AND
Azithromycin 1gm PO stat

Symptomatic treatment
and 4Cs

If discharge persists after
7 days treatment

Give alternative urethritis treatment and 4 Cs

IM Cefriaxone 500mg AND Azithromycin 2gm PO stat
OR

IM Gentamycin 240mg stat and Azithromycin 2gm PO stat

If discharge persists after 7days treatment

Refer for etiological management

Figure 2:1 Algorithm for the management of urethritis

Source: Kenya National Guidelines for the Prevention and Control of Sexually Transmitted Infections, 2018

CANDIDA VULVOVAGINITIS (MONILIA OR THRUSH)

This is a common infection of the vulva and vagina caused by the fungus *Candida albicans*. It is not always transmitted by sexual intercourse. Predisposing factors are diabetes mellitus, systemic antibiotics, pregnancy, hormonal oral or injectable contraceptives, and decreased host immunity.

Clinical Features

Vaginal discharge is creamy and thick (curd like), associated with itching, burning, and soreness during micturition and sexual intercourse. There is erythema, excoriation, and fissures. Diagnosis is mainly clinical.

Investigations

Wet mount is prepared by putting a drop of the discharge on to a glass slide and adding a drop of saline or 10% potassium hydroxide (KOH) and covering with a cover slip. Examine under low-power microscope. *Candida albicans* is identified by pseudohyphae and spores.

Management

- ◆ Give clotrimazole pessaries 200mg OD for 3 days and clotrimazole cream.
 - ◆ Give fluconazole 200mg STAT
 - ◆ Treat partner with fluconazole 200mg STAT and clotrimazole cream also.
- People who get recurrent infection should be given concurrent prophylactic treatment whenever broad-spectrum antibiotics are prescribed.

TRICHOMONAS VAGINITIS

"Trich" is a common cause of vaginal discharge. Caused by *Trichomonas vaginalis*, a flagellated protozoan, it is mainly sexually transmitted.

Clinical Features

Symptoms depend on the severity of the infection and include a frothy, greenish-yellow, foul-smelling discharge. Other features are vaginal soreness, dyspareunia, and post-coital spotting. Infection usually involves the vulva, vagina, and cervix, which may appear reddish and swollen. Diagnosis is mainly clinical.

Investigations

- ◆ Wet mount preparation demonstrates flagellated protozoa.
- ◆ *Trichomonas* may also be noted on urine microscopy or pap smear.

Management

- ◆ Metronidazole 400mg TDS for 7 days. The same dose for the male partner. (Alcohol consumption to be avoided during treatment with metronidazole.)
- ◆ Drug to be avoided during first trimester of pregnancy. If possible, withhold treatment until third month of pregnancy.



**Algorithm to manage common STIs
Syndromes: Vaginal discharge or pruritus**

History of vaginal discharge
Enquire about lower abdominal pain and examine

No lower abdominal pain or tenderness

Lower abdominal pain or tenderness present

Vaginitis treatment and 4Cs
Clotrimazole pessaries 100mg intra-vaginally OD for 6days and metronidazole 2gm PO stat
OR

Fluconazole 150mg PO stat and Metronidazole 2gm PO stat

For pregnant women

Give only Clotrimazole pessaries 200mg intra-vaginally OD for 3days

Follow the flow chart for lower abdominal pain

If no improvement after 7 days

Treat for Cervicitis and 4 Cs

Tab Cefixime 400 mg and Tab Azithromycin 1gm PO stat

Or

IM Ceftriaxone 500 mg Stat and Tab Azithromycin 1gm PO stat

Or

IM Gentamicin 240mg Stat and Tab Azithromycin 1gm PO stat

(DO NOT USE GENTAMICIN IF PREGNANT)

If discharge persists after 7 days

Refer for etiological management

Figure 2:2 Algorithm for the management of vaginal discharge or pruritis

Source: Kenya National Guidelines for the Prevention and Control of Sexually Transmitted Infections, 2018

BACTERIAL VAGINOSIS

Bacterial vaginosis (BV) is an infection of the vagina that results from a change in the normal balance of vaginal bacteria. BV usually asymptomatic in many patients but it can lead to complications, especially in pregnancy. The common risk factors are; having more than one intimate partner or a new partner. The other contributing factors are; smoking, vaginal douche (Douching upsets the natural balance of bacteria. So can scented soaps, bubble baths, and vaginal deodorants). The causative organism is *Gardenerella vaginalis* and *lactobacillus* species, *Prevotella* and *Mobiluncus*.

Clinical Features

Women with BV have no symptoms, but a few may experience:

- ◆ Burning sensation during micturition
- ◆ Fishy odour after sex
- ◆ Itching
- ◆ Thin white, gray, or green discharge

NB: The discharge must be differentiated from a yeast infection which presents with a thick white discharge that is not foul smelling.

Investigations

- ◆ Wet mount preparation, which will show vaginal epithelial cells with adherent clusters of Gram-negative bacilli or coccobacilli (Clue Cells).
- ◆ Whiff-test in which a drop of discharge is mixed with a drop of potassium hydroxide, which gives a characteristic fishy odour.
- ◆ Measuring the vaginal pH or acidity level.

Management

- ◆ The mainstay is antibiotics (**Metronidazole 2gm stat, Clindamycin 300mg TDS x 5 days, or Tinidazole 2gm OD x 3 days**).
- ◆ Topical treatment using a cream or gel to be inserted into the vagina can also be used. Most antibiotics should last for 5 to 7 days.
- ◆ Since BV can be spread through sex, do not engage in sex until complete taking the medicines. If your partner has another woman, they may want to see their doctor to find out if they need treatment.
- ◆ If a patient use an IUD and the infection recurs, the may change to a different type of family planning method.

Complications

Bacterial vaginosis has been associated with a higher risk of other problems, including:

- ◆ Endometritis
- ◆ A premature or low birth weight baby.
- ◆ Other STIs eg herpes genitalis, chlamydia, or gonorrhea, or HIV infection.
- ◆ Less success with fertility treatments like in vitro fertilization (IVF)
- ◆ Chronic PID - an infection of your uterus, fallopian tubes, and ovaries

Prevention

To lower your chances of getting BV, take these steps:

- ◆ Avoid douching.
- ◆ Limit your number of sex partners.
- ◆ Improved hygiene by wipe from front to back after visiting the washrooms.
- ◆ Go for testing (even the partners)
- ◆ Plus 4Cs.

CERVICITIS

About one third of all women presenting with vaginal discharge have cervicitis. The commonest causes of endocervicitis are gonorrhoea, chlamydia, trichomonas, and herpes simplex virus.

Clinical Features

Cloudy-yellow vaginal discharge that is non-irritating, non-odorous, and mucoid. There may also be inter-menstrual or post-coital spotting or both. There may also be dyspareunia or pelvic discomfort or both. Cervical mucosa appears inflamed with focal haemorrhages. Cervix is friable and bleeds easily on touch. Vesicular herpetic lesions will be found on vulva, vagina, and cervix. Abdominal and bimanual pelvic examination should be done to rule out pelvic inflammatory disease (PID).

Investigations

- ◆ Wet mount preparation: Look for pus cells, trichomonas, and yeasts.
- ◆ Gram-stain of the discharge of endocervical swab (*Neisseria gonorrhoea*: shows Gram-negative intracellular diplococci).
- ◆ Culture for gonorrhoea or chlamydia if available.
- ◆ Pap smear after treatment.

Management

- ◆ See Figure 2.2, vaginal discharge flowchart.
- ◆ Norfloxacin 800mg STAT then 400mg BD for 7 days Ceftriaxone 250mg.
- ◆ Doxycycline 100mg BD.
- ◆ Metronidazole 2g STAT.

TRICHOMONIASIS

Trichomoniasis is a sexually transmitted infection by a parasite called *Trichomonas vaginalis* (Tv) which is passed on through vaginal, oral, or anal sex. Trichomoniasis is highly curable if treatment is given promptly. Without treatment, TV can lead to complications. It can affect a pregnancy, and it also appears to increase the risk of getting or transmitting HIV.

Trichomonas vaginalis can be transmitted during oral, anal, or vaginal sex or through genital touching. In females, is most likely to affect the lower genital tract. In males, it affects the urethra, the tube through which urine passes. Other parts of the body, such as the anus, hands, or mouth, cannot usually become infected.

Risk factors

The following are risk factors of trichomoniasis:

- ◆ Female sex
- ◆ Having more than one sexual partner
- ◆ A previous history of other STIs
- ◆ Having unprotected sex

As the number of sexual partners that a person has increases, so does their risk of getting trichomoniasis.

Signs and symptoms:

Symptoms may appear between 5 and 28 days after exposure, or they may appear later or not at all. When symptoms are present, they can affect males and females differently. Minor symptoms include irritation, but someone with a more severe case may have inflammation with discharge.

The usual symptoms in females include:

- ◆ frothy, foul-smelling vaginal discharge, which may be clear, white, gray, yellow, or green
- ◆ vaginal discharge with blood
- ◆ genital irritation
- ◆ discomfort during sex or when urinating
- ◆ swelling in the groin
- ◆ frequent urination
- ◆ lower abdominal pain

Symptoms in males may include:

- ◆ Urethral discharge from the penis
- ◆ itching in the genitals
- ◆ burning sensations after ejaculating or urinating
- ◆ frequent urination
- ◆ pain when urinating

Complications

Trichomoniasis can lead to several complications including:

- ◆ preterm delivery
- ◆ premature rupture of the membrane (PROM)
- ◆ low birth weight newborns
- ◆ infertility

A woman can sometimes pass on the infection to the newborn during delivery, but this is rare.

Other complications:

- ◆ Trichomoniasis may increase the risk of reproductive tract infections
- ◆ Tv can increase the risk of getting HIV and other STIs, especially in females due to inflammation of the genito urinary system, reduced immune response and hangs in the balance of vaginal flora, in females. These factors may lower a person's natural protection from the virus.

Investigation

To diagnose a trichomoniasis infection is confirmed through history taking and pelvic exam. Laboratory tests include:

- ◆ Vaginal or penile discharge for microscopy and gram stain.
- ◆ Vaginal/urethral swab for a culture.
- ◆ Urinalysis and culture.

Regular follow-up appointments for 3 months are necessary especially for women.

Before the appointment, they should avoid using deodorant on the vulva, as this masks odor and can cause irritation. The doctor may also advise them to avoid vaginal intercourse or inserting any object, including tampons, into the vagina for 24–48 hours before hand. A pap smear test does not check for trich. If a person has a clear pap test, they may still have trich or another STI.

Because Tv increases the risk of passing on HIV, people with HIV should also have a test at least once a year. If the result is positive prescribe treatment and discuss with the patient next action to be taken. Contact tracing should be done to all sex partners, as they also need testing and treatment

Information during follow up:

- ◆ Take the whole dose or course of treatment to stop the infection from coming back.
- ◆ Avoid sexual contact until the treatment is complete.
- ◆ Seek further advice if symptoms remain a few days after finishing a course of antibiotics.
- ◆ Also recommend having tests for other STIs.

Treatment

- ◆ This usually involves taking a single dose of an antibiotic by mouth. You may also prescribe a vaginal suppository or a cream to apply topically.
- ◆ The antibiotic medications recommended include; Metronidazole (Flagyl) 400mg TDS x 7 Days, and Tinidazole (Fasigyn) 2gm OD x 3 Days.
- ◆ Patients should avoid alcohol while taking metronidazole, as there may be an adverse reaction, which can lead to abdominal cramps, nausea, headaches, and flushing.
- ◆ If symptoms continue after taking the treatment, 2nd line drugs should be used after reevaluation.
- ◆ NB: Lactating mothers should not take Tinidazole while breastfeeding.

Prevention

To prevent infection or reinfection, any sexual partners should also be treated.

The preventive measures include:

- ◆ limiting the number of sexual partners
- ◆ avoiding sex for 7–10 days after treatment
- ◆ limiting or avoiding the use of recreational drugs that can increase the risk of unsafe sex.

CHLAMYDIA

Chlamydia is a sexually transmitted infection caused by a bacterium called Chlamydia trachomatis. Usually, it has no signs or symptoms and can lead to long-term complications if not diagnosed and treatment instituted early.

Chlamydia can be passed on through genital contact. One can also get chlamydia if you come into contact with infected semen or vaginal fluid, or getting into the eyes. Chlamydia cannot be transmitted through kissing, hugging, sharing towels or using the same toilet as someone with the infection.

Clinical features

Many people with chlamydia do not experience any symptoms. If you do get symptoms, you may not notice them until several weeks after infection. Other people might not have any symptoms for several months.

The signs of chlamydia in women include:

- ◆ increase in vaginal discharge
- ◆ pain or burning when urinating (peeing)
- ◆ pain during sex and/or bleeding after sex
- ◆ pain in the lower stomach – especially when having sex
- ◆ bleeding between periods and/or heavier periods.

Signs of chlamydia in men include:

- ◆ white, cloudy or watery discharge from the penis
- ◆ pain or burning when urinating
- ◆ pain and/or swelling in the testicles.
- ◆ you can also get chlamydia infection in your anus

Investigations

Tests for chlamydia include:

- ◆ Urine sample for analysis and culture
- ◆ Take swabs from the areas that are infected such as from the cervix or the vaginal wall in women, and the tip of the penis (urethra) for men.
- ◆ In case of anal or oral sex, you may have a swab taken from your anus or throat.

When there is history of having had unprotected sex, or a patient is worried about STIs, test as soon as possible. However if the test is negative within two

weeks of having sex without protection, there is need to repeat the test later as the infection may not always be detectable in the early stages.

Treatment

We use Doxycycline 100mg BD x 14 days or Azithromycin 500mg OD x 3 to 6 days.

Complications or long-term effects of untreated chlamydia

If left untreated, chlamydia can lead to other, sometimes serious, health problems:

- ♦ **In women** untreated chlamydia causes pelvic inflammatory disease (PID). PID can cause pelvic pain, infertility (inability to get pregnant), and ectopic pregnancy (pregnancy outside the uterus) which can be life-threatening. PID can be treated with antibiotics.
- ♦ **In men** untreated chlamydia can cause swelling and pain in the testicles, and pain when urinating or during sex. Rarely, it can cause infertility in men.
- ♦ Chlamydia can also cause reactive arthritis in both women and men – inflammation of the joints, and in some people, the urethra and the eyes (conjunctivitis).

CHLAMYDIA AND HIV

If you have been diagnosed with chlamydia you should also test for HIV. Having chlamydia increases your risk of getting HIV, as it causes inflammation and sores that make it easier for HIV to enter the body.

In those living with HIV and not on treatment, having chlamydia can make them more likely to pass HIV particularly if they have sex without a condom. However, for those on treatment with HAART and have an undetectable viral load, they will not be able to pass HIV on – having chlamydia will not affect this.

If you're taking antiretrovirals, it's important to discuss with the doctor or health care provider how the chlamydia treatment may interact with HIV drugs.

Prevention

Using a new male or female condom or dental dam every time you have sex is the best way to protect against chlamydia.

Chlamydia can be passed on by sharing sex toys. Always cover sex toys with a new condom and wash them after use to reduce your risk of getting chlamydia and other STIs.

HEPATITIS B INFECTION

Hepatitis B (also known as Hep B or HBV) is part of a group of hepatitis viruses that attack the liver. It can be passed on via unprotected sex (sex without a condom or dental dam), through contaminated needles and from a pregnant woman to her baby during birth.

Risk factors for Hep B

- ♦ Use injected drugs like diabetics or drug addicts.

- ♦ Sex workers and men who have sex with men.
- ♦ Frequent change of sexual partners.
- ♦ Having close contact with someone who has chronic hepatitis B.
- ♦ Occupational exposure to the virus as with nurses, clinicians and laboratory staff.

Clinical features

Many people with hepatitis B don't have any symptoms. If you do get symptoms you may not notice them until two or three months after infection and they can last up to three months. There are two types of infection ie acute and chronic.

Acute (or short-term) symptoms include:

- ♦ flu-like symptoms, including tiredness, fever and aches and pains
- ♦ feeling and/or being sick
- ♦ loss of weight/appetite
- ♦ diarrhoea
- ♦ abdominal pain
- ♦ jaundice, meaning your skin and the whites of your eyes turn yellow
- ♦ dark urine
- ♦ pale feaces

Those patients with acute infection after six months, such as babies, young children and people with a weakened immune system because of HIV progress to develop chronic hepatitis B. This is when patients are at higher risk of liver failure, liver disease and cancer of the liver (hepatoma).

Investigations

- ♦ Blood test for Hepatitis B-surface Antigen will confirm the presence of the virus.
- ♦ Liver function Tests can help assess the extent of liver damage.

Also test for other STIs even for the recent sexual partner(s) so they can also get treated. Many cases of hepatitis B do not have any symptoms or signs but require to stop further transmission of the infection to others.

Management

For Acute hepatitis B infection

- ♦ There is no specific treatment for acute hepatitis B, and most people recover within one to two months. Usually, you can manage symptoms at home with analgesics if necessary.
- ♦ Do regular follow up by blood tests and physical check-ups. Most people make a full recovery from acute hepatitis B.

For Chronic hepatitis B infection

- ◆ Treatment should be given treatment to reduce the risk of permanent liver damage and liver cancer. Supportive and prophylactic treatment should continue for life.
- ◆ Without treatment, chronic hepatitis B can cause scarring of the liver (cirrhosis), which can cause the liver to stop working properly.
- ◆ A small number of people with cirrhosis develop liver cancer; a complication can lead to death.
- ◆ Liver transplant may be an option since there is no cure for cirrhosis.

Hepatitis B and HIV

- ◆ Vaccines for hepatitis B are routinely offered to infants. Adults at a higher risk of getting hepatitis B may also be offered the vaccine.
- ◆ Hepatitis B does not always cause symptoms and can pass in a few months without treatment (acute infection). People can also have a lifelong infection (chronic), and without appropriate treatment and care, it can become more serious and lead to liver damage or death.

Prevention

This can be achieved by:

- ◆ Not sharing of needles and syringes or other items that may be contaminated with blood, such as razor blades, toothbrushes and manicure tools (even old or dried blood can contain the virus).
- ◆ Avoid tattoos, body piercings or acupuncture in professional settings, and ensure new, sterile needles are used. Vaccinate those who may be at an increased risk of infection.

DYSURIA IN THE FEMALE

Dysuria can result from urinary tract infection, vaginitis or cervicitis. See relevant sections of manual for clinical features, investigations, and management. Gonorrhoea should be considered for patients at high risk for STIs.

2.2.1 LOWER ABDOMINAL PAIN IN THE FEMALE

Clinical Features

Often due to pelvic inflammatory disease (PID – see Part IV, Section 52.7). Must be differentiated from urinary tract infection, ectopic pregnancy, threatened abortion, appendicitis, and other causes of acute abdomen.

— *An abdominal and pelvic examination must be done on all cases of lower abdominal pain in women.*

Management

- ◆ See Figure 2.3 ,Table 2.5 and relevant sections of manual.

2.2.2 GENITAL ULCER DISEASE

This condition can present with a variety of features and have a variety of probable causes, from primary syphilis chancre to Herpes to Granuloma inguinale. A thorough physical examination is required.

Clinical Features

Refer to Table 2.6 for a summary of the various presentations of this condition, along with the probable causes and diagnoses.

Management

See Table 2.5 and Figure 2.2.

2.2.3 BUBOES OR SWOLLEN INGUINAL GLANDS

Buboies are enlarged lymph nodes in the groin. They may be associated with an ulcer in the genital area or on the lower limbs. Refer to genital ulcer disease.

Clinical Features

- ◆ Lymphogranuloma venereum: Several nodes matted together on one or both sides, usually without suppuration.
- ◆ Chancroid tender fluctuant bubo that suppurates, leaving an undermined inguinal ulcer that should be aspirated before suppuration.

Investigations

Serology for syphilis should always be performed.

2.2.4 GENITAL WARTS

Clinical Features

- ◆ Condylomaacuminatum (Human papilloma virus): Cauliflower-like warts. May be single or multiple on the vulva/vagina/perineal area or penis/urethra and sub-prepuclial. Vaginal discharge, pain, and bleeding on coitus or touch may occur.
- ◆ Molluscum contagiosum (Pox group virus): Umbilicated multiple papules with whitish, cheesy material being expressed when squeezed. Secondary infection and spread to other sites may occur.

— *Secondary syphilis should be ruled out when evaluating genital venereal warts.*

Management

- ◆ Carefully apply podophyllin 25% intincture of benzoin to each wart, protecting the normal surrounding skin with petroleum jelly. Wash off the podophyllin thoroughly 1–4 hours later.
- ◆ Repeat 1–2 times weekly. If there is no regression after 4 applications, use alternative treatment given below or refer:

- Alternative treatments: Podophyllotoxin 0.5% electrosurgery, cryotherapy,⁵-Fluorouracil, surgical removal, silver nitrate pencil application.
- In pregnancy: Podophyllin should not be used during pregnancy, not in vaginal, cervical, internal urethral, anal, or oral warts. Alternative regimens may be used, except 5-Fluorouracil and podophyllotoxin.

Table 2. 4: Clinical features and probable causes of genital ulcers

Clinical features	Probable diagnosis & cause
Single, painless, relatively clean ulcers without pus Incubation period up to 3 weeks Painless lymphadenopathy	Primary syphilis chancre <i>T. pallidum</i>
Multiple, soft, deep, tender ulcers with profuse pus Incubation period 1 week Very painful lymphadenopathy, which can be fluctuant Disfiguration of the genitalia Secondary infection	Chancroid <i>H. ducreyi</i>
Multiple shallow and tender ulcers May start as vesicles grouped together. Itchy Incubation period 1 week Tender lymphadenopathy, may be recurrent, rarely suppurative	Herpes genitalis <i>H. simplex</i>
Single, small and transient ulcers Incubation period 1–2 weeks Lymphadenopathy; several glands may be matted together Fistula and stricture formation	Lymphogranuloma venereum (LGV) <i>C. trachomatis</i>
Large, beefy ulcers Variable incubation period None or rarely lymphadenopathy	Granuloma inguinale <i>Calymmatobacterium granulomatis</i> (Donovan bacilli)



Algorithm to manage common STIs Syndromes: Lower abdominal pain in women

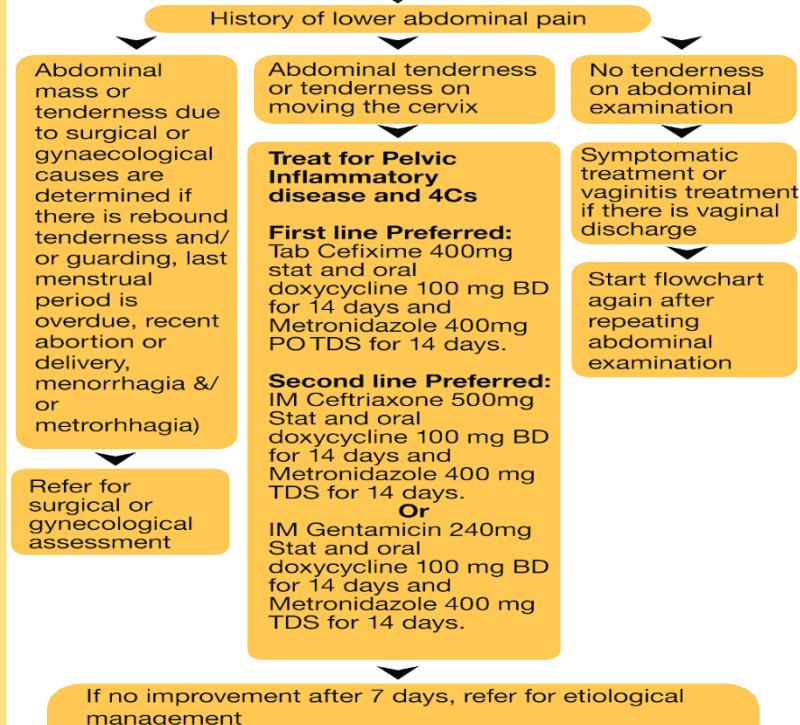


Figure 2:3 Algorithm for the management of lower abdominal pain in women

Source: Kenya National Guidelines for the Prevention and Control of Sexually Transmitted Infections, 2018

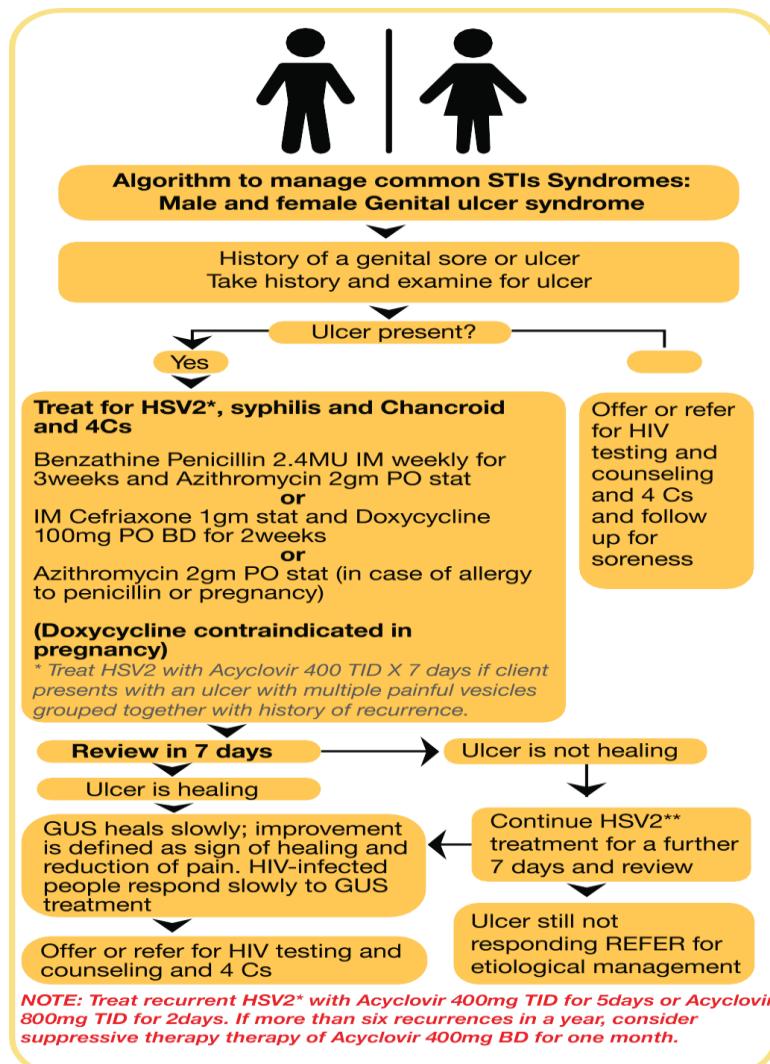


Figure 2:5 Algorithm for the Management of Genital Ulcer Disease

Source: Kenya National Guidelines for the Prevention and Control of Sexually Transmitted Infections, 2018

3. Cardiovascular Diseases

They include hypertension, coronary artery disease/ischaemic heart disease, rheumatic fever/rheumatic heart disease, infective endocarditis, congenital heart disease and deep venous thrombosis (DVT), among others.

3.1 Hypertension

Hypertension is diagnosed when blood pressure (BP) reading is greater than 140/90mmHg on 3 separate readings.

Classification

Primary Hypertension: Also known as essential hypertension. No obvious cause is found. Associated with certain risk factors like age, smoking, family history, lack of exercise. Comprises of majority of patients with hypertension.

Secondary Hypertension: Has an identifiable cause like kidney disease, endocrine disorder or drugs.

Clinical Features

Majority of patients are asymptomatic. Occasionally patients may present with early morning occipital headaches, dizziness or complication of hypertension, e.g., renal failure, stroke, and heart failure. Majority of patients have essential hypertension. Table 3.1 summarizes the degrees of hypertension.

Table 3.1:Definition and classification of hypertension

Systolic (mmHg)

Diastolic (mmHg)			
Optimal	<120	and	<80
Normal	120-129	and/or	80-84
High normal	130-139	and/or	85-89
Grade 1 hypertension	140-159	and/or	90-99
Grade 2 hypertension	160-179	and/or	100-109
Isolated systolic hypertension	>140	and	<90

(Adapted from the ESH/ISH guidelines

NB: The class is determined by whichever the readings are higher

Investigations

Refer to higher level.

Management – General

Goal of therapy: Control Blood pressure to a target of < 140/90mmhg in order to reduce cardiovascular risk. This can be achieved by two ways;

- ◆ Lifestyle modification (no use of drugs): These include healthy diets, avoidance of tobacco and alcohol use, adequate exercise, weight reduction. This advice should be emphasized in every clinic visit.
- ◆ Pharmacological therapy: This involves use of various antihypertensive drugs as monotherapy or in combination as an add on the above lifestyle modification.

Management – Pharmacological

Summary of plan for care in hypertension:

There are six major classes of antihypertensive agents:

- A:** Angiotensin Converting Enzyme Inhibitors (ACEIs) and Angiotensin receptor blockers (ARBs);
- B:** β-blockers (BBs);
- C:** Calcium Channel Blockers (CCBs);
- D:** Thiazide or thiazide-like diuretics;
- Z:** Others (sympatholytics, α adrenergic blockers, centrally acting drugs, alpha-2 agonists and direct arterial vasodilators).

For those with stage 1 hypertension, monotherapy is adequate to control, whereas grade 2 and above require combination therapy.

All the above drugs are effective in lowering the blood pressure. However, when choosing the best anti-hypertensive drug to start with, there are certain factors to consider; *Availability, cost, side effects, comorbidities, complications, age and race.*

Refer Complications; Any organ involvement

3.2 Hypertensive Crisis

Sudden or sustained diastolic BP of more than 120mmHg with papilloedema, progressive decrease in renal function, and evidence of neurological dysfunction. Aim of treatment is to achieve diastolic BP of 100–110mmHg. BP should be controlled within 1 hour in order to prevent permanent damage. However, rapid decrease of BP should be avoided to reduce risk of cerebral hypoperfusion.

Management

Refer to higher level.

Patient Education

Untreated hypertension has a high mortality rate due to: renal failure, stroke, coronary artery disease, and heart failure. Counsel patient on adherence to hypertensive medication

3.3 Deep Vein Thrombosis

Commonest site for DVT is the calf of the lower limbs followed by the pelvis. (See also Section 54.3.7, on DVT in pregnancy.)

Clinical Features

Diagnosis is mainly clinical. Pain is usually of sudden onset; warmth on palpation, local swelling and tenderness. Difference in extremity diameter of 2cm or more than the opposite limb from some fixed point is abnormal.

In DVT related to pregnancy and its complications as risk factors, the left lower limb is involved in over 80% of the cases..

Investigations

Refer to higher level.

Management –General

- ◆ Control pain.
- ◆ Promote venous drainage:
 - Order bed rest.
 - Elevate involved limb.
 - Place the foot of the bed in a slightly elevated position (Trendelenburg's).
- ◆ Encourage limited extension and flexion of involved limb.
- ◆ Encourage early ambulation as soon as pain and inflammation begin to resolve and patient is on specific treatment.

Watch out for the following complications:

- ◆ Recurrent thrombosis
- ◆ Pulmonary embolism

Management – Pharmacological

Refer to higher level.

3.4 Pulmonary Embolism

Diagnosis of acute pulmonary embolism

Clinical Features

- ◆ Unexplained sudden onset of dyspnea
- ◆ Lightheaded sensation or syncope
- ◆ Pleuritic chest pain
- ◆ Pulse \geq 100 beats/minute
- ◆ Heart murmur of tricuspid regurgitation, loud P2
- ◆ Distended neck veins.

Management

Refer immediately to higher level for urgent care if the above symptoms are noted.

3.5 Heart Failure

Heart failure occurs when the heart is unable to supply sufficient output for the metabolic needs of the tissues, in face of adequate venous return. Common causes of heart failure are hypertension, valvular heart disease, ischaemic heart disease, anaemia, and pulmonary thromboembolism.

Clinical Features

Tachycardia, gallop rhythm, raised JVP, dependent oedema, tender hepatomegaly, orthopnoea, fatigue, exercise intolerance, and basal crepitations.

Common precipitating factors of heart failure in cardiac patients must be considered in treatment of acutely ill patients: poor compliance with drug therapy; increased metabolic demands, e.g., pregnancy, anaemia; progression of underlying disease, e.g., recurrent myocardial infarction, uncontrolled hypertension; cardiac arrhythmias; pulmonary embolism; infective endocarditis; infection, e.g., pneumonia.

Investigations

Refer to higher level for investigation.

Management – General

- ◆ Restrict physical activities.
 - ◆ Order bed rest in cardiac position.
 - ◆ Administer oxygen by mask for cyanosed patients.
 - ◆ Restrict salt intake, control fluid intake, and measure urine output.
 - ◆ Measure weight daily.
- ◆ Refer to higher level for definitive management.

3.6 Pulmonary Oedema

This is an acute medical emergency caused by an increase in pulmonary capillary venous pressure leading to fluid in the alveoli, usually due to acute left ventricular failure.

Clinical Features

Breathlessness, sweating, cyanosis, frothy blood tinged sputum, respiratory distress, rhonchi, and crepitations.

Investigations

Refer to higher level.

Management

This must be immediate:

- ◆ Prop up patient in bed.
- ◆ Administer 100% oxygen 3.5–5/L/min.
- ◆ Give IV frusemide 40mg initial, repeat with higher dose every 20–30 minutes to 200mg maximum total dose (see Section 38.2 for paediatric doses).
- ◆ Monitoring: HR, RR, BP, SpO₂, mental status, urine output.
- ◆ Refer for further management.

3.7 Acute Myocardial Infarction (AMI)

AMI is caused by the complete or partial occlusion of a coronary artery and requires prompt hospitalization and extensive care management.

Clinical Features

Chest pain: Severe, retrosternal/epigastric crushing or burning discomfort. Discomfort radiates to neck and down the inner part of the left arm lasting at least 20 minutes to 7 hours. Occurs at rest and is associated with pallor, sweating, arrhythmias, pulmonary oedema, and hypotension. May also occur with physical activity.

Management

- ◆ Support and maintain vital functions.
- ◆ Carry out cardio-pulmonary resuscitation (CPR).
- ◆ 12-Lead ECG (if available)
- ◆ Administer 100% oxygen.
- ◆ Aspirin 300mg stat dose
- ◆ Refer immediately to higher level.

3.8 Acute Rheumatic Fever

This is an acute, systemic connective tissue disease related to an immune reaction to untreated group A beta haemolytic streptococcus infection of the upper respiratory tract. The initial attack of acute rheumatic fever occurs in most cases in children aged 3–15 years. The major complication of this disease is the cardiac involvement, which can eventually lead to severe heart valve damage. This is the commonest cause of heart disease in Kenyan children.

Clinical Features

- ◆ Major criteria: Migrating polyarthritis, carditis (signs of cardiac failure, persistent tachycardia, pericardial rub, or heart murmurs), Sydenham's chorea, erythema marginatum, and subcutaneous nodules.

- ◆ Minor criteria: Past history of rheumatic fever, raised ESR, fever, arthralgia.
- ◆ Diagnosis: 2 major and 1 minor or 1 major and 2 minor manifestations.

Investigations

- ◆ FHG
- ◆ Anti-streptolysin O titres
- ◆ ESR
- ◆ 12-Lead ECG if available

Management

Mainly supportive;

- ◆ Bed rest, reduced physical activity, high nutrition.
- ◆ Medical management
- ◆ Ant-inflammatory treatment with steroids in severe cases
- ◆ Symptomatic treatment of cardiac failure using anti-failure medication.
- ◆ Adequate penicillin for eradication of GAS.

Prevention

- ◆ Avoid overcrowding
- ◆ Early treatment of streptococcal sore throat with Benzathine penicillin 1.2 mega units STAT dose **OR** phenoxymethylpenicillin 125–250mg TDS for 10 days.

Prophylaxis

- ◆ If there has been previous acute rheumatic fever without carditis: Give benzathine penicillin 1.2 mega units monthly for 5 years or up to the age of 18 years whichever is longer **OR** erythromycin 125–250mg BD for 5 years for those sensitive to penicillin.
- ◆ If there has been previous acute rheumatic fever with carditis: Benzathine penicillin 1.2 mega units **OR** erythromycin 125–250mg BD for those sensitive to penicillin for life.
- ◆ Patient education: Emphasize need for follow up for prophylaxis
 - Advise that rheumatic heart disease is a known complication.

3.9 Rheumatic Valvular Heart Disease

This is a complication of rheumatic fever. The main site of pathology is on the valves. There may be mitral stenosis, mixed mitral valve disease (both stenosis and incompetence), mitral incompetence, and/or aortic stenosis and incompetence. Dyspnoea, palpitations, or heart murmurs may occur depending on the valvular lesion. Patients may be asymptomatic and maybe discovered to have the lesion during routine examination or during periods of increased demand such as pregnancy or anaemia. Patients may present also with congestive cardiac failure.

Investigations

Refer to higher level.

Management

Refer

Prophylaxis

- ◆ For rheumatic fever: All patients with a history of rheumatic fever should be given prophylaxis for recurrences, for life, with: benzathine penicillin 1.2 mega units IM monthly **OR** amoxicillin 125–250mg PO BD **OR** erythromycin 125–250mg PO BD.
- ◆ For infective endocarditis prophylaxis: In addition to rheumatic fever prophylaxis the following are required:
 - Before dental procedures patients should be given amoxicillin 3.0 g PO 2 hours before procedure and 1.5 g PO 6 hours after the initial dose.
 - If allergic to penicillin they should be given erythromycin 1g PO 2 hours before procedure, then half the dose 6 hours after the initial dose.
 - For lower gastrointestinal and genitourinary procedures patients should be given amoxicillin 2g IM 30 minutes before procedure and 6 hours after the initial dose + gentamicin 1.5mg/kg IM 30 minutes before procedure and 8 hours after the initial dose.

Patient Education

- ◆ Emphasize need for follow up.
- ◆ Advise female patients on contraception.

Complications

- ◆ Congestive cardiac failure
- ◆ Pulmonary oedema
- ◆ Bacterial endocarditis

4. Central Nervous System

4.1 Headache

Headache is a common symptom in clients. It is commonly secondary to other causes, though a great percentage have no identified cause and are referred to as primary headache disorders. Examples of the latter are migrainous headaches, cluster headaches, and tension headaches.

The assessment of headache should involve a detailed history, physical examination, brief neurological examination including Fundoscopy; and should usually be adequate to arrive at the diagnosis.

Assessment of Headache

Accompanying features

- ◆ Aura
- ◆ Disorders of vision, sensation, balance, motor, speech
- ◆ Change in awareness or cognition
- ◆ Features of migraine (photophobia, phonophobia, osmophobia, mechanophobia, nausea, vomiting, loss of appetite)
- ◆ Autonomic features (lacrimation, conjunctival injection, peri-orbital oedema, miosis, nasal congestion, sweating ptosis)

Care should be taken to note any Red Flag features, such as;

- ◆ Focal neurological symptoms, or especially signs
- ◆ Altered mentation/cognition
- ◆ Papilloedema
- ◆ New onset and progressive
- ◆ Weight loss/other constitutional symptoms

Screening tools such as the SNOOPS criteria may be used in the assessment of headache;

SNOOPS

Screening tool developed by Dodick, Mayo Clinic, Scottsdale

- ◆ Systemic symptoms (fever, weight loss)
- ◆ Neurological symptoms or abnormal signs (abnormal exam, confusion, impaired alertness, loss of consciousness)
- ◆ Onset: sudden, abrupt, split second, first and worst
- ◆ Older: new onset or progressive, especially in over 50s
- ◆ Previous headache history (new, or change in pattern)
- ◆ Secondary risk factors (HIV, cancer).

4.1.1 PRIMARY HEADACHES

TENSION TYPE HEADACHE

- ◆ Usually bilateral, pressure sensation, episodic or continuous
- ◆ Triggers-Emotional upsets, worry, posture
- ◆ Any features of anxiety or depression

Management

- ◆ Reassurance
- ◆ Lifestyle change
- ◆ Restrict analgesia
- ◆ Refer for specialist review

MIGRAINE

- ◆ With (classical) or without (common) migraine
- ◆ Headaches are moderate to severe
- ◆ Unilateral or bilateral
- ◆ Episodic or chronic (+/- episodic)
- ◆ 'Pounding', 'throbbing', 'pulsing'.
- ◆ Accompanying features: photophobia, phonophobia, osmophobia, mechanophobia,
- ◆ nausea/vomiting/loss of appetite

Phases of Migraines

- ◆ Prodrome: tiredness, yawning, increased micturition, cravings, irritability
 - Visual: classically fortification spectra
 - Sensory: paraesthesia, numbness
 - Motor: hemiparesis
 - Speech: slurring, aphasia
 - Cognitive: difficulty thinking/concentrating
 - Vertebrobasilar: vertigo, dizziness, rarely diplopia collapse or drowsiness
- ◆ Headache: 4-72 hours
- ◆ Resolution and recovery: fatigue, exhaustion

Treatment

- ◆ Pharmacological treatment may involve administration of: Analgesics like paracetamol, Non-steroidal anti inflammatory drugs.
- ◆ Refer if no relief from above medications.

CLUSTER HEADACHE

- ◆ One of the trigeminal autonomic cephalgias
- ◆ Severe pain
- ◆ 15-180 mins each attack, up to 8 attacks per day
- ◆ Agitated during attack, can't lie down
- ◆ Autonomic features ipsilateral to pain
- ◆ More common in men, smokers, and can be triggered by alcohol when attacks are active

Clinical Features

- ◆ Unilateral
- ◆ Severe ocular/frontal pain
- ◆ Conjunctival injection
- ◆ Lacrimation
- ◆ Unilateral nasal discharge/congestion
- ◆ Agitated
- ◆ Often at night
- ◆ Occur in clusters

Investigation & Management

- ◆ High flow oxygen
- ◆ Refer for specialist management

Management of Secondary Disorders

Secondary headaches such as those due to trauma, vascular disorder, infection, homeostatic disorders are treated with analgesics plus treatment of the primary cause.

Specialist review for Investigations and rx may be required in a lot of these cases.

SUDDEN-ONSET HEADACHES

- ◆ A neurological emergency

Primary

- ◆ Migraine
- ◆ Idiopathic (thunderclap)
- ◆ Benign exertional/coital
- ◆ Cough h/a
- ◆ Cluster h/a

Secondary

- ◆ SAH
- ◆ Cerebral venous sinus thrombosis
- ◆ Pituitary apoplexy
- ◆ Arterial dissection

4.2 Seizure Disorders

Seizures are result of excessive electric impulse discharge of cerebral neurons.

Classification of Seizures

- ◆ Seizures are classified according to onset, into three:
 - Focal Onset
 - Generalized onset
 - Unknown onset

4.2.1 EPILEPSY

- ◆ Epilepsy is a chronic brain disorder characterized by repetitive and unprovoked seizures occurring more than two times 24 hours apart in a year.
- ◆ The disorder may arise from many and varied causes, however, in many cases no specific cause can be identified
- ◆ Aetiologies of epilepsy may be:
 - Structural- mesial temporal sclerosis, polymicrogyria, tuberous sclerosis, stroke, trauma, cavernoma, infection such as abscess.
 - Genetic- family history may help to determine this
 - Infectious- Most common aetiology worldwide
 - Typical infections:
 - Neurocysticercosis
 - HIV
 - Tuberculosis
 - Cerebral malaria
 - Sub-acute sclerosing panencephalitis
 - Cerebral toxoplasmosis
 - Zika virus
 - Cytomegalovirus
 - Metabolic- defined metabolic conditions that may have a genetic bias
 - Immune- Requires specific antibody testing (example anti-NMDA, anti-LGI1, anti-VGKC) in specific labs; May require immune based therapy in addition to AED.
 - Unknown

Clinical Features

- ◆ Aetiologies of epilepsy may be:
 - Meticulous history from patient and reliable witness (objective evidence as compared to the subjective/patient account) is critical in diagnosing a seizure disorder.
 - Ask about the prodromal phase, aura and the type, duration, frequency, and the age at onset of seizures.

- Details about the post ictal phase are important. Ask about precipitating factors, for example alcohol use.
- Video evidence may be helpful in making the diagnosis.
- ◆ A thorough physical examination including fundoscopy in newly diagnosed cases should be carried out.

Comorbidities should be recognized early in the classification of epilepsy as this helps with diagnosis, early management, and appropriate support

- ◆ Learning difficulties
- ◆ Intellectual disability
- ◆ Psychiatric features (example, autism spectrum)
- ◆ Motor deficits
- ◆ Scoliosis
- ◆ Sleep disturbance
- ◆ Gastrointestinal disorders
- ◆ Renal, skin, eye, cardiac, lung (example tuberous sclerosis complex)

Investigations & Management

Refer for specialist investigations and management

First Aid

- ◆ During a seizure;
 - Remove patient from any danger e.g., fire.
 - Place patient in the left lateral position with head turned to the same side.
 - Remove or loosen tight fitting clothing around the neck.
 - Remove dentures.
 - DO NOT attempt to insert any instrument into the mouth
 - Shield the patient
 - Allow the seizure to complete its course without physically attempting to hold down the patient.
 - However, after an attack, Refer patient for Investigation and treatment.

Principles of pharmacologic treatment

- ◆ First treat any underlying diagnosed condition e.g., hypoglycemia, meningitis.
- ◆ Establish a firm diagnosis before starting Anti-epileptic drugs (AED)
- ◆ For most patients, start on therapy as outpatients.
- ◆ Encourage therapy if patient has had 2 or more seizures within 1 year.
- ◆ Advise patient that treatment is usually life-long. Therapy may be discontinued after a seizure-free period of at least 2 years. Reduce the dose gradually over many months. Sudden discontinuation of drugs may precipitate status epilepticus.

- ◆ Complex partial seizures will require lifelong drugs.
- ◆ Start therapy with one drug, usually phenobarbitone. Increase at regular intervals until seizures are controlled or side effects appear. If side effects appear and seizures are still not controlled, introduce other drugs and taper off the first drug.

—Drugs used at maximum recommended dose should be withdrawn if seizures are not controlled.

Refer if underlying metabolic cause is suspected or raised intracranial pressure is present.

Patient Education

- ◆ Avoid becoming drunk, especially drinking sprees during weekends.
- ◆ Eat at regular intervals.
- ◆ Stress, physical or mental may precipitate a fit, thus manage stress.
- ◆ Avoid sleep deprivation.
- ◆ Never swim alone and all precautions should be taken when swimming.
- ◆ Avoid driving or operating heavy or sharp edged machinery.
- ◆ To prevent burns, protective shield should be made around "jikos"(braziers).

Take Note - AED:

- ◆ Avoid Sodium valproate in women of child bearing potential unless they are informed about the risk and are on a contraception to prevent pregnancy. (This should be documented).
- ◆ Pregnancy and AED: Epilepsy needs active management during pregnancy. Ideally the client should be Seizure free and plan the pregnancy. Folate supplementation should be done, and a safe AED selected No antiepileptic drug can be considered to be absolutely safe in pregnancy.
- ◆ Babies born to women with epilepsy have an increased rate of malformations; this is believed to be attributable mostly to antiepileptic drugs.

Many AEDs affect enzyme function through inhibition or induction and can affect the way drugs like ARVs and antiTB medication work in the body

Take caution with Drugs such as ;

- ◆ Carbamazepine
- ◆ Phenytoin
- ◆ Phenobarbitol
- ◆ Primidone
- ◆ Felbamate
- ◆ Oxcarbazepine
- ◆ Optimal choices
- ◆ Lamotrigine (plasma concentration)
- ◆ Levetiracetam
- ◆ Gabapentin
- ◆ Pregabalin
- ◆ Vigabatrin

4.2.2 NON-EPILEPTIC ATTACK DISORDERS

Psychogenic seizure/conversion disorder diagnosed mainly based on history that is usually sudden and variable in onset or pattern.

- ◆ The client may or may not identify stressors
- ◆ Talk around event, poorly describing event
- ◆ Talk about what happened to them
- ◆ Witness attack/video/directly observe what happens in clinic
- ◆ Examination and Investigation may be normal.

Clinical Features

- ◆ Tearing
- ◆ Forced eye closure
- ◆ Head back or turning side-side
- ◆ Back arching/opisthotonus
- ◆ Irregular/asynchronous movements arms and legs
- ◆ Waxing and waning
- ◆ Typically long duration
- ◆ Repeated attacks
- ◆ May respond to external stimuli or comfort
- ◆ Can be incontinent but tongue biting unusual

Important to diagnose because;

- ◆ Prevention of harm
- ◆ Avoidance of unnecessary hospital/ICU stay
- ◆ Avoidance of unnecessary investigation
- ◆ Avoidance of AEDs
- ◆ Appropriate management
- ◆ Neuropsychology intervention
- ◆ Earlier intervention more effective

4.3 Status Epilepticus

This is a succession of seizures in which the patient does not regain consciousness between attacks. It could be due to partial, complex partial, absence, tonic-clonic, or clonic. Only the last 2 are life threatening.

Clinical Features

Patient is not able to talk, the tonic phase is not clear and the patient appears in continuous clonic phase, the short tonic phases being difficult to see. May be in respiratory embarrassment with cyanosis or may be hypoglycemic.

Management

Supportive

Place patient by the side (lateral position).

Do NOT attempt to put anything into the patient's mouth to stop the biting of the tongue.

Pharmacological

♦ Give IV (not IM) diazepam 10mg STAT then infuse IV phenytoin 15–20mg/kg at a rate not exceeding 50mg/minute (for adults). Maintenance dose of 100mg 8 hourly. To be administered in normal saline. If no response use IV phenobarbitone. Maintenance 300–500mg/day, preferably oral.

♦ Phenobarbitone second line after phenytoin. Loading dose of phenobarbitone 20mg/kg IV at a rate of 50–75mg/minute. If no response repeat at 5–10mg/kg. Maintenance 1–5mg/kg/day PO.

♦ Rectal diazepam 10–20mg may be as effective as intravenous diazepam.

♦ Use rectal solution at 0.5mg/kg.

— **Phenobarbitone should only be used where respiratory support is available.**

4.4 Stroke

Acute Stroke is a medical emergency characterized by sudden onset of focal neurological deficit.

Causes include

- ♦ Interrupted supply of blood to the brain (ischaemic) - thrombosis or infarction (80%)
- ♦ Primary intracranial hemorrhage (15%)
- ♦ Sub arachnoid haemorrhage (5%)
- ♦ Cerebral venous thrombosis

4.4.1 ISCHEMIC STROKE

Clinical Features

Rapid onset of neuronal malfunction referable to the area of the brain for which blood supply is disrupted.

Investigations

- ♦ Supportive- Glucose, FBC, U&EC , XR, ECG, PT/APTT
- ♦ Referral- Urgent CT will be required

Management

- ◆ Refer for specialist management urgently. This is deemed urgent if the client is on anticoagulation or other high risk of ICH, there is suspected cerebellar infarct, suspected SAH and/or signs of raised intracranial pressure.
- ◆ BP (avoid a sudden drop)
- ◆ Stabilize and protect the airway
- ◆ Refer for urgent investigations and mana.
- ◆ For ischemic strokes; Thrombolytic therapy is useful if initiated within 3 hours of onset of symptoms. Benefit may extend to thrombolysis done within 4.5hrs in cases

Prevention of Complications

Avoid giving anything orally if drowsy or having difficulty in swallowing or talking so as to prevent Aspiration pneumonia

4.4.2 HAEMORRHAGIC STROKE

Hypertension and vascular malformations are the commonest causes of haemorrhagic stroke, both subarachnoid and intracerebral haemorrhages, both of which are associated with very high mortality.

Clinical Features

- ◆ Intense headache of sudden onset, commonly associated with elevated blood pressure.
- ◆ In half of patients there is transient alteration of the level of consciousness, commonly going into coma.
- ◆ If there is subarachnoid bleed there are features of meningism including stiff neck and a positive Kernig's sign.

Investigations and Management

- ◆ Management depends on the cause of the haemorrhage.
- ◆ Control of blood pressure controls hypertensive haemorrhage.
- ◆ Refer for specialist management

4.4.3 SUB ARACHNOID HAEMORRHAGE

Headache follows exertion in 1/3 cases

Clinical Features

- ◆ Classical presentation: sudden/dramatic onset ‘blow to head’, usually bilateral, may be unilateral.
- ◆ Stiff neck
- ◆ Photophobia
- ◆ Nausea
- ◆ Vomiting
- ◆ Fever
- ◆ Reduced Glasgow Coma Scale (GCS)
- ◆ Rarer: seizures, cranial nerves signs, confused
- ◆ On examination
 - GCS may be reduced
 - Nuchal rigidity, retinal blood, restlessness, focal neurological sign
- ◆ Pain may be relieved by non-narcotic analgesics or triptans
- ◆ Over reliance on the classical presentation
 - Misdiagnosis includes infection, migraine, hypertensive encephalopathy, cardiac disorder (91% cardiac arrhythmia; ECG may also be consistent with myocardial ischaemia)
 - May present without a history of (e.g. seizures, reduced/LOC, confusion)

Investigation

- ◆ Refer for urgent investigations

4.5 Cerebral Venous sinus thrombosis

Cause

- ◆ Trauma, intracranial tumour, infection (face, ear, nose, sinuses), abscess, meningitis, polycythaemia, systemic infection.

Clinical Features

- ◆ Headache 82%
- ◆ Papilloedema 50%
- ◆ Seizures 42%
- ◆ Focal deficit 41%
- ◆ Reduced GCS 31%
- ◆ Multiple CN palsies 11%
- ◆ Bilateral cortical signs 4%
- ◆ Cerebellar signs

- ◆ Other symptoms pulsatile tinnitus, visual obscurations, diplopia (6th n palsy), encephalopathy or sudden onset 'SAH-like'

Investigations and Management

Refer

4.6 Meningitis and Encephalitis

Meningitis is an acute inflammation of the pia and arachnoid coverings of the brain with spread into the cerebro-spinal fluid (CSF). It is most commonly due to invasion by bacteria (Pyogenic meningitis), and less so by viruses (Aseptic meningitis), tubercle bacilli (Tuberculous meningitis), or fungi (Fungal meningitis).

The commonest bacterial organisms are *Streptococcus pneumoniae* (*Pneumococcus*), *Haemophilus influenzae*, and *Neisseria meningitidis* (*Meningococcus*), but almost any other bacteria may be involved depending on circumstances of the invasion and the age of the person.

Encephalitis is distinguished from meningitis by the presence of abnormal brain function as evidenced by altered mental status, sensory or motor deficits, altered behavior or personality changes and speech or movement disorders. Encephalitis is most commonly associated with a viral infection.

When there is both meningeal and parenchymal involvement, there can be a mixed presentation of meningoencephalitis, as is commonly caused by viral infections.

Predisposing factors are low immunity, prematurity and septicaemia; infections in the nose, sinuses, ears, throat, and lungs; penetrating injuries of the skull and spinal column, and congenital malformations of the brain and spine.

Meningococcal meningitis often occurs in epidemics.

Clinical Features

Neck stiffness, positive Kerning's sign, altered level of consciousness, headaches, fever, vomiting, convulsions, photophobia are common features.

Investigations

- ◆ Haemogram and ESR
- ◆ CXR
- ◆ Others: Mantoux test, history of contact with TB

Table 4.1: CSF characteristics

Type	Colour	Protein	Sugar	Cells
Normal	Crystal clear	Below 0.4g/L	Above 2.5mmol/L	0–5(x10/L)
Pyogenic	Cloudy	High	Low or nil	Hundreds to thousands mainly polymorphs
Tuberculous	Clear OR opalescent	Moderately raised	Low	A few hundreds mainly lymphocytes
Viral	Clear OR opalescent	Moderately raised	Normal	A few hundreds mainly lymphocytes

— Admit patient if meningitis or encephalitis is suspected. Initiate treatment immediately.

Management – General

- ◆ When seizures occur:
 - Stop seizures by giving IV/IM diazepam 0.3mg/kg **OR** 0.5mg/kg STAT rectally. Repeat as necessary.
 - Prevent seizures by giving phenobarbitone 3–6mg/kg IM BD or TDS **OR** 3–6mg/kg/day orally.
- ◆ Treat coma as follows:
 - Keep airway clear and suck out secretions.
 - Nurse the patient on the side; turn every 2 hours.
 - Give oxygen, if necessary, 0.5–1L/min by intranasal catheter.
 - Give IV fluids if necessary.
 - Observe vital signs carefully every 2 hours until awake
- ◆ Follow the patient's progress:
 - Take the temperature and pulse.
 - Assess neck stiffness/Kerning's sign.
 - Maintain fluid and electrolyte balance.
 - Ensure patient is passing urine well.
 - Ensure patient does not go into further seizures.
- ◆ Treat for malaria if in endemic area for malaria.
 - ◆ Give dexamethasone 4mgIM/PO TDS for 72 hours in adults to reduce sequel of meningitis such as deafness. Carry out physiotherapy on the patient.

Management – Pharmacological

If CSF is normal, discontinue anti-meningitis therapy and investigate and treat patient in line with other clinical and laboratory findings.

Antibiotics

- ◆ Streptococcus pneumoniae: Benzylpenicillin 4 mega units IV 6 hourly for 14– 21 days **OR** chloramphenicol 1g IV 6 hourly for 14 days, **OR** ceftriaxone 2-4g/ day IV 12 hourly for 14–21 days, Vancomycin 2g/day IV 8–12 hourly **OR** meropenem 2g/day IV 8 hourly may also be given.
- ◆ Neisseria meningitidis: Benzyl penicillin 4 mega units IV 6 hourly for 10 days **OR** chloramphenicol 1g IV 6 hourly for 10 days. Ceftriaxone may also be given as above. Dexamethasone 0.15mg/kg IM/PO 8 hourly for 4 days in adults to reduce sequel of meningitis such as deafness.

Prophylaxis

- ◆ To close contacts or household members for meningococcal meningitis:
 - Sulphadiazine 1g BD PO for 2 days (if the organism is susceptible) **OR**
 - Rifampicin 600mg BD PO for 2 days **OR**
 - Minocycline 100mg BD PO for 2 days for adults only
- ◆ Purified capsulate polysaccharide vaccine is available to control outbreaks, but it must be administered within 3–7 days of case identification to prevent an epidemic. NB: The vaccine is not very useful for children <2years.

Complications

- ◆ These include subdural effusion, hydrocephalus, blindness or deafness, secondary epileptic seizures, mental and physical retardation.
- **Notify the disease surveillance officer if meningococcal meningitis is diagnosed.**

4.7 Tetanus

Neurological disorder characterized by muscle spasms due to endotoxin produced by Clostridia tetani. Tetanus occurs in several clinical forms, including generalized, neonatal, and localized disease.

Clinical Features

Trismus(lockjaw), opisthotonus(rigid arching of back muscles), dysphagia, laryngospasm. Diagnosis is mainly clinical.

Management

- ◆ Maintain adequate airway (intubation is necessary)
- ◆ Insert a nasogastric tube as early as possible for nutrition and drug administration
- ◆ Neutralize toxin: 1,000–3,000IU of human tetanus immunoglobulin IM wound. Horse serum is an alternative.
- ◆ Eliminate toxin production:
 -

- Crystalline penicillin 1 mega unit IV QDS for 10 days (children 50,000IU/kg/ day; Neonates BD, older children QDS)
 - Metronidazole 2g/day for 7–10 days

 - Other agents that can be used include cephalosporins, imipenem, macrolides and tetracyclines.
 - Surgical toilet of the wound
- ◆ Control spasms –general
- Diazepam is the drug of choice. Add phenobarbitone or chlorpromazine if additional sedation is required. All 3 drugs may be needed in severe cases. (Refer to Table 7.5 for a guide to the dosage of these drugs.)
 - Diazepam 10–60mg IV/ rectally QDS
 - ◆ Phenobarbitone 30–90 mg IV/M every 12 hourly chlorpromazine 100mg IM QDS alternating with diazepam. Maintain fluid balance.
 - ◆ Monitor for and treat intercurrent infections.
 - ◆ Nurse in a dark, quiet isolation.

Prevention

People with open wounds should be given 2 doses of tetanus toxoid at least 4 weeks apart. Only 1 dose if immunized during the last 3 years and adequate surgical toilet.

Guideline for dosage administration for tetanus drugs

Drug administered	Time in hours								
	0	3	6	9	12	15	18	21	24
Diazepam	+		+		+		+		+
Chlorpromazine		+		+		+		+	
Phenobarbitone	+							+	

Note: Frequency of drug administration should be titrated against clinical condition. Optimum level of sedation is achieved when patient remains sleepy but can aroused.

5. Endocrine System

These are conditions associated with difference hormone abnormalities from the endocrine systems. They include; diabetes, thyroid diseases, pituitary gland disease and adrenal gland diseases.

5.1 Diabetes Mellitus

Diabetes mellitus is recognized by chronic elevation of glucose in the blood (hyperglycaemia).

NOTE: The terms insulin dependent diabetes (IDDM) and non-insulin dependent diabetes mellitus (NIDDM) for Type 1(T1DM) and Type 2 DM (T2DM) respectively are obsolete and no longer used as patients with T2DM may require insulin as discussed under insulin use in T2DM.

Clinical Presentation

Commonest symptoms are polyuria, polydipsia, polyphagia, and weakness. Wasting tends to occur in type 1 diabetes while obesity may predominate in type 2. Patients with T2DM may be asymptomatic. Some patients with diabetes may present with features of target organ damage or complications involving the kidneys (proteinuria/renal failure), heart (heart attack or heart failure), nerves (peripheral neuropathy) eyes (DM retinopathy, cataracts) brain (stroke) or sexual dysfunction.

Presentation

Commonest symptoms are polyuria, polydipsia, polyphagia, and weakness. Wasting tends to occur in type 1 diabetes, while obesity may predominate in type

Sequelae of target organ damage in the kidneys, blood vessels, heart, nerves, and eyes may be the main manifestations.

Physical examination

- ♦ Anthropometric measurements: blood pressure, weight, height (body mass index; BMI), waist circumference.
- ♦ Features of insulin resistance: acanthosis nigricans.
- ♦ Features of complications: Diabetic foot, edema (kidney or heart failure).
- ♦ Other tests done in patients with diabetes:
 - Urinalysis: ketones, proteinuria
 - Renal function tests/urea, electrolytes and creatinine (UECr)
 - Lipid profile: dyslipidemia.
 - Glycated Hemoglobin (HbA1c): for monitoring sugar control: target < 7%.

Management

Goals of management

- ◆ Symptomatic relief
- ◆ Symptomatic relief
- ◆ Correct hyperglycemia
- ◆ Long term glycemic control
- ◆ Prevent DM complications and diabetes related deaths.

Non-pharmacological therapy

This is important for most types of diabetes and include; healthy diets, cessation of tobacco use, moderation or cessation of alcohol use, weight loss for the overweight/obese patients and aerobic physical activity/exercise. For the diet, consultation with a nutritionist/dietician is important and should be individualized.

One can use a plate model to advise on diet;

- ◆ Half of a plate: vegetables
- ◆ A quarter of a plate: proteins
- ◆ A quarter of a plate: starches/carbohydrates.
- ◆ Limit fruits intake.

Model plate

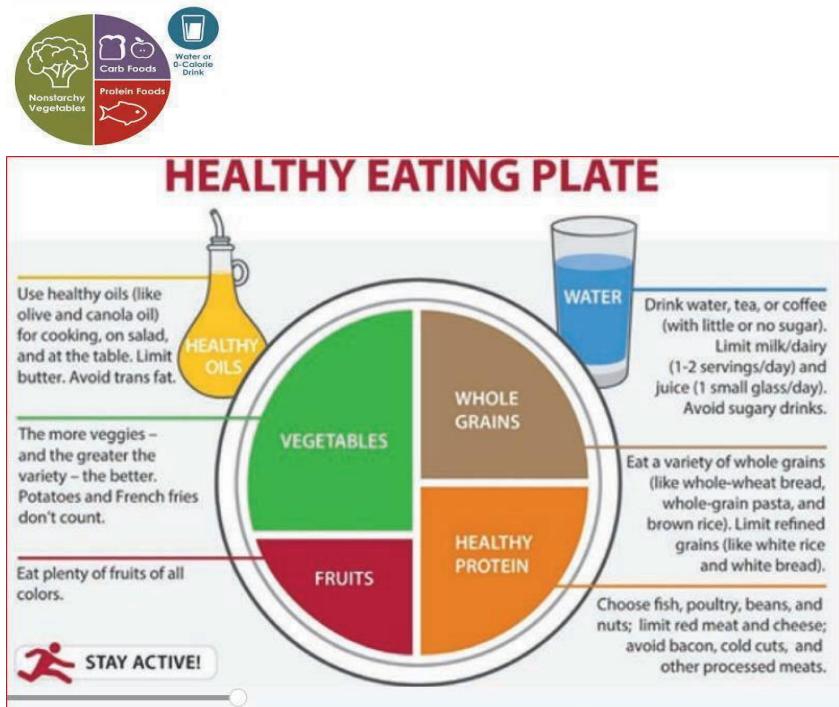


Figure 5:1 Plate Model as adapted from the Kenya National Diabetes

Food composition

- ◆ Carbohydrate: 50–60% in complex form, e.g., rice, beans, peas, etc.
- ◆ Protein: 10–20%. Vegetable protein source include soyabean, lentils and beans.
- ◆ Fat: 25–30%.
- ◆ Fiber in diet can prolong absorption of sugar. Fiber containing foods include beans, legumes, and bran.
- ◆ Artificial sweeteners e.g., saccharin and aspartate, are helpful in maintaining a palatable diet.

Consider the Glycemic Index (GI) of various foods. Encourage low GI foods and avoid high GI foods. The GI of various foods is as indicated in Table 5.1 below as adapted and modified from the 2018 Kenya Diabetes Study Group Guidelines.

Table 5.1 : Glycemic index of selected types of food

Low Glycemic Index (GI) Foods	High Glycemic Index (GI) Foods
Whole wheat or bran bread	Glucose
Brown rice	Potatoes: (mashed, baked, chips/French fries, boiled peeled).
Sweet potatoes	Rice Flour
Whole wheat pasta	Honey
Fresh peas	Cooked Carrots
Whole wheat sugar free cereal	Corn Flakes
Oatmeal	Cooked Broad beans
Whole grain pasta	Pumpkin
Kidney beans	Sugar (Sucrose)
Raw carrots	White bread
Dairy products	Refined sweetened cereal
Dried beans	Chocolate bars
Brown or yellow lentils	Soda
Chick peas	Cookies
Green vegetables (tomatoes, eggplant, zucchini, garlic, onions etc).	Corn
Green beans	White rice
Green Lentils	Noodles
Split peas	Raisins
Dark Chocolate (>70% cocoa).	Fruits: Watermelon, bananas.
Fruits (Green apples, cherries, berries,).	Fruit juices.

Meal Schedules

Strict adherence to meals schedule is important.

Pharmacological management:

Oral hypoglycaemics

- ◆ Metformin 500mg to 2 mgs/day in 2-3 divides
- ◆ Refer for additional investigations and management.

Insulin is indicated in type 2 DM if:

- Oral hypoglycaemic drugs are not effective, e.g., persistent polyuria, hyperglycaemia.
- Ketonuria occurs.
- Infection occurs.
- Other complications, e.g., renal failure are present.
- Patient undergoes surgery.

~ Refer patient for admission for insulin therapy.

- ~ Hypoglycaemia should be considered in all diabetic patients who present with altered consciousness or coma.

TYPE 1 DIABETES MELLITUS

Usually present with diabetic keto-acidosis (DKA). Patients with type 2 DM can also present with DKA especially in situations of stress such as infection or neglect of therapy. Clinical features include intense polydipsia, abdominal pain, vomiting, dehydration, acidotic breathing, or coma.

Investigations

- ◆ Urinalysis should reveal ketonuria and glycosuria
- ◆ Blood sugar should show hyperglycaemia.

Management

- ◆ DKA is a medical emergency and should be treated as such. Not all patients with DKA are in coma.
- ◆ Fluid replacement: Initiate fluid replacement with normal saline then change to 5% dextrose alternating with normal saline when blood sugar is between 12.0 and 14.5mmol/L. If severely dehydrated continue normal saline and 5% dextrose together.
- ◆ For further management of DKA refer.

Patient Education

- ◆ Teach patients how to avoid foot injury.
- ◆ Hospital occupational therapist should advise patients on foot care.
- ◆ Patients with any injury, however minor, should seek medical advice.
- ◆ Patients should eat regularly.
- ◆ Patients should carry sweets or glucose and chew them if they experience any symptoms of hypoglycaemia.
- ◆ Patients should always carry “Diabetic Alert” card with them.
- ◆ Patients should join any branch of the Kenya Diabetic association for support and continuing education.
- ◆ Patients should be followed up in the diabetic clinics or non-communicable disease centres
- ◆ Advise on annual eye examination.

~ All diabetics with complications such as diabetic foot should be referred.

Psychosocial support

Patients with diabetes undergo a lot of stress. There is need for psychosocial support, for both the patient and the caregivers.

5.1.1 COMPLICATIONS OF DIABETES MELLITUS

The main complication is hypoglycaemia, which occurs when blood glucose is lower than 4mmol/L.

- ◆ General management of hypoglycaemia
 - Give sugar-containing soft drinks, snacks or sweets
 - Monitor blood sugar every 15 minutes until blood glucose is 6–8mmol/L
- ◆ Pharmacological management of hypoglycaemia
 - IV 50% dextrose bolus 25–50ml (children 1–2ml/kg)
 - IM/IV/SC glucagon: <30kg – 0.5mg STAT dose; 30kg – 1mg STAT dose
- ◆ Give 5 or 10% dextrose fluid as a continuous infusion for normal maintenance of fluid requirements for age (refer to Section 6.1, on diarrhoeal diseases).

5.2 Diseases of the Pituitary Gland and Adrenals

Pituitary gland disorders can be either pituitary hyperfunction or hypofunction. These are reflected in the disorders of adrenals, thyroid and ovarian functions.

5.2.1 THYROID DISEASES

These are conditions affecting the thyroid gland.

The thyroid is an endocrine gland that produces thyroid hormones (T3 and T4) under the stimulation of TSH from the anterior pituitary gland.

These diseases include:

- ◆ Hyperthyroidism/Thyrotoxicosis: Excessive thyroid hormones.
- ◆ Hypothyroidism: Reduced thyroid hormones.
- ◆ Goiter: Enlargement of the thyroid Gland.
- ◆ Thyroid Nodules: Discrete thyroid mass that can be single or in multiple.

Clinical Features

Most patients are asymptomatic. Pressure symptoms consist of engorged neck veins, dysphagia, stridor, hoarseness. In hyperthyroid patients' signs and symptoms include weight loss, diarrhoea, heat intolerance, sweating, tachycardia, heart failure, tremors, eyelid lag, exophthalmos, and menstrual disorders.

Patients with hypothyroidism may present with

- ◆ Fatigue
- ◆ Weight gain
- ◆ Increased blood cholesterol level
- ◆ Increased sensitivity to cold
- ◆ Constipation
- ◆ Dry skin
- ◆ Puffy face

- ◆ Hoarseness
- ◆ Muscle weakness, aches, tenderness, and stiffness
- ◆ Joint pain, stiffness, or swelling
- ◆ Irregular menstrual periods or amenorrhea
- ◆ Irregular menstrual periods or amenorrhoea
- ◆ Dry hair or hair loss

Investigations

Refer to higher level.

Management

Refer to higher level.

5.2.2 PITUITARY GLAND DISORDERS

The pituitary gland is located in the pituitary fossa in the base of the skull. It has two lobes that secrete stimulating hormones. When you suspect a patient has a pituitary gland disorder, refer to a physician or endocrinologist for further evaluation and management.

5.2.3 ADENOCORTICOL DISORDERS

These can be either underproduction or overproduction of glucocorticoids or mineral corticoids, leading to hypofunction or hyperfunction status.

5.2.4 GLUCOCORTICOID EXCESS

This is also called hypercortisolism or Cushing's Syndrome.

It arises from a functional adrenal cortex tumor (malignant or benign) producing excess cortisol. Exogenous use of steroids can also lead to Cushing's Syndrome.

Cushing's Diseases arise from adrenocorticotrophic hormone producing adenoma from the anterior pituitary gland.

Clinical Features

Clinical features include weight gain, moon-facies, hypertension, skin striae, hirsutism, acne, easy bruising, hyperpigmentation, glucose intolerance, plethora, proximal muscle weakness, menstrual dysfunction, osteoporosis, hypokalaemia and metabolic alkalosis.

Diagnosis

Refer to higher level.

Management

Refer to higher level.

5.2.5 ADRENAL INSUFFICIENCY

Commonly caused by infections like TB, auto-immune conditions, and neoplasms. Patients commonly present with features of weakness, weight loss, diarrhoea, vomiting, hypotension and darkening of skin palms and recent scars.

Diagnosis and Management

Refer to higher level.

6. Gastrointestinal Conditions

6.1 Diarrhoeal Diseases

Diarrhoea is defined as occurrence of at least 3 loose or watery stools in a day.

Classification

There are three categories of diarrhoeal diseases:

- ◆ **Dehydration:** This is the major cause of death from diarrhoea. Management is aimed primarily at evaluation, prevention, and treatment of dehydration.
- ◆ **Dysentery:** This is bloody diarrhoea.
- ◆ **Persistent diarrhoea:** This is diarrhoea that lasts for 14 days or more.

Clinical Evaluation of Dehydration

Refer to Table 6.1 for a summary of the signs of dehydration, whether severe, moderate, or mild.

6.1.1 REHYDRATION PROTOCOL

In using the protocol summarized in Table 6.2, bear in mind:

- ◆ The volumes indicated are guidelines only.
- ◆ Rehydration must be evaluated in terms of clinical signs, not in terms of volume of fluids given.
- ◆ If necessary, the volumes given below can be increased or else the initial high rate of administration can be maintained until there is clinical improvement.
- ◆ Periorbital oedema is a sign of fluid overload in infants or hypermotremia in those on oral rehydration salts (ORS).
- ◆ Maintenance therapy should begin as soon as signs of dehydration have resolved, but not before.

Table 6:1 Clinical signs of dehydration

Clinical feature	Mild dehydration	Moderate dehydration (2 signs present)	Severe dehydration (≥ 2 signs present)
General appearance: Older children and adults	Thirsty, alert	Thirsty, alert	Generally conscious, anxious, cold extremities, clammy, cyanosis, wrinkled skin of fingers, muscle cramps, dizzy if standing
Pulse	Normal	Rapid	Rapid, thready, sometimes absent
Respiration	Normal	Deep, sometimes rapid	Deep and rapid
Systolic BP	Normal	Normal	Low, sometimes unmeasurable
Skin elasticity	Normal: fold of pinched skin disappears at once	Decreased	Fold disappears very slowly (>2 seconds)
Eyes	Normal	Sunken	Severely sunken
Tears	Present	Absent	Absent
Mucous membranes (test mouth with a clean finger)	Moist	Dry	Very dry
Urine output	Normal	Reduced, urine dark	Anuria, empty bladder
% of body weight loss	1–5%	6–9%	10% or plus
Estimated fluid deficit	10–50ml/kg	60–90ml/kg	100ml/kg

6.1.2 FLUID MAINTENANCE THERAPY

- ◆ Fluid to be given after correction of dehydration.
- ◆ Adapt rehydration treatment to the clinical status of the patient.

Note the following:

- ◆ Other liquids such as plain water, rice water, *uji*, *maziwa mala*, etc., can also be given.
- ◆ ORS should constitute about two-thirds of the fluid intake until diarrhoea ceases.
- ◆ Thirst is the best guide for maintenance fluid therapy in older children and adults. Let them drink as much ORS (and other liquids) as they desire.
- ◆ Give fresh fruit or mashed bananas to provide potassium.
- ◆ Return to health worker if no improvement in 3 days or if patient develops the following: many watery stools, very poor drinking, repeated vomiting, fever, marked thirst, and/or blood in stool. Also, if the caregiver is not happy with the condition.

Table 6. 2: Rehydration protocol

Degree of dehydration	Age	Type of liquid	Volume to give	Rate
Mild	All	ORS	50ml/kg	In 4 hours
Moderate	All	ORS	100ml/kg	In 4 hours
Severe	Older children and adults	Hartmann's solution, Ringer's lactate	110ml/kg	In 4 hours: at first as rapidly as possible until a radial pulse is palpable

NOTES: (a) Initially, adults can usually ingest up to 750ml of ORS/hour, and older children 300ml/hour.

(b) If Ringer's lactate or Hartmann's solution are not available, use:

- Half-strength Darrow's solution
- Normal saline with sodium bicarbonate and potassium chloride added
- Normal saline diluted to half-strength with 5% glucose(dextrose)

— None of these solutions is as effective as Ringer's lactate or Hartmann's solution.

6.1.3 MAINTAINING NUTRITION

It has been shown that there is no physiological reason for discontinuing food during bouts of diarrhoea and that continued nutrition is beneficial. Continued feeding should be encouraged.

6.1.4 PHARMACOLOGICAL MANAGEMENT

Note that 50–60% of acute gastroenteritis is viral. Also note the following:

- ♦ Always treat the fever and consider other diseases associated with diarrhoea (e.g., malaria, otitis media, pneumonia).
- ♦ Antimicrobial drugs should be used only as follows:
 - Antibiotics only for dysentery and suspected cholera with severe dehydration.
 - Antiprotozoal drugs (e.g., metronidazole) for suspected amoebiasis only after antibiotic treatment of bloody diarrhoea has failed or feaces shows trophozoites of *E. histolytica*.
 - Antiparasitic drugs for giardiasis when diarrhoea has lasted over 14 days and cysts or trophozoites of giardia are seen in feaces.
- ♦ Antibiotics for specific intestinal infections are listed in Table 6.3.

Table 6. 3 Antibiotics used in the treatment of diarrhoea

Aetiology/Clinical features	Management
Cholera: Very profuse watery diarrhoea (rice-water stools), frequent vomiting	Doxycycline: 100mg BD x 7 days OR Erythromycin: 250mg QDS x 5days
Shigella dysentery: Blood & mucus days in stools, cramps, tenesmus, fever days Tabs Ciprofloxacin 500mg OD x 5 days	Cotrimoxazole: 960mg BD x 5 Amoxicillin: 500mg QDS x 5
Intestinal amoebiasis: Acute amoebic dysentery: As with shigella, but usually no fever (except amoebic liver abscess)	Metronidazole: 800mg TDS x5–10 days OR Tinidazole 2g OD for 3days
Acute giardiasis: Prolonged diarrhoea, often marked eructation (belching), flatulence	Metronidazole: 800mg TDS x 5–10days OR Tinidazole 2g OD for 3 days

Prevention

- ◆ Proper sanitation: Provision of safe drinking water in sufficient quantities and disposal of feaces.
- ◆ Hygiene during food preparation. Remember the 4C's, Clean hands, Clean food, Clean utensils, Clean storage.
- ◆ Cholera vaccine.

6.2 Gastritis

This is an acute ulceration of the stomach, usually multiple lesions, non- recurrent, and self-limiting.

Aetiology.

Drugs (NSAIDs), alcohol, acute stress associated with massive burns, head injuries.

Clinical Features

Epigastric pain with or without vomiting. May follow ingestion of drugs and herbal preparations. Heartburn maybe a feature. Examination reveals tenderness in the epigastrium and the regions around it.

Investigations

Not always necessary if cause is obvious. Otherwise, refer to higher level.

Management

- ◆ Treat the primary disease, e.g., head injury, renal failure.
- ◆ Avoid drugs known to cause ulceration.

- ◆ Magnesium trisilicate tabs 2–4 QDS or frequently **OR** mist antacids 30ml 1 hour and 3 hours after meals. Adjust dose according to pain.
- ◆ Role of triple therapy (see Section 6.4, below, on peptic ulcer disease).

6.3 Gastro-Oesophageal Reflux Disease (GORD)

Physiological process characterized by effortless movement of gastric contents from the stomach to the oesophagus. Symptoms and pathology occur when the oesophageal mucosa has excessive contact with gastric contents as a consequence of continual failure of anti-reflux mechanism.

Clinical Features

- ◆ Heartburn is the characteristic symptom of GORD, with or without regurgitation of gastric contents into the mouth.
- ◆ There is pain on swallowing hot drinks or alcohol.
- ◆ Esophagitis causes bleeding, which can be massive.
- ◆ Peptic stricture causes gradually progressive dysphagia.
- ◆ Aspiration of gastric contents can result in aspiration pneumonia.
- ◆ Oesophageal ulcers cause same type of pain as gastric or duodenal ulcer.

For any investigation not available in this level, refer to level 4 and above for diagnosis confirmation

Diagnosis

- ◆ Detailed history points to the diagnosis.
- ◆ Refer suspected cases for further investigations and management.
- ◆ Oesphagoscopy: With oesophageal washing or biopsy confirms diagnosis

6.4 Peptic Ulcer Disease

Ulceration of gastroduodenal mucosa that has tendency to be chronic and recurrent. Can be duodenal or gastric.

Clinical Features

- ◆ **Duodenal ulcer**
 - Epigastric pain, typically at night and when hungry.
 - May present for the first time with complications [see later in this section].
 - Wide individual variation in symptoms and food that give pain.
 - 95% of duodenal ulcers are caused by Helicobacter pylori (H. pylori).
- ◆ **Gastric ulcer**
 - Epigastric pain, worse with food
 - Other features as in duodenal ulcer above

Investigations

- ◆ Stool for occult blood. Refer for further investigation.
- ◆ For any investigations not available at this level, refer to a higher level for diagnosis confirmation.

Management

- ◆ Avoid any foods that, to the patient's experience, give pain.
- ◆ Avoid obviously acidic foods, e.g., cola drinks.
- ◆ Limit alcohol intake and smoking.
- ◆ Bed rest in acute attacks.
- ◆ Avoid gastric irritating drugs (NSAIDs).
- ◆ Give antacids: magnesium-based antacids or combined magnesium-aluminum compounds, liquid preferred. Maximum dose is 6 tablets a day. Adjust dose to limit pain.
- ◆ If no response, give cimetidine 800mg 4–6 weeks then 400mg or as maintenance.
- ◆ Aim for H. pylori eradication by triple therapy.

For any treatment option not feasible at this level, refer to level 4 or higher facility for the required treatment as below.

Other proton pump inhibitors such as esomeprazole can be used instead of omeprazole.

Complications

Hematemesis, obstruction, perforation, penetration to the pancreas, malignancy.

6.5 Upper GIT Bleeding

Bleeding from the GIT above the ligament of Treitz.

Aetiology

- ◆ Oesophageal varices
- ◆ Gastritis and gastric ulcers
- ◆ Duodenal ulcers
- ◆ A-V malformation
- ◆ Malignancies – stomach and oesophagus
- ◆ Mallory-Weiss syndrome
- ◆ Polyps

Clinical Features

Vomiting of fresh bright blood or coffee-ground vomitus (haematemesis). Forceful vomiting followed by haematemesis suggests gastroesophageal junction tear. Excessive alcohol intake or ingestion of anti-inflammatory drugs may suggest erosive gastritis, while previous epigastric pain suggests peptic ulcer. In massive haemorrhage, blood may appear per rectum.

Investigations

- ◆ For any investigation not available in this level, refer to level 4 and above for diagnosis confirmation.
- ◆ Haemoglobin, platelet count
- ◆ Investigate as per cause, if obvious, eg., liver function test in liver disease

Management

- ◆ Set up large IV line, start infusion of normal saline.
- ◆ Group and cross-match at least 3 units of blood.
- ◆ Perform nasogastric suction to assess blood loss.
- ◆ Infuse fluids to maintain normal pulse, blood pressure, and urine output and substitute with whole blood as soon as possible.
- ◆ Assess any further loss of blood as evidenced by: persistent tachycardia, postural hypotension, continuing haematemesis.
- ◆ Admit all patients with haematemesis.

For any treatment option not feasible at this level, refer to level 4 or higher facility for the required treatment like surgery.

6.6 Lower GIT Bleeding

This may be frank bleeding (haematochezia) or occult bleeding, depending on the cause.

Common Causes

- ◆ Haemorrhoids
- ◆ Anal fistula and fissures
- ◆ Tumours:
 - Benign: polyps, leiomyoma, fibromas
 - Malignant
- ◆ Infections
 - Bacterial: shigella, campylobacter, salmonella
 - Protozoa: amoebiasis
 - Parasite: schistosomiasis
- ◆ Trauma
- ◆ Angiodysplasia
- ◆ Inflammatory bowel disease (Crohn's disease and ulcerative colitis)
- ◆ Diverticular disease
- ◆ Bleeding disorders.

Investigations

For any investigation not available in this level, refer to level 4 and above for diagnosis confirmation.

- ◆ Haemogram and ESR
- ◆ Stool for microscopy C&S
- ◆ Double contrast barium enema

Management

- ◆ Group and cross match if necessary.
- ◆ Treat the cause identified.
- ◆ Refer to the surgeons any suspicious rectal bleeding.
- **No physical examination is complete without a rectal examination.**

6.7 Pancreatitis

Pancreatitis is an inflammation of the pancreas. There are two forms of pancreatitis:

- ◆ Acute pancreatitis is a sudden and short bout of inflammation
- ◆ Chronic pancreatitis is ongoing inflammation.

6.7.1 ACUTE PANCREATITIS

Clinical features

- ◆ Moderate to severe upper abdominal pain that may spread to the back.
- ◆ Pain that comes on suddenly or builds up over a few days.
- ◆ Pain that worsens when eating and relieved when leaning forward lying in a fetal position.

- ◆ Swollen, tender abdomen
- ◆ Nausea and vomiting
- ◆ Fever
- ◆ Increased heart rate

6.7.2 CHRONIC PANCREATITIS

- ◆ Constant, sometimes disabling pain that spreads to the back.
- ◆ Unexplained weight loss.
- ◆ Foamy diarrhea with visible oil droplets (steatorrhea).
- ◆ High blood sugar, if insulin-producing pancreas cells are damaged.

Diagnosis

For any investigation not available in this level, refer to level 4 and above for diagnosis confirmation.

- ◆ Ultrasound
- ◆ Oral glucose tolerance test
- ◆ Stool tests

Treatment

- ◆ Intravenous (IV) hydration
- ◆ Analgesics
- ◆ Antibiotics

For any treatment option not feasible at this level, refer to level 4 or higher facility for the required treatment as surgical intervention

6.7.3 IRRITABLE BOWEL SYNDROME

This is a common chronic disorder that affects the large intestine.

Clinical features

- ◆ Cramping,
- ◆ Abdominal pain,
- ◆ Bloating,
- ◆ Diarrhea or constipation, or both.

Investigations

- ◆ Clinical Presentation
- ◆ For any investigation not available in this level, refer to level 4 and above for diagnosis confirmation.
- ◆ Stool Exam (Microscopy) to rule out infection
- ◆ Lactose intolerance tests
- ◆ X-ray to R/O other abdominal conditions

Management

- ◆ There is no definitive treatment for the condition.
- ◆ Treatment aimed at symptomatic relief.
- ◆ Lifestyle remedies aimed at relieving the condition include;
 - Participating in regular physical exercise
 - Cutting back on caffeinated beverages that stimulate the intestines
 - Eating smaller meals
 - Minimizing stress (talk therapy may help).

For any treatment option not feasible at this level, refer to level 4 or higher facility for the required treatment.

Prevention

- ◆ Avoid deep-fried or spicy foods.

6.8 Inflammatory Bowel Disease

Inflammatory bowel disease (IBD) is a group of disorders that cause chronic inflammation (pain and swelling) in the intestines. IBD includes Crohn's disease and ulcerative colitis.

Causes of IBD

- ◆ Genetics: family history of the disease
- ◆ Immune system response: food mistaken for foreign substances
- ◆ Environmental triggers: exposure to an environmental triggers like smoke, stress, medication use, depression etc.

Investigations

For any investigation not available in this level, refer to level 4 and above for diagnosis confirmation.

- ◆ Stool test
- ◆ Abdominal X-ray

Management

- ◆ Mild disease requires only symptomatic relief and dietary manipulation.
- ◆ Mild to moderate disease can be managed with 5-aminosalicylic acid compounds, including olsalazine and mesalamine.
- ◆ Mesalamine enemas and suppositories are useful in treating proctosigmoiditis.
- ◆ Metronidazole may be required in patients with Crohn's disease.
- ◆ Corticosteroids are beneficial in patients with more severe symptoms.
- ◆ Inflammatory bowel disease in pregnant women can be managed with 5-aminosalicylic acid compounds and corticosteroids.
- ◆ For any treatment option not feasible at this level, refer to level 4 or higher facility for the required treatment as necessary.

6.9 Ascites

This is an abnormal accumulation of fluid within the (peritoneal) cavity.

Causes

- ◆ Liver cirrhosis
- ◆ Cancer within the abdomen
- ◆ Congestive heart failure
- ◆ Tuberculosis
- ◆ Renal failure
- ◆ Chronic (long standing) pancreatitis

Clinical Features

- ◆ Abdominal pain
- ◆ Bloating
- ◆ Shortness of breath
- ◆ An abnormally enlarged belly
- ◆ Nausea
- ◆ Less hungry feeling than usual
- ◆ Tiredness/exhaustion
- ◆ Breathlessness
- ◆ Urinary urgency and constipation

Investigations

- ◆ Physical examinations
- ◆ Urea, electrolytes and creatinine
- ◆ Abdominal ultrasound
- ◆ For any investigation not available in this level, refer to level 4 and above for diagnosis confirmation.

Management

- ◆ Treatment of the underlying condition
- ◆ Relieving the symptoms; Ascetic tap, diuretics
- ◆ Supportive measures including; reduce salt intake, amount of fluids intake, alcohol intake etc.

6.10 Cholecystitis

Cholecystitis is inflammation of the gallbladder that occurs most commonly because of an obstruction of the cystic duct by gallstones arising from the gallbladder (cholelithiasis).

Clinical Features

- ◆ Tenderness in the abdomen when it's touched. Pain begins in the mid to upper right abdomen and may spread to the right shoulder blade or back.
- ◆ Nausea and bloating.
- ◆ Vomiting.
- ◆ Fever above 100.4 F (38 C)
- ◆ Chills.
- ◆ Abdominal pain that gets worse when taking a deep breath.
- ◆ Abdominal pain and cramping after eating – especially fatty foods.
- ◆ Jaundice

Investigations

- ◆ Abdominal ultrasound
- ◆ For any investigation not available in this level, refer to level 4 and above for diagnosis confirmation.

Management

- ◆ Fasting, to rest the gallbladder
- ◆ IV fluids to prevent dehydration.
- ◆ Analgesics.
- ◆ Antibiotics to treat infection
- ◆ For any treatment option not feasible at this level, refer to level 4 or higher facility for the required treatment as below.

6.11 Viral Hepatitis

This is liver inflammation caused by viruses, including hepatitis A,B,C,D (delta), and E.

- ◆ Hepatitis A and D are transmitted through the fecal oral route; the rest are by blood and blood products. The hepatitis A virus causes an acute hepatitis, which is usually self-limiting, while the rest can go to the chronic stage.
- ◆ Chronic B and C infections can lead to cirrhosis and hepatocellular carcinoma.

Clinical Features

Symptoms and signs of acute hepatitis include yellowness of eyes, fever, nausea, anorexia, vomiting, right upper quadrant pain. Physical examination reveals upper abdominal tenderness.

Investigations

For any investigation not feasible at this level, refer to level 4 or higher facility for the required tests like for hepatitis B, Hepatitis B surface antigen.

Management

- ◆ General: supportive of liver function.
- ◆ For any treatment option not feasible at this level, refer to level 4 or higher facility for the required treatment.

Prevention

- ◆ Hygiene
- ◆ Safer sex practices
- ◆ Vaccination
- ◆ Precaution in handling biological fluids and laboratory equipment
- ◆ Vaccination against hepatitis A and B

6.12 GIT Parasitic Infestations

6.12.1 AMOEIASIS

An infection usually of the colon caused by *Entamoeba histolytica*. Most cases can be prevented if at level 1 strict attention is paid to personal hygiene, availability of clean, uncontaminated water, environmental sanitation and waste disposal.

Clinical Features

Presents in the form of amoebic dysentery. Amoebic liver abscess. Amoebiasis and “vague” abdominal complaints. Asymptomatic cyst carrier.

Investigations

- ◆ Stool for microscopy—trophozoites with ingested RBCs and cysts of *entamoeba histolytica* in amoebic dysentery
- ◆ Chest x-ray
- ◆ Full haemogram
- ◆ Liver ultra-sound scan
- ◆ Needle aspiration for microscopy in amoebic liver abscess
- ◆ For any investigation not available in this level, refer to level 4 and above for diagnosis confirmation

Management

- ◆ Amoebic dysentery:
 - Correct dehydration
 - Give metronidazole 400mg TDS for 5 days
- ◆ Amoebic liver abscess
 - Give metronidazole 750g OD for 3–5 days
 - Refer pointing abscesses for surgical drainage
- ◆ Amoebiasis and “vague” abdominal complaints:
 - Where amoebiasis is common, there is a tendency to blame any abdominal complaints on amoeba. Usually these patients have cysts in stool but no evidence of invasive disease, e.g., ingested RBC in trophozoite. Exclude other causes of abdominal pain.

- ◆ Asymptomatic cyst carriers:
 - Treat cyst carrier only if patient is a food handler. Use diloxanide furoate 500mg twice daily for ten days, or a combination of diloxanide furoate with metronidazole (entamizole) 1 tab 3 times a day for 10 days.

Prevention

- ◆ Provision of safe drinking water and sanitary disposal of feaces are important preventive measures.
- ◆ Regular examination of food handlers and appropriate treatment when necessary.

6.12.2 INTESTINAL WORMS

These infections comprise a large group of parasitical cestodes, schistosomes, flukes, nematodes, and filarial worms. Only nematodes are dealt with in this section. They include hookworm disease, ascariasis, enterobiasis, trichuriasis, trichostrongyliasis, anisakiasis, capillariasis, and gnathostomiasis. Still, only the common ones are highlighted. Table 6.4 (overleaf) summarizes the most common worm infections with their clinical features and the method of detection.

Management

Management of the more common intestinal worms is summarized in Table 6.5.

Table 6. 4:Common intestinal worms – Features and investigations

Worms	Clinical features	Investigations
Ascaris lumbricoides (roundworms): Large round, cream-coloured worms that live in the small intestines	<ul style="list-style-type: none"> ● Infection by swallowed embryonated eggs ● Loeffler's syndrome ● Mild bouts of recurrent colic ● The mother has seen the worm in stool or vomitus ● Complications such as obstruction, vomiting may occur 	Stool for ova
Hookworms (Ancylo. duodenale, Necator. americanus, etc)	<ul style="list-style-type: none"> ● "Ground itch" ● Features of anaemia (iron deficiency) 	Stool for ova Haemogram
Trichuris trichiura (whipworms)	<ul style="list-style-type: none"> ● Diarrhoea with blood ● Rectal prolapse ● Anaemia ● Wasting 	Stool for ova Worms may be seen adhering to rectal mucosa
Strongyloides stercoralis	<p>Most infections are asymptomatic, but the following may occur:</p> <ul style="list-style-type: none"> ● Larva currens(buttocks) ● Soiling of inner wear with stool ● Hyper infection syndrome ● Diarrhoea ● Gram-negative septicaemia ● Bacterial peritonitis ● Encephalitis 	Direct stool microscopy (motile larvae, adult worms)
Enterobius vermicularis oxyuriasis (pin worm) Synonyms: Threadworm, pinworm, seat worm. The worm is 4mm long and is just visible to the human eye	<p>Mode of spread <i>Auto-infection:</i></p> <ul style="list-style-type: none"> ● Direct anal to mouth transfer via the fingernails ● Retro- infection; eggs may hatch into larvae at the anal-rectal area. Then larvae move retrogradely to the caecum. <p><i>Cross infection:</i></p> <ul style="list-style-type: none"> ● Contamination of fingers by cloth- ing, objects, toilet seats,etc. ● By inhaling and swallowing eggs in the dust ● Main presentation: perianal and perineal itching. Migrating larvae may cause: ● Vaginitis, vulvitis, salpingitis, and peritonitis ● Irritation, insomnia may occur 	Stool for ova Ova can be obtained from the perianal region by use of adhesive tape
Taenia saginata (beef tapeworm)	<ul style="list-style-type: none"> ● Non-specific symptoms, irritability ● Segment may be passed with stools ● Egg in stools 	Stool for ova (motile proglottides)

Table 6. 5: Management of intestinal worm infections

Worms	Adult doses
Ascaris lumbricoides (roundworm)	Albendazole 400mg STAT OR Levamisole 2.5mg/kg as a single dose
Ancylostomatidae spp.(hookworm)	Albendazole 400mg STAT OR Levamisole 2.5mg/kg as single dose
Trichuris trichiura (whipworm)	Albendazole 400mg STAT
Strongyloides stercoralis	Albendazole 400mg BD x 3 days
Enterobius vermicularis (pinworm)	Mebendazole 500mg STAT; Levamisole 2.5mg/kg as single dose REPEAT AFTER 10 DAYS
Taenia saginata (beef tapeworm)	Praziquantel 25mg/kg/dose ; Albendazole 400mg once daily for 3 days

7. Infections (Selected) and Related Conditions

7.1 Parasitic Infections

Parasitic, bacterial, fungal, and viral infections are leading causes of morbidity and mortality. Accurate diagnosis and appropriate, cost-effective treatment are essential. Individual infections are discussed depending on their clinical importance.

7.1.1 MALARIA

Malaria parasites are usually transmitted by the bite of an infected female anopheles mosquito. *Plasmodium falciparum* is the commonest in Kenya and is associated with significant morbidity and mortality. The other species are: *P. malariae*, *P. vivax*, and *P. ovale*.

Clinical Features

Occurs in two forms based on severity:

Uncomplicated Malaria

Classically malaria presents with paroxysms of fever, chills, rigors and sweating. Other features include malaise, headache, myalgia, joint pains, refusal to feed, nausea, vomiting, abdominal discomfort, and diarrhoea.

Severe (or complicated) Malaria

Severe malaria presents with a combination of most of the above plus either one or more of the following:

- ◆ Parasitaemia>5%
- ◆ Anaemia Hb <5g%
- ◆ Cerebral malaria manifesting as confusion, stupor, convulsions, or coma
- ◆ Jaundice
- ◆ Hyperpyrexia, temperature>39°C
- ◆ Hypoglycaemia (blood sugar<2.2mmol/L)
- ◆ Pulmonary oedema
- ◆ Disseminated intravascular coagulopathy (DIC – spontaneous bleeding)
- ◆ Malaria haemoglobinuria (cola coloured urine)
- ◆ Oliguria
- ◆ Hypovolaemic shock
- ◆ Fluid electrolyte imbalance

Any room for malaria Rapid Diagnostic Test (RDT)

◆ OPD cases:

- Thick blood smear for malaria parasites (may require several slides)

◆ Inpatient cases:

- Thin blood smear for parasite count, species identification and RBC morphology: haemoglobin, blood sugar, urinalysis

Note: A *negative slide does not necessarily rule out malaria*. Where cerebral malaria is suspected appropriate therapy must be instituted promptly.

Exclude other diseases, e.g., meningitis, that may present with similar features. Do not assume a positive slide explains the cause of a febrile illness: 20–30% of the normal population in endemic parts of Kenya will have positive slide for malaria parasites without symptoms and signs of malaria.

Management

Refer to Table 7.1 for a summary of the management of uncomplicated malaria in children.

Table 7. 1 Uncomplicated malaria in children

Weight of patient	Number of tablets per dose	Content of artemether (A) + lumefantrine (L)	Doses required
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5–14kg	1	20mg A + 120mg L	Twice per day for 3 days
15–24kg	2	40mg A + 240mg L	Twice per day for 3 days
25–34kg	3	60mg A + 360mg L	Twice per day for 3 days
35+ kg	4	80mg A + 480mg L	Twice per day for 3 days

Table 7. 2: Dosage of intra-muscular injection of quinine hydrochloride

Weight range (kg)	Volume of quinine injection (ml)	No. of injection sites
31 – < 36	3.2	2
36 – < 41	4.0	2
41 – < 46	4.5	2
46 – < 51	5.0	2
51 – < 56	5.5	2
56 – < 60	6.0	2
60 +	6.0	2

Dilution to 100mg/ml with 4 ml water for injection

Use 10ml sterile syringe. Draw up 4ml of sterile water for injection. Then into the syringe, draw up 600mg (2ml) from an ampoule of quinine and shake. The syringe now contains 100mg quinine per ml.

NOTE: Each injection should not be more than 3ml per injection site.

The dose for adults above 60kg should not exceed 600mg.

- ◆ Quinine hydrochloride may be given IM in emergencies.
- ◆ Oral quinine may be introduced intragastrically by NG tube in situations when parenteral quinine is not available.

Refer patient if the following conditions are present or persist:

- ◆ Patient is in renal failure—oliguria and rising blood urea. Or any major complication.
- ◆ Case is complicated and you have no general support facilities (IV, blood transfusion): coma, convulsions, signs of renal involvement (oliguria).

Chemoprophylaxis

- ◆ Anti-malaria prophylaxis should be given to the following groups when going to malaria prone areas:
 - All non-immune visitors to malarious areas:
 - Long-term residence >4weeks
 - Short-term residence <4weeks
 - Patient with sickle cell disease and thalassaemia
 - Children with impaired immunity (e.g., HIV, leukaemia)
 - Patients with hyperimmune malaria syndrome, leukaemia or splenectomy
 - Pregnant women (minimum of 2 IPT doses)
- ◆ Chemoprophylaxis regimen:
 - General: Current recommended antimalaria prophylaxis for those at risk is proguanil 100g OD or Doxycycline100mg starting 2 weeks before travel to a malaria endemic area and continued for up to 4 weeks after return to a non malarious area.

Patient Education

- ◆ Put on clothes that cover all exposed parts of the body in the evenings.
- ◆ Use long lasting insecticide treated nets (LLINs)—especially for children below age 5 years and pregnant women.
- ◆ As a community effort, participate in indoor residual spraying (IRS) in epidemic prone areas, clear brush around dwellings, empty/drain mosquito breeding places (stagnant pools, discarded containers, old tyres, coconut shells, etc.).

7.1.2 TRYPANOSOMIASIS (SLEEPING SICKNESS)

It is a zoonotic disease caused by *Trypanosoma brucei*, which is transmitted by bites of tsetse fly (*glossinaspp*). There are 2 types in Africa: *T. brucei rhodesianse* (East Africa) and *T. brucei gambiense* (West Africa).

Clinical Features

Disease caused by *T. brucei rhodesianse* is an acute febrile illness complicated by myocarditis and meningoencephalitis that is rapidly fatal if not treated. *T. brucei gambiense* causes a chronic debilitating illness with mental deterioration and physical wasting.

Management

Refer all suspected cases.

7.1.3 LEISHMANIASIS

The disease occurs in two forms:

VISCERAL LEISHMANIASIS

Disease caused by *Leishmania* species. Visceral leishmaniasis (kalaazar) is caused by *Leishmania donovani*. It is transmitted by a sandfly, which has an animal reservoir in domestic dogs and other canines.

Clinical Features

Presents with a massive enlargement of spleen and liver, anaemia, as well as wasting despite a good appetite. It occurs as an opportunistic infection in the immunocompromised.

Management

Refer all suspected cases.

CUTANEOUS LEISHMANIASIS

Not common in Kenya. Caused by *Leishmania tropica*.

Clinical Features

Presents as ulcers or skin lesions that may be confused with fungal disease or even neoplasm.

Management

Refer all suspected cases.

7.1.4 TOXOPLASMOSIS

Caused by *T. gondii*. Common in immunocompromised persons. Transmitted by blood products, ingestion of contaminated foods, tissue and organ transplantation, and laboratory accidents.

Clinical Features

Presents with lymphadenopathy, CNS, and ocular manifestations.

Management

Refer all suspected cases.

7.1.5 SCHISTOSOMIASIS

Infection with blood flukes of the genus *Schistosoma*, which may cause chronic disease of intestines, liver, and genitourinary tract. Adult flukes are white worm-like creatures that inhabit parts of the venous system of humans. All need a molluscan intermediate host. Important species of schistosomiasis in Kenya are:

- *S. haematobium* and *S. mansoni*. Adult worms live and copulate within the veins of the mesentery. For *S. mansoni*, the sexually mature ones are found mainly in the intestinal veins, while those of *S. haematobium* are mainly located in the venous plexus of the genitourinary tract. Some eggs may penetrate the intestinal or bladder mucosa and are passed in feaces or urine.
- Eggs hatch in fresh water, liberating cercariae that multiply in snails (intermediate host) and produce thousands of cercariae. These penetrate human skin within a few minutes after exposure and transform into schistosomes, which develop into sexually active adult worms in the intestinal veins or venous plexus of genito- urinary tract depending on the species. The life span of adult worms ranges from 3 to 37 years. *S. haematobium* is common along the coastline, Tana River, Kwale, and Lamu. *S. mansoni* is widespread, particularly in Machakos, rice schemes (Mwea), and parts of Nyanza (Ahero) and even Nairobi due to movement of people.

Clinical Features

Acute dermatitis and fever after exposure is a rare presentation. Occasionally transverse myelitis and convulsions may occur. In the case of *S. mansoni*, chronic schistosomiasis may result in portal hypertension, splenomegaly, anaemia, and oesophageal varices. Terminal haematuria, dysuria, progression to obstructive uropathy, and bladder cancer may occur in the case of *S. haematobium*.

Metastatic eggs can be found in other organs such as the spinal cord and brain. *Salmonella* infection in patients with schistosomiasis is difficult to eradicate until the schistosomiasis has been treated. *Salmonella* infection may present as recurrent pyrexia.

Investigations

- ◆ *S. mansoni*: Stool for ova, use concentration or Kato technique
- ◆ *S. haematobium*: Urine for RBC and for ova of *S. haematobium* hatching test

Management

Praziquantel 40mg/kg BD for a day (effective against all types).

NB: Patients should be examined for living eggs; if positive, re-treat.

7.1.6 FILARIASIS

Arthropod-borne diseases caused by thread-like nematodes that in their mature adult stage reside in lymphatic or connective tissue (see Table 7.3 for a summary).

Management

- ◆ Refer all suspected cases.

Prevention

Vector control: Avoid bites of mosquitoes, ticks, fleas, mites, and other vectors.

Table 7.3: Summary of species, vectors, and pathologies for filariasis

Disease

Species	Vector	Pathology	
<i>Wuchereria bancrofti</i>	Mosquitoes	Lymphatic (elephantiasis) and pulmonary	
<i>Brugia malayi</i>	Mosquitoes	Lymphatic (elephantiasis) and pulmonary	
<i>Brugia timori</i>	Mosquitoes	Lymphatic (elephantiasis)	
<i>Onchocerca volvulus</i>	Black fly	Skin, eye, and lymphatics	<i>Loa loa</i>
	Deer fly	Allergy	
<i>Mansonella perstans</i>	Midges	Allergy	
<i>Mansonella streptocerca</i>	Midges	Skin	
<i>Mansonella ozzardi</i>	Midges	Vague	

7.2 Viral Diseases

7.2.1 MEASLES

Measles occurs mainly in children. Although it is rare in adults, in this case it carries much higher mortality rates. For full description see paediatric section.

7.2.2 VIRAL HAEMORRHAGIC FEVERS

As summarized briefly in Table 7.4, these are viral infections characterized by fever and haemorrhage.

~ Refer all suspected cases immediately. Notify the sub county Medical Officer of Health.

Table 7. 4: Summary of viral haemorrhagic fevers.

Condition.	Vector	Clinical manifestations	Management
Yellow fever	Aedes mosquitoes	Severe fever Jaundice Vascular permeability, shock, and DIC Diagnosis: Blood and liver examination for viruses	Treatment is supportive
Dengue fever	Aedes mosquitoes	Severe fever Vascular permeability, shock, and DIC Diagnosis: RT-PCR for virus	Treatment is supportive
Tick borne diseases	Ticks	Severe fever Vascular permeability, shock, and DIC Diagnosis: Blood and tissue Examination	Treatment is supportive
Congo Crimean fever	Contaminated Material	Severe fever Vascular permeability, Shock, and DIC	Treatment is supportive
African	Marbug and	Fatal haemorrhagic, fever Rash, hepatic and pancreatic	Treatment is supportive

Haemorrhagic Ebola viruses inflammations
fevers

7.3 Bacterial Infections

7.3.1 SALMONELLA INFECTIONS

These are diseases caused by the following salmonella: *Salmonella typhi* and *Salmonella paratyphi A, B, and C* commonly cause enteric fever. *Salmonella enteritis* causes gastroenteritis. *S. typhimurium* causes acute food poisoning.

TYPHOID FEVER

Systemic disease caused by *S. typhi*. Typhoid bacilli are shed in the feaces of asymptomatic carriers or in the stool or urine of those with active diseases.

Transmission of typhoid fever is via contaminated food or water by:

- ◆ Direct contamination by feaces or urine.
- ◆ Flies from feaces to food.
- ◆ Healthy carriers who are food handlers.
- ◆ Health personnel through inadequate hygiene when changing soiled linen.
- ◆ Healthy carriers who can shed organisms for more than one year.

Clinical Features

These include high fever, headaches, anorexia, weight loss, diarrhoea, constipation, abdominal tenderness, changes in sensorium, splenomegaly, relative bradycardia, Rose Spots (blanching lesions). A high index of suspicion for typhoid is required when investigating any patient with unexplained fever.

Investigations

- ◆ Widal test: Fourfold rise in spared specimen acquired two weeks apart suggest *S.typhi* infection. Rising titres of O antigen are significant.
- ◆ NB: Only titres of O antibody of 1:160 or more are significant. The diagnostic gold standard should be isolation of bacilli in cultures.

Management

- ◆ Amoxicillin 4–6g or 100mg/kg/day in 3 divided doses for 2 weeks
- ◆ Ciprofloxacin: 500–750mg BD for 14 days

OR

- ◆ Norfloxacin: 400mg BD for 14 days

OR

- ◆ Ceftriaxone: 1g OD IV for 7–14 days

OR

- ◆ Ofloxacin: 400mg BD for 14 days (is available in higher level facilities)

Complications

Refer if patient is not improving or is deteriorating.

Prevention

◆ Health education

◆ Vaccination:

- Live attenuated oral vaccine 4 capsules given on alternate days. Avoid antibiotic for 1 week. NB: contraindicated in immunosuppression cases.
- Typhim VI vaccine – single dose 0.5ml IM (70% efficacy boost every 2–3 years).

7.4 Other Selected Infections and Related Conditions

First and second line antibiotics for a selection of common infections are summarized in Table 7.6.

Table 7.5: Antibiotics for selected common infections

Diagnosis	First line treatment	Second line treatment
Acute rheumatic fever	Benzathine penicillin	Erythromycin
Acute osteomyelitis	Clidamycin Cloxacillin + gentamicin	Cloxacillin + chloramphenicol
Cellulitis	Cloxacillin	
Conjunctivitis (bacterial)	Tetracycline eye ointment	Chloramphenicol eye drops
Dysentery (shigella)	Ciprofloxacin	Ceftriaxone
Ludwig's angina	Benzyl penicillin	
Otitis media	Cotrimoxazole	Amoxicillin
Pneumonia (mild)	Cotrimoxazole	Amoxicillin
Pneumonia (severe)	Benzyl penicillin + gentamicin	Ceftriaxone Amoxicillin + clavulinate Amoxicillin + gentamicin
Septic arthritis	Cloxacillin + gentamicin	Amoxicillin + gentamicin
Urinary tract Infections		
Lower	Cotrimoxazole	Cotrimoxazole
Upper (outpatient)	Amoxicillin + clavulin	Ciprofloxacin
Upper (inpatient)	Gentamicin	

8. Musculoskeletal Conditions

8.1 Non-Specific Arthralgia

Joint pain without features of inflammation.

Clinical Features

General malaise, joint pains, joint mobility not affected, joint not red, not warm, not tender, or only slightly tender. Usually, it is a feature of another illness and careful systemic examination is warranted.

Investigations

None except for the illness of which arthralgia is a feature.

Management

- ◆ NSAIDS such Ibuprofen 400mg 8 hourly **OR** paracetamol 1g 8 hourly.

European League Against Rheumatism (EULAR) defined characteristics describing arthralgia at risk for rheumatoid arthritis.

These parameters are to be used in patients with arthralgia without clinical arthrisitis and without other diagnosis or other explanation for the arthralgia.

History taking

- ◆ Joint symptoms of recent onset (duration <1 year)
- ◆ Symptoms located in metacarpophalangeal joints
- ◆ Duration of morning stiffness >60 min
- ◆ Most severe symptoms present in the early morning
- ◆ Presence of a first-degree relative with rheumatoid arthrisitis

Physical examination

- ◆ Difficulty with making a fist
- ◆ Positive squeeze test of metacarpophalangeal joints

8.2 Rheumatoid Arthritis

A chronic inflammatory disease that affects the joints. It is symmetrical, peripheral, polyarthritic, most commonly involving the small joints of hands, wrists, metacarpophalangeal joints, ankles, knees, and cervical spine.

Clinical Features

- ◆ Articular: Symmetrical peripheral polyarthritis mostly of small joints (warm, painful, stiff, swollen). Stiffness worse in the morning. Muscle wasting. Deformities may occur, including ulnar deviation, boutonniere deformity.
- ◆ Extra-articular: Fever, weight loss, lassitude, anaemia, subcutaneous nodules, splenomegaly, lymphadenopathy, keratoconjunctivitis, pericarditis, pleuritis.

The figure below shows the criteria used for clinical classification of RA.

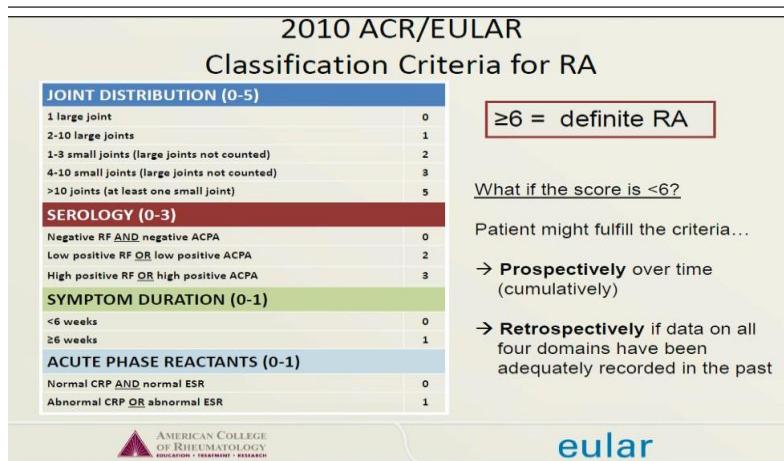


Figure 8:1 Classification criteria for Rheumatoid Arthritis

Investigations

- ◆ Haemogram—Moderate hypochromic, microcytic anaemia; or leucopaenia in Felty's syndrome
- ◆ Acute phase reactants such as ESR or C-reactive Protein—Elevated
- ◆ Rheumatoid factor
- ◆ Anticitrullinated cyclic peptides (ACCP)—highly specific
- ◆ Imaging such as radiographs or ultrasounds of involved joints

Management

- ◆ Initiate physiotherapy or occupational therapy as indicated
- ◆ Provide drug treatment to relieve pain
 - Use of NSAIDs such as Ibuprofen 400mg tabs 8 hourly until pain is relieved. Refer early as NSAIDs do not treat RA sufficiently when used alone
 - Glucocorticoids, especially prednisone at doses not exceeding 10mg/day.
 - Refer for definitive treatment and any systemic organ involvement.
 - Steroids should be used sparingly and correctly.

- ♦ Refer for orthopaedic review if:
 - Deformities are present
 - Disease not responding to non-steroidal anti-inflammatory drugs (NSAIDs).
 - Management of acute exacerbation.
 - Bed rest (may need to splint the affected joint).

Complications

All the systems are involved in this disease. It needs specialist attention, as does the use of steroids or chloroquine. Refer patients.

8.3 JUVENILE IDIOPATHIC ARTHRITIS (JRA)

Clinical Features

Arthritis beginning at or before the age of 16 years and persisting for more than 6 weeks. Tends to affect large and small joints and may interfere with growth and development. Refer to Table 8.1 for a summary of characteristics and the clinical classification.

Management

- ♦ Supportive treatment including Ibuprofen at 10mg/kg every 8 hours; physiotherapy and occupational therapy.
- ♦ Aspirin is used with caution because of concerns about Reyes syndrome. For dosage see under adult treatment or paediatric schedule.
- ♦ Refer for specialist management.

Prognosis

- ♦ JRA is a chronic disease and majority of children will have active disease into adulthood.
- ♦ Those with oligoarticular, ANA+ disease are at high risk for vision threatening chronic anterior uveitis. Thus, there's need for routine ophthalmologic evaluation (3-6 monthly) for children with JRA.
- ♦ Those with polyarticular and RhF positive have a less favourable prognosis. NB: For osteomyelitis and septic arthritis see Chapter 51 (Orthopaedics).

Table 8.1: Summary of juvenile rheumatoid arthritis (JRA)

Characteristic Systemic disease	The clinical classification of JRA noted or observed Pauciarticular	Polyarticular
Percentage	20%	40%
Rheumatoidfactor	-ve	-ve
Antinuclearfactor	-ve	75%
HLAB27		+/-+ve/-ve
Clinicalpresentation	Highfever,rash, splenomegaly, generalized arthritis lymphadenopathy, Younger age serositis, striking leucocytosis, and thrombocytosis	-ve As for adult rheumatoid

8.4 Gout

An inflammatory arthritis, caused by prolonged hyperuricaemia, resulting in the deposition of Monosodium Urate crystals in joints, most commonly the large metacarpophalangeal joint (Big toe). Causes of gout may be primary or secondary (e.g., myeloproliferative, lymphoproliferative disorders, haemolytic anaemia, polycythaemia; tumour lysis syndrome following cytotoxic therapy and thiazide diuretics). Gout is characterized by acute flares lasting a few days, and quiescent periods, termed as intercritical gout.

Clinical Diagnosis

- ♦ Measurement of Serum Uric Acid levels.
- ♦ Normal levels- Males- 420umol/l. Females- 360umol/l
- ♦ Synovial fluid aspiration and examination for Uric acid crystals

Asymptomatic Hyperuricaemia represents high uric acid levels, which may not require treatment. Lifestyle measures may be encouraged. Lifestyle measures to lower serum uric acid involve weight reduction, limiting or lowering alcohol and soft drinks, and limiting purine-rich food such as shellfish and meats.

8.4.1 ACUTE GOUT

Acute gout flares should be treated as early as possible.

Clinical Features

- ♦ Excruciating joint pain, usually single joint commonly the big toe. Pain becomes more severe as attack progresses, but subsides spontaneously in about 4 days. There is erythema and warmth over the affected joint.

Management

- ◆ NSAIDS may be used
 - Ibuprofen 400–800mg 8 hourly. Gastro-intestinal and renal side effects should be considered when using NSAIDs.
- ◆ Refer for definitive management.

8.4.2 CHRONIC TOPHASCEOUS GOUT

People with gout may also develop tophi, where urate crystals collect under the skin in hard, painful lumps; common areas are the pinna and the olecranon bursa. Patients with gout should be assessed and managed for associated comorbidities such as chronic kidney disease and symptoms of cardiovascular disease. Medications such as thiazides, low-dose aspirin, cyclosporine and tacrolimus may lead to high urate levels and should be reviewed often by the specialist.

8.5 Osteoarthritis

This is a degenerative joint disease characterized by cartilage degeneration and bone hypertrophy at the articular margins. It is chronic but does commonly present with acute-on-chronic flares.

Clinical Features

Pain, stiffness, immobility, and “cracking” of the joints. Pain worse towards end of day. Joint tenderness, bony swelling, loss of full range of movement, and crepitus on movement. Heberden’s nodes. Joints commonly involved are cervical and lumbar spines, the knees and hips, as well as the hands and feet. It may also occur secondarily in response to severe or chronic joint injury (e.g., after fractures).

Investigations

- ◆ Haemogram, ESR
- ◆ X-ray, joints – Loss of joint space, osteophytes, marginal bone lipping, bone cysts
- ◆ Arthroscopy
- ◆ MRI scan

Management

- ◆ Resting of joints, including use of crutches; involve physiotherapist.
- ◆ Ibuprofen 400mg tabs 8 hourly until pain is relieved.
- ◆ Others are:
 - Non-selective NSAIDs combined with gastric mucosal protectant.
 - Opioid analgesics such as tramadol may be used but may cause side effects and should be monitored.
 - Use of Intra-articular steroids should be under specialist only.
 - Severe destruction may require joint replacement.
 - Referral for further management.

8.6 Systemic Lupus Erythematosus (SLE)

A multisystemic auto-immune disease that commonly affects females. It has a broad range of clinical and immunologic manifestations. The various clinical symptoms do not always occur simultaneously and may develop at any stage of the disease.

Diagnosis of SLE can be made if a client satisfies 4 of the clinical and immunologic criteria used in the SLICC classification criteria, including at least one clinical criterion and one immunologic criterion, OR if he or she has biopsy-proven nephritis compatible with SLE in the presence of ANAs or anti-dsDNA antibodies.

8.6.1 CLASSIFICATION OF SLE: THE SYSTEMIC LUPUS INTERNATIONAL COLLABORATING CLINICS (SLICC)

Clinical Criteria

- ◆ Acute cutaneous lupus erythematosus (including “butterfly rash”)
- ◆ Chronic cutaneous lupus erythematosus (e.g., localized or generalized discoid lupus erythematosus)
- ◆ Oral ulcers (on palate and/or nose)
- ◆ Non-scarring alopecia
- ◆ Synovitis (≥ 2 joints) or tenderness on palpation (≥ 2 joints) and morning stiffness (≥ 30 min)
- ◆ Serositis (pleurisy or pericardial pain for more than 1 day)
- ◆ Renal involvement (single urine: protein/creatinine ratio or 24-hour urine protein, $>0.5\text{g}$)
- ◆ Neurological involvement (e.g., seizures, psychosis, myelitis)
- ◆ Hemolytic anaemia
- ◆ Leukopenia ($<4000/\mu\text{L}$) or lymphopenia ($<1000/\mu\text{L}$)
- ◆ Thrombocytopenia ($<100000/\mu\text{L}$)

Immunological Criteria

- ◆ ANA level above laboratory reference age
- ◆ Anti-dsDNA antibodies
- ◆ Anti-Sm antibodies
- ◆ Antiphospholipid antibodies (anticardiolipin and anti- β 2-glycoprotein I [IgA, IgC, or IgM] antibodies; false positive VDRL[Veneral Disease Research Laboratory test].)
- ◆ Low complement (C3, C4, or CH50)
- ◆ Direct Coombs test (in the absence of hemolytic anaemia)

For classification as SLE, four criteria (at least one of them clinical and at least one immunological) have to be fulfilled or lupus nephritis has to be diagnosed histologically in the presence of ANA or anti-dsDNA antibodies. The SLICC criteria are not diagnostic criteria.

Management

- ◆ Refer for specialist support.

Comorbidities commonly occur in SLE;

- ◆ Antiphospholipid Syndrome-The presence of a PL is associated with thrombotic and obstetric complications and increased risk of damage.
- ◆ Infections - commonly result in patients with SLE , as a result of the disease or the treatment with immunosuppressive therapy.
- ◆ Cardiovascular disease.

8.7 Systemic Sclerosis

Systemic sclerosis (SSC) is a connective tissue disease, characterized by excessive production and accumulation of collagen, called fibrosis, in the skin and internal organs and by injuries to small arteries.

Diagnosis

- ◆ Mostly clinical; As per the American College of Rheumatology 2013 criteria for classification of systemic sclerosis, Patients with a score of at least 9 points are classified as having systemic sclerosis.

Table 8.2: Classification criteria for systemic sclerosis issued in 2013 by the American College of Rheumatology (ACR) and the European League Against Rheumatism (EULAR)

Criteria	Points
Skin thickening of the fingers of both hands extending proximal to the metacarpophalangeal joints	9
Puffy fingers or Sclerodactyly (skin thickening of the fingers)	2 4
Digital tip ulcers or fingertip pitting scars	2 3
Telangiectasia	2
Abnormal nailfold capillaries	2
Pulmonary arterial hypertension or Interstitial lung disease	2 2
Raynaud's phenomenon	3
Systemic sclerosis-related autoantibodies (anti-centromere, anti-topoisomerase I, anti-RNA polymerase	3

Investigations

- ◆ Kidney function tests
- ◆ ANA profile
- ◆ SS autoantibodies- anti-centromere, anti-topoisomerase, anti-RNA polymerase are specific for the condition
- ◆ Echocardiogram
- ◆ Chest Radiographs and CT scans

Management

- ◆ Specific management of systemic sclerosis may depend on the specific symptom or system affected and complications of systemic sclerosis such as renal crises, pulmonary arterial hypertension may require multidisciplinary and specialist review.
- ◆ Referral for specialist management is advised.

8.8 Large Vessel Vasculitides

Large-vessel vasculitis includes giant cell arteritis (GCA) and Takayasu's arteritis (TAK). Early diagnosis of these two diseases is quite challenging in clinical practice and may be accomplished by combining the patient symptoms, physical examination findings, blood test results, imaging findings, and biopsy results, if available.

Rapid diagnosis and effective treatment are required in large vessel vasculitis (LVV) to reduce the risk of complications such as blindness in giant cell arteritis (GCA) and aortic aneurysm or vascular stenosis in GCA and Takayasu arteritis (TAK).

8.8.1 GIANT CELL ARTERITIS

GCA affects patients aged over 50, females being affected two to three times more often than males. GCA mainly involves large- and medium-sized arteries, particularly the branches of the proximal aorta including the temporal arteries.

Vasculitic involvement results in the typical manifestations of GCA including temporal headache, jaw claudication, and visual loss. A systemic inflammatory response and a marked response to glucocorticoids is characteristic of GCA. GCA usually remits within 6 months to 2 years from disease onset. However, some patients have a chronic-relapsing course and may require longstanding treatment.

Mortality is not increased, but there is significant morbidity mainly related to chronic glucocorticoid use and cranial ischaemic events, especially visual loss.

All patients presenting with signs and symptoms suggestive of GCA should be urgently referred to a specialist team for further multidisciplinary diagnostic work-up and management.

Untreated active GCA is an emergency and carries a substantial risk of permanent visual loss and other ischaemic complications. It is recommended that all patients ≥ 50 years of age presenting with acute or subacute onset of signs and symptoms suggestive of GCA especially and raised inflammatory markers without explanation (eg, infection) should be referred urgently to a specialist team/experienced centre for further diagnostic work-up.

Management

Refer for specialist management.

8.8.2 TAKAYASU ARTERITIS

Takayasu arteritis (TAK) mainly involves the aorta and its main branches. Women are particularly affected with a female:male ratio of 9:1. In most patients, age of onset is between 20 and 30 years. Early manifestations of TAK are non-specific and include constitutional and musculoskeletal symptoms. Later on, vascular complications become manifest. Most patients develop vessel stenoses, particularly in the branches of the aortic artery, leading to manifestations of vascular hypoperfusion. Aneurysms occur in a minority of cases.

Diagnosis

- ♦ Inflammatory markers- ESR, CRP

Management

- ♦ Refer for specialist management.
- ♦ Surgical review for Revascularization procedures may be required in patients with severe established stenoses or occlusions.

8.9 Chronic inflammatory Muscle Disease

Polymyositis, dermatomyositis and inclusion body myositis are chronic auto-immune, inflammatory muscle diseases, characterized by muscle weakness. The muscles affected are typically those closest to the trunk or torso, affecting both sides of the body. The onset can be gradual or rapid. Patients with inflammatory myopathies have increasing difficulty with tasks requiring the use of proximal muscles, such as getting up from a chair, climbing steps, or lifting objects. Tasks requiring distal muscles, such as buttoning or holding objects, are affected early in inclusion-body myositis but only in advanced cases of polymyositis, dermatomyositis, and necrotizing auto-immune myositis.

Polymyositis is common in females and may have flares or relapses, and periods with minimal or no symptoms, known as remissions.

Dermatomyositis is characterized by distinct skin manifestations accompanying or preceding muscle weakness; the skin manifestations include periorbital heliotrope (blue purple) rash with edema; erythematous rash on the face, knees, elbows, malleoli, neck, anterior chest (in a V-sign), and back and shoulders (in a shawl sign); and a violaceous eruption (Gottron's rash) on the knuckles, which may evolve into a scaling discoloration. The lesions are photosensitive and may be aggravated by ultraviolet radiation. Dilated capillary loops at the base of the fingernails, irregular and thickened cuticles, and cracked palmar fingertips ("mechanic's hands") are characteristic of dermatomyositis. Subcutaneous calcifications, sometimes extruding to the surface of the skin and causing ulcerations and infections, may occur and are especially common among children.

Diagnosis

- ◆ Physical examination of muscle strength- weakness
- ◆ Physical therapy

Management

- ◆ Referrals and follow up care: may be made to rheumatologists and other specialists as needed.
- ◆ Investigation for malignancies may be required.
- ◆ Vaccinations

9. Neoplasms

Neoplasms can be benign or malignant. Malignant neoplasms are also referred to as cancers. They most commonly present as swellings, and at times pain and malfunction of the affected organs or tissues. Neoplasms can occur in any age group. Refer to a higher level.

-Patients with suspected malignancies should be urgently referred to appropriate consultants for diagnostic examinations and treatment.

10. Haematologic Conditions

10.1 Anaemia

Patients with anaemia have a reduction in total red blood cell mass, decreased concentration of red cell (RBC) and haemoglobin (Hb) in the peripheral blood, and a corresponding decrease in the oxygen carrying capacity of the blood. In Kenya, anaemia is generally accepted as Hb <10g%. Degrees of anaemia are categorized as *mild anaemia* at haemoglobin levels of Hb 8–10mg, *moderate anaemia* at Hb 6–7g, *severe anaemia* at Hb 4–5g, while *very severe anaemia* at below Hb 4g. The following are normal Hb levels:

- ◆ Males:13.5–17.5g/dl
- ◆ Females:12.0–16.0g/dl

Common causes of anaemia in Kenya are:

- ◆ Haemolysis due to infections especially malaria and haemoglobinopathies, especially sickle cell disease.
- ◆ Iron deficiency due to chronic blood loss, nutritional deficiency, and intestinal parasites, e.g., hookworm.
- ◆ Bone marrow depression (aplastic anaemia).

Clinical Features

Meticulous history is essential, e.g. a history of previous hospitalization for sickle cell, blood loss due to menorrhagia. Clinical features include irritability, listless- ness, anorexia, easy fatigability, and pallor of the mucous membranes (conjunctivae, lips, tongue), nail beds, and palms. There may be splenomegaly and a short, soft, apical “haemic” systolic murmur. Severe cases may present in heart failure and shock.

Investigations

- ◆ Full haemogram/Hb estimation
- ◆ Thin blood film examination for cell morphology and blood parasites
- ◆ Stool for ova of helminthes, occult blood
- ◆ Urinalysis

Management

Identify the cause and treat:

- ◆ Malaria:
 - Give a full course of an appropriate antimalaria drug. Thereafter give antimalaria prophylaxis (see Section 7.1.1 on malaria) for 3 months. If the spleen is palpable, continue prophylaxis until it is not palpable.

◆ Iron:

- Give iron orally if the anaemia is mild or moderate Adults: ferrous sulphate 200mg 8 hourly with folate 5mg once daily, continue for a minimum of 3 months after normal HB levels are reached.
- Give parenteral iron in patients who cannot receive transfusion, with chronic renal failure, or in unavailability of blood. For those who are unable to tolerate oral iron or if compliance is poor, consider iron sucrose or other similar. This also replenishes body stores of iron.
- ◆ Folic acid: Give to all patients who have malaria and anaemia. Dose is 5mg once daily.
- ◆ Hookworm treatment: Give albendazole 400mg STAT for adults.
- ◆ Sickle cell anaemia:
 - Folic acid, malaria prophylaxis (see Section 7.1.1, malaria)

Blood transfusion indications

- ◆ Any patient if the haemoglobin is less than 8g/dl and there is also:
 - More than 20% blood loss (more than 1 litre in an adult).
 - Active bleeding with shock, hypotension, cold extremities, slow capillary refill.
- ◆ Refer any patient with indications for transfusion to a higher level facility.

Urgently refer all patients with:

- ◆ Severe anaemia.
- ◆ Active and severe bleeding.
- ◆ Anaemia (any degree of severity) that is accompanied by pneumonia, heart failure, dizziness, confusion, oedema.

10.2 Sickle Cell Disease (Anaemia)

A chronic haemolytic anaemia found mainly in Nyanza, Western, and Coast regions, characterized by sickle -shaped RBCs as a result of homozygous inheritance of HBS. In HBS, amino-acid valine is substituted for glutamic acid in position 6 of the b-chain. This Hb polymerizes at sites of low partial pressures of oxygen (PO₂) and the RBCs assume the "sickle shape"; they adhere to vascular endothelium and plug small capillaries and arterioles leading to occlusion and infarction. Because sickled RBCs are fragile and cannot withstand the trauma of circulation, haemolysis occurs in the small blood vessels. These abnormal RBCs are also destroyed within the spleen.

Clinical Features

- ◆ Impaired growth and development
- ◆ Susceptibility to infections (malaria, H. influenza, pneumonococcal)
- ◆ Anaemia and mild jaundice
- ◆ Hepatosplenomegaly in young children
- ◆ Bone pain (especially long bones in children)
- ◆ Pain and swelling of the hands and feet (hand and foot syndrome)

- ◆ Arthralgia with fever may occur
- ◆ Avascular necrosis of the femoral head is common
- ◆ Severe abdominal pain with vomiting
- ◆ Occlusion of major intracranial vessels may lead to haemiplegia, cranial nerve palsies and other neurological deficits
- ◆ Acute chest syndromes (sudden onset of fever, chest pain leukocytosis and pulmonary infiltrates on x-ray), which may be fatal
- ◆ Tower shaped ("bossing") skull

Investigations

- ◆ Full haemogram to include peripheral smear, Hb
- ◆ Sickling test

Management

Refer to a higher level.

10.2.1 SICKLE CELL CRISIS

There are 3 types of crises: thrombotic (vaso-occlusive, painful or infarctive), aplastic (sequestration), and haemolytic.

- ◆ Management of the crisis
 - Give IV or oral fluids until they produce dilute urine.
 - Give analgesics regularly. In the acute phase if pain is severe, give narcotic analgesics (e.g., morphine injection 10mg PRN).
- ◆ Treat infections vigorously and promptly if present by use of ceftriaxone 1g IV once daily for 7 days or coamoxiclav 1.2g 8 hourly for 7 days.
 - Treat malaria if present endemic areas.
 - Give supplementary folic acid but AVOID iron.
- ◆ Blood transfusion when required, **refer to higher level facility.**
- ◆ Monitor cardiovascular and renal function
 - If hypotension develops start IV fluids.
- ◆ Hydroxyurea should be given to patients with more than 3 crises per year. This can be started at a dose of 10mg/kg orally and escalated by 5mg/kg to a maximum dose of 25mg/kg/day.

11. Conditions in Pregnancy

11.1 Anaemia In Pregnancy

This is a major obstetric problem in Kenya. In severe anaemia the pregnancy is in danger of abortion, premature labour, or IUD, while in very severe anaemia the mother's life is also in danger. Most cases are due to iron deficiency resulting from dietary deficiency, or blood loss from hookworm infestations, hemolysis due to malaria, and sickle cell disease. Anaemia can also result from folate deficiency due to inadequate intake, and from haemolysis following malaria infection. Iron deficiency and folic acid deficiency often occur together causing "Dimorphic Anaemia".

Clinical Features

General weakness, dizziness, pallor, and oedema. Haemolytic anaemia may be associated with jaundice and hepatosplenomegaly.

Investigations

- ◆ Full haemogram (Hb, PCV, PBF)
- ◆ Stool for hookworm ova and schistosomal ova, where applicable
- ◆ Urine for urobilinogen and schistosomal ova, where applicable
- ◆ Blood slide for malaria parasites
- ◆ Sickling test

Principles of Treatment

Manage as indicated in Table 11.1, with the aim of:

- ◆ Raising Hb (oral or parenteral haematinics, transfusion).
- ◆ Eradicating cause: Correct dietary deficiency, treat malaria, treat hookworms, give haematinics with ferrous sulphate 200mg TDS and folic acid 5mg OD if dietary deficiency exists.
- ◆ Preventing recurrence.

Table 11. 1: Management of anaemia in pregnancy

Severity	Hb (g%)	Management
Mild	8–10	Treat cause Oral haematinics, as for prophylaxis
Moderate	6–7	As above
Severe	4–5	Refer
Very severe	Below 4	Refer

Prevention

- ◆ Prophylaxis iron throughout pregnancy
- ◆ Prophylaxis antimalarial (see Section 11.4 malaria in pregnancy).

11.2 Cardiac Disease In Pregnancy

In Kenya, this is often of rheumatic heart disease origin, involving the valves.

Clinical Features

- ◆ History of rheumatic fever in childhood, known rheumatic heart disease. Features of dyspnoea.
- ◆ Palpitations, body oedema, cough, easy fatigability, evidence of heart enlargement, murmurs, thrills, left parasternal heave, raised jugular venous pressure, tachycardia. Hepatomegaly, ascites and basal crepitations may be present.

Investigations

- ◆ Routine antenatal profile (Hb, VDRL, blood group, urinalysis)
- ◆ Urine for microscopy and culture and sensitivity.

Management

- ◆ Refer to higher level for management.

11.3 Diabetes in Pregnancy

Diabetes mellitus is a metabolic disorder characterized by hyperglycaemia.

Clinical Features

- ◆ **Overt diabetes:** If not already diagnosed the symptoms include polydipsia, polyuria, weight loss, blurred vision, lethargy. Glycosuria is common but not diagnostic.
- ◆ **Gestational diabetes:** This will occur in 1–5% of pregnancies. Historical risk factors include previous gestational diabetes, family history of diabetes, previous macrosomic infant, previous unexplained still birth, polyhydramnios, obesity, advanced maternal age. Glycosuria may be present but is not diagnostic.
- ◆ **Complications of diabetes:** These include chronic hypertension and nephropathy, pregnancy-induced hypertension, foetal macrosomia, intrauterine growth retardation, polyhydramnios, foetus distress, and foetal hypoglycaemia.

Investigations

- ◆ Postprandial blood glucose level

Management

Refer to higher level for appropriate management.

11.4 Malaria in Pregnancy

Falciparum malaria is particularly dangerous in the pregnant women. The clinical features of malaria in pregnancy depend to a large extent on the immune status of the woman, which in turn is determined by her previous exposure to malaria. (Refer also to Section 7.7.1, malaria.)

Clinical Features

- ◆ Non-immune (women from endemic area): These have a high risk of maternal perinatal mortality. Clinical features include acute febrile illness, severe haemolytic anaemia, hypoglycaemia, coma/convulsions, and pulmonary oedema. Abortion, intrauterine death, premature labour, and intrauterine growth retardation are other complications.
- ◆ Semi-immune (women from endemic area): These may be asymptomatic, despite placental infection. They may develop severe anaemia and deliver low birth weight babies. It is more common in primigravidae than multigravidae. One of the dangers of malaria in these settings is that it is not detected or suspected. Antimalarials should form part of the case management of all women with severe anaemia who are from an endemic area, irrespective of whether they have a fever or a positive blood slide (see Section 11.1, above, anaemia in pregnancy).

Investigations

- ◆ As for malaria

Management – Supportive

- ◆ Check blood sugar regularly as hypoglycaemia is a common problem in women with severe disease.
- ◆ Correct dehydration.
- ◆ Carry out evacuation if incomplete/inevitable abortion.
- ◆ Deliver if foetal death or established labour.

Management – Pharmacological

- ◆ For clinical disease it is essential to use the most effective antimalaria drug available.
- ◆ Immediate treatment is essential.
- ◆ For uncomplicated disease: Oral quinine 600mg TDS for 7 days
- ◆ For severe or complicated disease: Quinine IM as 15–20mg/kg body weight or 900–1,200mg. Give oral glucose and then refer to level 4–6.
- ◆ Other drugs that can be used for treatment in pregnancy in the second and third trimesters are artemisinin derivatives.

11.5 Puerperal Psychosis

The following aspects in the patient's history may help to identify high-risk patients and are helpful in facilitating early identification of patients with puerperal psychosis:

- ◆ Family history of major psychological illness of close relative, e.g., mother.
- ◆ Major emotional complications during and after a previous pregnancy.
- ◆ "Reaction" of current pregnancy.
- ◆ "Fear" of labour from a previous experience.
- ◆ Traumatic childhood.
- ◆ Deprivation of emotional support during adult life, e.g., single mother.
- ◆ Severe prolonged or multiple somatic symptoms with no apparent organic cause during current or preceding pregnancy.
- ◆ Major sustained mood changes or repeated rapid mood swings or abnormal sleep patterns.
- ◆ Refer to Mental Illness chapter for clinical features and management.

12. Lower Respiratory Tract Conditions

12.1 Pneumonia –Adults

This is consolidation of the lung parenchyma due to infection.

Clinical Features

Breathlessness, cough with or without sputum which may be rust coloured, fever, pleuritic chest pain. Bronchial breathing, reduced chest movements, reduced breath sounds, tachypnoea, crackles, and percussion dullness. Features less pronounced in the elderly patients.

Classification

- ◆ **Primary:** Occurring in a previously healthy person living in the community. This is usually lobar due to pneumococci. Usually a very short history.
- ◆ **Secondary:** Develops in association with prior respiratory' disease, immunocompromised patients, debilitated patients, alcoholics, or post-operative patients.

Investigations

- ◆ Haemogram – PBF, WBC
- ◆ Sputum microscopy

Management – Community acquired pneumonia

- ◆ For outpatients:
 - Amoxicillin 500mg TDS for 7days
 - If penicillin allergy present: Erythromycin 500mg QDS for 7 days.
 - Alternative antibiotics include cotrimoxazole and tetracycline. Analgesics: Paracetamol **OR** aspirin
- ◆ Refer if:
 - Cyanosis is present.
 - Respiratory distress (**RR** >25 per minute) is present.
 - Heart failure or pleural effusion is present.
 - More than one lobe is involved.
 - There is poor response as outpatient.
 - Patient is dehydrated.
 - Secondary pneumonia is suspected.
 -

12.2 PULMONARY TUBERCULOSIS

Tuberculosis is caused by *Mycobacterium tuberculosis* (M-TB). This is commonly M-TB hominis, but M-TB bovis also causes human infections. Transmission is by droplet infection through coughing and sneezing. The bovine type is mainly contracted by drinking unpasteurized milk. The incidence of TB is on the increase because of its association with HIV/AIDS, poverty, malnutrition, and overcrowding.

Clinical Features

Most cases of tuberculosis in Kenya (80%) are pulmonary. Features of pulmonary tuberculosis are cough for 3 weeks or more, haemoptysis, chest pain, fever and night sweats, weight loss, and breathlessness.

Extrapulmonary tuberculosis symptoms depend on the organs affected. TB adenitis manifests as lymphadenopathy, TB arthritis as painful swollen joints, TB meningitis as meningitis with features of meningitis, TB peritonitis as ascites and TB pleural as pleural effusion.

Investigations

- ◆ Sputum for AAFB (2 sputums pot and early morning).
- ◆ GeneXpert
- ◆ Mantoux test.
- ◆ Chest x-ray.
- ◆ Lymph node biopsy.
- ◆ Fine needle aspirate of lymph nodes.
- ◆ Body fluids for biochemistry and microscopy (CSF,pleural,pericardial, and peritoneal fluids).
- ◆ Sputum for AAFB culture and sensitivity (before the start of treatment in those on treatment and suspected drug resistantTB).

Management

The success of tuberculosis treatment depends on strict adherence to WHO's DOTS (directly observed treatment short-course) strategy.

General Management

- ◆ Follow national treatment guidelines.
- ◆ Ensure adequate supply of drugs.
- ◆ Use correct regimens and dosages.
- ◆ Ensure regular patient attendance.
- ◆ Always supervise initial phase of treatment.
- ◆ Trace defaulters promptly.
- ◆ Maintain accurate patient information and clinic attendance records.

Pharmacological Management

Pharmacologic management depends on the classification of the patient and the presence of other conditions, such as HIV.

Classification of TB Patients. Patients are classified into the following groups for epidemiological and treatment reasons depending on the site, microbiology, severity of disease, and history of previous treatment. These same categories are used in the TB register for reporting:

- ◆ New (N): Patient who has never been treated for TB before.
- ◆ Relapse(R): Patient who has received treatment and was declared cured, but now has TB again.
- ◆ Transferred in(TI):Patient who was registered in another county initially and has now reported to continue treatment.
- ◆ Treatment resumed(TR):Patient who interrupted treatment, and was declared “out of control”, but is now resuming treatment.
- ◆ Other(O):Other types of patients e.g. failure cases put on retreatment.

Short Course Chemotherapy(SCC).SCC is given to all TB patients registered by the National Leprosy and Tuberculous Programme (NLTP). Different SCC regimens are used for the different categories of tuberculosis. The following apply:

- ◆ In the first 2 months (initial phase of treatment) the drugs should be administered under the direct observation of either a health care provider in a health facility or another reliable member of the household or community.
- ◆ Drugs and tools for registration and reporting should be available before treatment is started. Patient should be admitted if is too ill or DOTS cannot be ensured.
- ◆ During the continuation phase the patient should collect a supply of drugs 2 weekly for daily self-administration at home.

Treatment Regimens and Drug Dosages. The treatment regimen for new adult smear-positive patients and other seriously ill cases of TB, e.g., TB meningitis, military TB, and TB of vital organs is summarized in Table 12.1

Table 12.1:Dosage of individual anti-TB drugs according to body weight

Drug	Recommendations Average dose in mg/kg	Range in mg/kg	Maximum dose
Isoniazid	10	7-15	300mg
Rifampicin	15	10-20	600mg
Pyrazinamide	35	30-40	2.0mg
Ethambutol	20	15-25	1.0mg

Treatment of TB in HIV/AIDS Patients. HIV increases a person's susceptibility to infection with M. tuberculosis. In individuals infected with M. tuberculosis, HIV is a

potent cause of progression of tuberculosis infection to disease. In HIV infected children, dissemination of TB is common. TB meningitis, miliary tuberculosis, and widespread tuberculous lymphadenopathy occur. Offer all TB patients HIV testing and counselling, and put all HIV- positive patients on cotrimoxazole preventive therapy. For these patients, do a work up for ART and request them to bring their regular sexual partners for counselling and HIV testing.

Complications of TB

These include haemoptysis (coughing up blood), spontaneous pneumothorax, bronchiectasis, lung fibrosis and lung abscess.

Acquired Drug Resistant TB

Acquired drug resistance results from inappropriate use of one drug or poor adherence to treatment. This suppresses the growth of organisms susceptible to the drugs but encourages the multiplication of isolated strains with spontaneous drug resistance. Multiple Drug Resistant TB (MDR-TB). This is resistance to at least both rifampicin and isoniazid as a consequence of poor adherence to recommended treatment regimens by clinicians and patients. This resistance is further associated with increasing poverty and the HIV/AIDS epidemic. MDR-TB is confirmed on culture and sensitivity.

Prevention of MDR-TB. Drug resistance can be prevented by:

- ◆ Strengthening TB programmes.
- ◆ Ensuring directly observed therapy whenever rifampicin is used.
- ◆ Using fixed dose combination tablets containing rifampicin.
- ◆ Referring all drug-resistant TB patients to higher level for appropriate management.

~ Refer all drug-resistant TB patients to higher level for appropriate management.

12.3 Asthma (Adults)

This is a clinical syndrome characterized by increased responsiveness of the tracheobronchial tree to a variety of stimuli. This results in airway obstruction that varies in severity either spontaneously or as a result of treatment.

Clinical Features

Patients present with breathlessness, wheezing, and cough with tenacious sputum.

Examination shows:

- ◆ **Mild attack:** Wheezing, pulseless than 100/min, BP normal, RR less than 20/min.
- ◆ **Moderate:** Wheezing with cough, sweating, pulse 100–120, RR 20–30/min, and normal BP.
- ◆ **Severe:** Cyanosis, pulse 120/min, RR 30/min, pulsus paradoxicus, respiratory distress in upright position; may have a silent chest.

Chronic: Mild attack (see above) all the time.

- ◆ **Status asthmaticus:** Moderate or severe attack not responding to conventional therapy or persisting for more than 12hours.

Investigations

- ◆ Peak expiratory Flow monitoring- diagnosis and monitor treatment
- ◆ Peak Expiratory Flow measurements (PEF) is the maximal flow of expired air after a full
- ◆ inspiration. The best of 3 efforts is used.
 - PEF is measured using the peak flow meter. Predicted values for PEF are also available
but the range of normal values is very wide.
 - PEF measurements should be compared to the individual's own previous best measurements when used for monitoring.
 - Daily diurnal variation in PEF of more than 10 % in adults and over 13 % in children over
a 2-week documented period suggests asthma. Variation above 15% between clinic
visits also support the diagnosis of asthma.
- ◆ PEF variability can be measured as:
 1. Twice daily readings, Maximum minus minimum PEF value of the day expressed as a percentage of the mean daily PEF value and averaged over one to two weeks.
 2. Minimum morning pre-bronchodilator PEF over one week expressed as a percentage of the recent best (preferred method)
Caution during periods of high COVID transmission rates within the community
- ◆ CXR, ECG- to rule out mimics

Management

- ◆ **Mild:** SC adrenaline 0.5ml of 1:1,000 concentration STAT, repeat after 20–30 minutes if there is no response (up to a total of 3 doses). If there is response, discharge on salbutamol 4mg TDS for 1 week **OR** theophylline 200–250mg BD or TDS. Inhaled medium acting B2 agonist such as albuterol, terbutaline, dibuteral, or metaproterenol.
- ◆ **Moderate:** Adrenaline as above up to 3 doses or salbutamol inhalation 2 puffs every 20 minutes till response or patient gets tremors. If no response IV aminophylline 6mg/kg slowly over 15 minutes, and then 0.9mg/kg/hr. If there is good response, discharge on salbutamol 4mg TDS for 1 week **OR** theophylline. If no response, treat as severe asthma. Oral and inhaled corticosteroid, or antileukotriene, or inhaled theophylline. Inhaled B agonist should be added to any of these as needed.
- ~ Refer if there is no response or condition deteriorates.
- ◆ **Severe asthma:** Treat as above then refer.
- ◆ **Maintenance treatment:** Salbutamol 4mg TDS orally or salbutamol inhaler or steroid inhaler. If poor response, give oral theophylline 100–200mg TDS. If response is still poor, refer to physician.
- ◆ **Status asthmaticus:** Refer to higher level for appropriate management.

12.4 Chronic Obstructive Pulmonary Disease

Clinical syndrome of chronic dyspnoea and cough with expiratory airway obstruction produced by either chronic bronchitis or emphysema.

Clinical Features

Chronic productive cough for many years with slowly progressive breathlessness that develops with reducing exercise tolerance. Tachypnea, purse-lip breathing, use of accessory muscles of respiration. Chest hyper-resonance, breath sound decreased, wheezes with or without rhonchi. Cyanosis may be present. Note absence of clubbing.

In acute exacerbations, symptoms worsen, and the sputum becomes yellow or may increase in quantity.

Management of COPD includes:

- ◆ Smoking cessation: This has the greatest impact in reducing the disease progression. This can be done through:
 - a) Patient counseling
 - b) Nicotine replacement therapy e.g. nicotine patches, nicotine gums, sublingual tablets etc.
 - c) Institution of smoking prevention and tobacco control strategies (Refer to National Tobacco Control policies)
- ◆ Prevention of occupational exposure

- ◆ Reduction of exposure to indoor pollutants e.g. bio fuels in poorly ventilated houses
- ◆ Physical exercise
- ◆ Pharmacotherapy – refer to higher facility.

13. Other Common Conditions

13.1 Coma

Coma is a state in which the patient is unarousable and unresponsive to external stimulation. In profound coma, brain stem and myotatic reflexes may be absent. Coma noticed for the first time is always an emergency. It is only after the cause is known and its implications are understood that it may be treated otherwise.

Aetiology

Infections (malaria, meningitis, encephalitis), trauma, tumours, cerebro-vascular accidents, diseases (diabetes, epilepsy, liver failure), drugs (alcohol, methyl alcohol, barbiturates, morphine, heroin), chemicals, and poisons (see Section 1.9, poisoning).

History

Detailed history from relative or observer to establish the cause if known or witnessed. The circumstances and temporal profile of the onset of symptoms is of critical importance in ascertaining the cause of the coma. Use of drugs and pre-existing diseases are important.

Examination

- ◆ Secure a patent airway.
- ◆ Determine if cardiac output is adequate (BP, pulse rate)
- ◆ Evaluate and monitor according to Glasgow Coma Scale (refer to Section 47.3, head injury).
- ◆ Monitor temperature, pulse, respiratory rate and their pattern
- ◆ Consider leads to possible causes:
 - Hypothermia: Occurs in alcohol, barbiturate, and sedative poisoning, hypoglycaemia, and hypothyroidism.
 - Hypotension: Occurs in internal haemorrhage, myocardial infarction, septicaemia, alcohol or barbiturate poisoning.
 - Hyperventilation with a change in pulse rate may signify increased intracranial pressure.
 - Hypertension may signify hypertensive encephalopathy or a cerebrovascular accident.
 - Fever occurs in systemic infection with meningitis or encephalitis.
 - Neck stiffness could signify meningitis, subarachnoid haemorrhage, or cerebral malaria.
- ◆ Determine the muscle tone and deep tendon reflexes. Note any asymmetry.

Investigations

Vary according to findings but generally include:

- ◆ Blood slide for malaria parasites
- ◆ Blood sugar

Management (to be initiated at any level where it occurs).

- ◆ Monitor vital signs.
- ◆ Maintain adequate airway.
- ◆ Ensure adequate circulation-always fix a large IV canula immediately in anticipation of drug administration.
- ◆ Refer immediately.

13.2 Fever

An elevation of core body temperature above the normal circadian (daily) range. Normal body temperature in adults 18–40 years is $36.8^{\circ}\text{C} \pm 0.4^{\circ}\text{C}$. Substances that cause fever are called pyrogens. Fever accompanies a wide variety of illnesses and need not always be treated on its own. In general, the cause should be ascertained before therapy as far as possible.

Management – General

- ◆ Consider the following conditions, which merit lowering the temperature on their own: Precipitation of heart failure, delirium/confusion, convulsions, coma, malignant hyperpyrexia, or heat stroke, when the patient is extremely uncomfortable.
 - ◆ Treat the cause.
 - ◆ Administer acetylsalicylic acid injection or tablets **OR** paracetamol tablets.
- ~ Fever alone is not a reason to give antibiotics. Management – Fever of Unknown Origin**

This describes fever of more than 3 weeks duration, the cause of which is not apparent after at least one week of intensive investigations. Assessment should include observation of the fever pattern, detailed history and physical examination, laboratory tests, and non-invasive and invasive procedures. This definition excludes common short self-limiting infections and those that have been investigated and diagnosed within 3 weeks.

Management

Refer to higher level for proper management.

13.3 Jaundice

Yellow colouration of skin and mucous membranes due to excess bilirubin. Serum bilirubin >2mg% (34.2 μ mol/L). In general terms, hyperbilirubinaemia may be pre-hepatic, hepatic, and post-hepatic.

- ◆ **Pre-hepatic:** Due to excess intravascular release of bilirubin by haemolysis.
- ◆ **Hepatic:** Due to hepatocyte dysfunction (faulty uptake, metabolism, or excretion of bilirubin).
- ◆ **Post-hepatic:** Due to impaired removal of bilirubin from biliary system (e.g., common bile duct obstruction, intrahepatic cholestasis).
- ◆ **Common causes include:** Viral hepatitis, haemolytic anaemia (e.g., sickle cell, malaria), cirrhosis, biliary obstruction, hepatoma, drug induced (e.g., alcohol, isoniazid).

Clinical Features

Meticulous history and physical examination are important before ordering investigations. History should include exposure to hepatotoxic drugs for pre-existing known haematological disorder. History of anorexia, nausea, and aversion to smoking is suggestive of viral hepatitis, while history of dark urine, pale stool, and pruritus is suggestive of obstructive jaundice. Physical examination should include

observation for the presence of spider naevi, gynaecomastia, loss of axillary hair, parotid gland enlargement, and ascites, which is suggestive of cirrhosis. Splenomegaly is suggestive of parenchymal liver disease or haemolytic jaundice.

Investigations

- ◆ Blood slide for malaria parasites. Jaundice in a patient with malaria is a medical emergency.
- ◆ Urine – Bilirubin:
 - Absence of bilirubin in a patient suggests haemolytic anaemia.
 - Presence of bilirubin suggests hepatobiliary jaundice
- ◆ Urine – Urobilinogen:
 - Excessive urobilinogen suggests haemolysis. Urobilinogen is absent in obstructive jaundice.

Management

Refer to higher level for proper management.

13.4 Obstructive Jaundice

This refers to jaundice caused by obstruction of bile in the biliary tree (post- hepatic jaundice). Causes include:

- ◆ Intraluminal (within the lumen) include gallstones that dislodge from the gall bladder and are impacted in common bile duct (CBD), helminthiasis (ascaris and liver flukes).
- ◆ Mural (within the wall of ducts) due to inflammation, benign and malignant tumours of bile duct wall, e.g., cholangiocarcinoma, cholangitis etc.
- ◆ Extramural (outside the walls) include choledochal cysts enlarged lymph nodes of any cause, and carcinoma of the pancreas.
- ◆ Other possible causes are congenital biliary atresia, iatrogenic trauma to the ducts during surgery (especially cholecystectomy), and strictures after cholangitis and cholecystitis.

Clinical Features

- ◆ Painless jaundice, with pruritus that can be severe; jaundice progresses steadily.
- ◆ Distended gall bladder, which is present in 60% of carcinoma of the head of the pancreas.
- ◆ Anorexia, which is usually present.
- ◆ Diarrhoea that is troublesome, with foul smelling pale stool.
- ◆ Dark urine, history of flatulence, and dyspepsia in fat females are suggestive of gallstones.

Management

- ◆ Refer to higher level for appropriate management.

13.5 Lymphadenopathy

An abnormal increase in size or altered consistency of lymph nodes. It is a manifestation of regional or systemic disease. The following common diseases are associated with lymph node enlargement:

- ◆ Infectious diseases
 - Viral diseases; HIV
 - Bacterial infections; pyogenic infections, tuberculosis.
- ◆ Malignant diseases
 - Haematological; Hodgkin's and non-Hodgkin's lymphoma
 - Metastatic tumours to lymph nodes; head and neck, breast, prostate
- ◆ Immunological disease
 - Connective tissue disorders.

Clinical Features

Clinical features depend on underlying cause.

Management

Refer to higher level for appropriate management.

14. Skin Diseases

14.1 Eczema

14.1.1 ATOPIC DERMATITIS (OR ECZEMA)

Clinical Features

An acute, subacute but usually chronic pruritic inflammation of the epidermis and dermis often occurring in association with a personal or family history of hay fever, asthma, allergic rhinitis, or atopic dermatitis. Onset is within the first year of life in 60% of patients, and usually in the first 2–3 months of life.

It is the commonest type and presents with a variety of skin lesions: erythema, papules, scaling, excoriations, and crusting. Pruritus is the cardinal feature of eczema and the constant scratching leads to a vicious cycle of itch-scratch-rash-itch.

Subsequently the skin becomes thickened (lichenified) presenting mainly on cheeks and extensor surfaces of limbs of an infant. It later localizes on the flexural areas of the limbs in both older children and adults. The natural history is that the disease improves with age in the majority of children.

Management

- ◆ Patients should be educated on the disease and its natural history and be advised to avoid precipitating factors e.g.:
 - Avoid synthetic clothing.
 - Avoid any food substance that may aggravate the eczema.
 - Avoid letting the skin to dry excessively, e.g., by using harsh soaps, perfumed bar or liquid soaps.
 - **Note:** One should use normal or mild toilet soaps. No need to use medicated soaps.
 - Avoid any of the petroleum jelly products on those who react (Vaseline, Ballet, Valon, Ideal, etc.)
- ◆ Chlorpheniramine maleate can be used to alleviate itch.
- ◆ Topical steroids are the mainstay treatment. Use of the mildest steroid that controls the itching eg hydrocortisone or betamethasone is advocated.

Note: If the body surface area involved is extensive (e.g., 50% and over) or the disease is very severe, refer to a specialist (at levels 4 and above) who may choose to use systemic steroid.

The main complications are usually secondary of infection need prompt treatment, e.g., bacterial, fungal, and viral. As with other atopic conditions, stress may aggravate eczema and thus older children should be encouraged to try to avoid stress.

14.1.2 CONTACT DERMATITIS

Can be acute or chronic inflammation produced by substances coming into contact with the skin and causing toxic (irritant) or allergic reactions.

- ◆ **Primary irritant dermatitis:** caused by substances like acids, alkalis, soaps, detergents, acetone, etc.
- ◆ **Allergic contact dermatitis:** Topical drugs, plants (poison ivy), shoes (rubber), clothing, metallic compounds (nickel), dyes, and cosmetics (including nail polish). Sensitivity to latex in gloves is a particular problem for many health workers, and sensitivity to latex condoms may preclude their use by some men.

Clinical Features

Lesions may be acute vesicles or weeping subacute erythema, or dry and scaly with papules or chronic lichenified (thickened) excoriated and hyper pigmented rash. The lesions may take the shape of the contact with the offending item, for example shoes on the feet, termed moccasin distribution, watch causes rashes around the wrist , gloves on hands, etc., but may be asymmetric and not having any particular pattern.

Management

- ◆ Identify and remove causative agent.
- ◆ Drain large blisters but do not break or remove tops (roofs).
- ◆ Apply gauze or thin cloths dipped in water or normal saline.
- ◆ Apply topical Betamethasone ointment for dry lesions and cream for wet lesions.

14.1.3 PSORIASIS

This is a common papulosquamous skin disease that occurs in 2–3% of the general population.

Clinical Features

Clinical presentations are erythematous macules, papules, or plaques that are usually covered with loosely adherent silvery scales. Involves the lower back, elbows, knees, feet including the soles, face, palms and nails. Rarely affects the whole body (erythroderma). May present with psoriatic arthritis.

Management

- ◆ Refer to higher level for appropriate management.
- ◆ Treatment involves the use of topical therapy with corticosteroids, anthralin, calcipotriol (Dovonex), tazarotene and tar. These are available as cream, ointment or solution especially for scalp lesions.

14.2 Bacterial Skin Infections

14.2.1 IMPETIGO CONTAGIOSUM

A contagious intradermal infection caused by streptococcus or staphylococcus. Commonly associated with poor hygiene, crowded living conditions, and neglected minor trauma. Frequently complicates scabies, purpura urticaria, insect bites. Presents as bullous lesions that rupture and have crusts on the face, arms, legs, and buttocks.

Management

- ◆ Local treatment by cleaning with normal saline.
- ◆ Topical antibiotics for fucidic acid and bacitracin or silver sulphadiazine.
- ◆ Systemic antibiotics: are used mainly for extensive lesions (ampiclox ,cloxacillin, erythromycin and cephalosporins).

14.2.2 BULLOUS IMPETIGO

Common in neonates (termed, pemphigus neonatorum) although any age can be affected. Caused by staphylococcal infection. Affects mainly axilla and groin. Causes large bullae containing pus and clear serum; these rupture easily leaving raw areas. It does not form crusts as in impetigo contagiosum.

Treatment

- ◆ Treatment is similar to that of impetigo infectiosum.
- ◆ Refer if patient is toxic or septicaemia is suspected to level 4 and above for management.

Patient Education

- ◆ Spreads easily in schools because pupils have frequent body to body contact.
- ◆ Isolate and treat infected individuals.
- ◆ Separate towels and bath facilities for patients.

14.2.3 STAPHYLOCOCCAL SCALDED SKIN SYNDROME (SSSS)

Toxin-mediated epidermolytic disease leading to detachment of superficial epidermal layers to resemble scalding. Mainly occurs in children under 2 years of age. Severity varies from localized form to generalized form of epidermolysis bullosa. Also found in immune-compromised adults and in those with renal failure.

Clinical Features

- ◆ Vesicles that are flaccid (easily breaks up); gentle lateral pressure causes shearing off leaving raw areas.
- ◆ Focus or site of infection may be found in the nose, umbilical stump, purulent conjunctivitis, otitis media, nasopharyngeal infection.

Management

- ◆ Give broad spectrum antibiotics eg Flucloxacillin, Amoxiclav or Cephalexin for 7-10 days.
- ◆ If no improvement after 3 days, refer to higher level 4 or above for appropriate management.

14.3 Superficial Fungal Skin Infections

The dermatophyte infections are caused by fungi (genus microsporum, trichophyton and epidermophyton) and thrive on non-viable keratinized tissue of the skin (stratum, stratum corneum, hair, nails). Sources of infection include other persons, animals such as puppies or kittens, and more rarely the soil.

Nomenclature is “tinea” followed by the Latin name of the appropriate part.

Clinical Features

- ◆ **Tinea pedis (athlete's foot):** Scaling or maceration between toes particularly the fourth interspace. Causative organisms T. rubrum and/or T. interdigitalae. Hot humid weather and occlusive footwear are the usual predisposing factors.
- ◆ **Tinea cruris:** An erythematous and scaly rash with distinct margin extending from groin to upper thighs or scrotum. Itching may be severe. Common in males.
- ◆ **Tinea corporis (body ringworm):** Characteristically annular plaque with raised edge and central clearing with variable levels of scaling and itching.
- ◆ **Tinea capitis (scalp ringworm):** Mainly disease of children and they get spontaneous recovery at puberty in normal circumstances. Scaling, itching, and loss of hair are common (also termed, *Mashillingi*). Scarring, alopecia may result.

◆ ***Tinea anguum:*** Involves the nails and presents with nail discolouration and subungual hyperkeratosis (accumulation of friable debris that lifts the nail from the nail bed).

NB: If not sure of the diagnosis, refer to level 4 or higher for investigations and management.

Investigations

◆ Direct microscopy of skin scales in 10 or 20% potassium hydroxide solution mounted on a slide to demonstrate hyphae.

Management

◆ For wet lesions (in skin folds), apply gentian violet 0.5% paint daily and when the lesions dry apply Clotrimazole Skin ointment BD or Cream for 2 weeks or a week after lesions have healed.

Griseofulvin 500mg OD daily with fatty food for 1 month (in children 10mg/kg with a fatty meal or tea with bread having butter spread).

14.3.1 DEEP FUNGAL INFECTIONS

Deep fungal infections comprise two distinct groups of conditions: subcutaneous mycoses and systemic mycoses, as these are common in tropical and subtropical regions. In recent years, the systemic mycoses have become important opportunistic infectious complications in immunocompromised people.

Examples of deep fungal infections include;

- ◆ Aspergillosis
- ◆ Blastomycosis
- ◆ Cryptococcosis
- ◆ Chromoblastomycosis
- ◆ Histoplasmosis
- ◆ Mycetoma, and
- ◆ Sporotrichosis

Subcutaneous mycoses are due to a large and diverse group of fungus that produce infection when traumatically introduced into the skin and subcutaneous tissue or one has depressed immunity. A variety of skin changes may be seen in association with systemic mycoses. The skin lesions depend partly on which fungus is the cause.

Diagnosis

This is made by history, careful physical examination and investigations eg Skin scrapping for KOH test.

If not sure of any specific condition refer to level4 and above for investigations and treatment.

Investigations

For some of the investigations for extensive and deep infections refer to level 4 and above; skin scrapings for culture, Antigen testing, fungal cultures and DNA and RNA molecular tests.

Treatment

A number of agents are now available for treating deep fungal infections, including triazoles eg fluconazole and terbinafine that are given for 4-6 weeks.

14.4 Parasitic Skin Infestations

14.4.1 SCABIES

Scabies is caused by the human itch mite (*Sarcoptes scabiei*) and spreads through intimate personal contact, facilitated by overcrowding, poor hygiene, and sexual promiscuity.

Transmission via bedding or clothing is infrequent (the mites do not survive for a day without host contact).

Clinical Features

- ◆ Intense itching, worse at night or after a hot shower
- ◆ Burrows (tunnels under the skin containing mites) occur predominantly on the finger webs, the wrist flexor surfaces, elbow and axillary folds, and around the areolae of the breasts in females, the genitals especially males, along the belt line and buttocks.
- ◆ Secondary infection causes urticarial papules, crusts and pustules.

NB: The burrow is a small tunnel under the skin that appears as wavy scaly line (0.5–1cm long) with a small papule/ vesicle at the end and contains many mites.

Diagnosis

- ◆ Demonstration of typical burrows: this may be difficult to identify by some people.
- ◆ Microscopy of material from lesions to demonstrate the presence of mites, ova or faecal pellets.

Management

The following is recommended for management of scabies:

- ◆ Apply to the entire skin (from the neck to toes) 25% Benzyl benzoate emulsion (use 12.5% in children) for 3 days, Apply on day 2 without bathing. And on day 3, bathe and apply again.
- ◆ Alternatively, one can apply 1% Lindane (Gammabenzene hexachloride) solution stat.

For recurrent or chronic cases, refer to level 4 and above for proper treatment.

Prevention

The nonspecific measures against scabies include the following:

- ◆ Maintain good personal hygiene.
 - ◆ Use antihistamines for pruritus.
 - ◆ Put the clothing used by the affected individual(s), including bedding and mattresses, in the sun to dry.
 - ◆ Treat secondary bacterial infections using cloxacillin in severe cases.
- NB:** Treat the whole family and as many personal contacts as possible for scabies at the same time.

14.4.2 JIGGERS (TUNGIASIS)

This is caused by an ectoparasite called Tunga penetrans.

Diagnosis is not a problem but educating the community on treatment is mandatory for its control.

Management includes:

- ◆ Extracting the jiggers carefully with a clean sterile pin or needle.
- ◆ Suffocating the jiggers by soaking feet in liquid paraffin or kerosene.
- ◆ Topical application of two component dimeticone as used in treatment of headlice is also effective.
- ◆ Give Tetanus toxoid injection.
- ◆ Dust earthen floors with insecticide powders eg Permethrin. this is highly recommended as it eradicates the parasites on the floor.
- ◆ Keep the patient comfortable and give adequate analgesia
- ◆ Offer supportive feeding
- ◆ Restore normal health and independence by physiotherapy.

14.5 Skin Conditions Due to Vitamin Deficiencies

14.5.1 PELLAGRA (NIACIN DEFICIENCY)

Occurs when there is dietary Vitamin B3 deficiency (from starvation, alcoholism, or deranged absorption or utilization) and in isoniazid therapy, in various diarrhoeal conditions, and in liver cirrhosis. An increasing number of patients are now seen amongst prisoners in Kenya.

Clinical Features

Presents with characteristic features of dermatitis, diarrhoea, dementia. Other features include; weight loss, anorexia, fatigue, malaise, pruritus, burning, dysphagia, nausea, diarrhoea, vomiting, impaired memory, confusion, and paranoid psychosis.

Skin lesions are limited to exposed areas of the face, neck, hands, and feet. Mucous membranous shows scarlet fever, stomatitis, and scarlet red tongue. Patients with pellagra may die if they are not treated.

Management

- ◆ Provide high protein diet
- ◆ Give Multivitamin tablets or syrup or
- ◆ Vitamin B complex tablets if available.

14.6 Seborrhoeic Dermatitis

An inflammatory scaling disease of the scalp, face (hairy parts), and occasionally other areas with numerous sebaceous glands (axilla, upper chest, anogenital areas).

Clinical Features

Symptoms develop gradually and include:

- ◆ Dry or greasy diffuse scaling of scalp (dandruff) with pruritus.
- ◆ Yellow-red scaling papules in severe cases found along the hairline, external auditory canal, the eyebrows, conjunctivae, and naso-labial folds.
- ◆ It does not cause hair loss.
- ◆ Cradle cap (thick yellow crusted scalp) in newborns.

NB: Severe seborrhoeic dermatitis is found in neurological disorders (Parkinson's disease) and HIV infection due to compromised immunity.

Management

- ◆ Control scaling by 2% Salicylic acid in olive oil
- ◆ Wash hair with shampoos containing selenium sulphide, sulfur, and salicylic acid, or tar shampoos daily until dandruff is controlled. (Recently ketoconazole shampoo has proved to give good results).
- ◆ Apply topical steroids, e.g., a mild lotion of 0.01% fluocinolone acetate.
- ◆ Treat superimposed bacterial, fungal, or viral infections that are prevalent in HIV patients.
- ◆ If no good response, refer to higher level 4 or above for proper evaluation and treatment.

14.7 Dermatological Emergencies

14.7.1 ERYTHEMA MULTIFORME SYNDROME

A common problem due to increased prevalence of HIV/AIDS. It is an infiltration into the dermo-epidemial junction by mononuclear cells causing vesicles, and generally involves; the extremities, palms, and soles in the mild form of disease. In severe forms, widespread mucosal involvement occurs (Steven's-Johnson syndrome), which may last 1–2 months with a high mortality.

Causes range from idiopathic (50% have no known causes), to reactions from drugs (e.g., sulphonamides, phenytoin, barbiturates, penicillins, thiacetazone, etc.). Other possible causes are infections viral (Herpes simplex), streptococcal, and mycoplasma, and underlying malignancies (like lymphomas, etc).

Clinical Features

- ◆ In severe form the mucous membranes are always involved, with extensive bullae formation and systemic symptoms of fever and prostration.
- ◆ Cheilitis and stomatitis interfere with feeding, while vulvitis in females and balanitis in males lead to difficulties in micturition.
- ◆ Keratitis as a result of conjunctivitis.
- ◆ Epidermal necrolysis: This is a life-threatening condition.

Management

- ◆ Refer to higher level (4 or above) for appropriate management.

14.7.2 EXFOLIATIVE DERMATITIS

Synonyms: Exfoliative erythroderma syndrome, erythroderma.

It is a serious, life-threatening condition of the skin characterized by generalized (80-90% of surface area) and confluent inflammatory lesions due to drugs or other pre-existing diseases including cancers but 10-20% cases have no identifiable cause.

Clinical Features

Has generalized reddening of the skin with scaling and associated systemic toxicity, generalized lymphadenopathy, and fever. The disease can be acute or chronic in form. More than 50% of patients have a history of pre-existing dermatosis, commonly eczematous dermatitis (atopic, contact), psoriasis, drug reactions. They may also have pre-existing leukemia, lymphoma, or other malignancy.

Other features are constitutional symptoms including fatigue, weakness, anorexia, weight loss, malaise, and feeling cold with (shivering), as well as clinically red appearing skin that is thickened and with scaly lesions having no recognizable

borders. Oedema of lower legs and ankles may occur. When palms and soles are involved, there is thickening and fissuring. There tends to be alopecia (hair loss, but not uniform) and nails tend to be shed.

Confirmation of primary skin disorder by skin biopsy for histo-pathology.

Note: Erythroderma may also be secondary to HIV infection.

Management – aims at treating underlying cause and prevent itching.

- ◆ Topical steroids e.g. Betamethasone skin ointment
- ◆ Topical emollients: White soft paraffin, liquid paraffin or emulsifying ointment
- ◆ Soaking in a warm bath containing oils or other emollients like glycerine or lanolin.

Nursing care: Done in a room with good humidity, keep warm, etc.

Systemic management:

- Keratolytic agents eg 3-5% Salicylic acid skin ointment BD for several weeks
- Prescribe antibiotics for secondary bacterial skin infections.

Supportive – Monitor, control fluid intake, and maintain electrolytes balance.

Provide high protein diet as this

Stop any unnecessary drugs or suspected to have precipitated the condition eg carbamazepine, hydantoin, cimetidine, etc.

Antihistamines eg Chlorpheniramine and Cetirizine tabs or syrups in case of children to reduce itching. Then refer to level 4 and above for further management under specialist supervision.

Prevention

This involves avoidance of precipitating factors and treatment of pre-existing diseases.

14.8 Blistering Skin Diseases

Blistering skin disorders are characterized by the development or presence of blisters, which are fluid-filled lesions that form under the epidermis or within the dermis layers of the skin. Blisters occur as a result of a loss of adhesion between cells within the epidermis - called acantholysis; oedema between epidermal cells (called spongiosis) and dissociation between the epidermis and dermis. Blisters that form within the epidermis tend to be more fragile (flaccid) than subepidermal blisters that are tense. Blisters that are smaller than 1 centimeter in diameter are called **vesicles**, while blisters that are larger than 1 centimeter in size are called **bullae**.

Aetiology:

The common causes for blistering disorders, include auto-immune disorders, drug reactions, infections, genetic disorders, and traumatic injury. These conditions range from benign to very severe and life-threatening conditions.

Life-threatening cutaneous blistering disorders include toxic epidermal necrolysis, staphylococcal scalded skin syndrome, disseminated herpes simplex virus infection, and disseminated herpes zoster.

Generally speaking, blistering skin disorders may be divided into localized or generalized disorders.

Among **generalized blisters** are: systemic illness, whereas others that are not associated with include miliaria crystallina, bullous impetigo, linear IgA bullous dermatosis, epidermolysis bullosa, pemphigus, pemphigoid, and dermatitis herpetiformis. Examples of those **causing localized blisters** are bullous pemphigoid, dyshidrotic eczema and herpes simplex infection.

The examples of common conditions include:

MILIARIA CRYSTALLINA: typically results in multiple tiny vesicles on the face and trunk, due to obstruction of eccrine sweat gland ducts in the setting of excessive warmth.

Usually, the rash of miliaria resolves on its own, the key is to avoid overheating the body by wearing lighter clothing, staying hydrated, and keeping a cool environment, for instance by using air conditioner. A soothing ointment like calamine lotion can also help.

BULLOUS IMPETIGO is caused by Staphylococcus aureus, which produces exfoliative toxins that cleave adhesions between the epidermis and dermis, leading to the formation of bullae.

The cleavage plane is either sub-corneal or within the upper stratum granulosum. The bullae rupture easily, leave erosions. The most frequent areas involved are the face, trunk, perineum, and extremities.

Since *Staphylococcus aureus* are found on the skin and can be spread among family members, prevention is targeted towards preventing transfer from person to person.

Bullous impetigo can be treated with oral antibiotics like cephalexin, and if it doesn't improve it could indicate that it is due to a MRSA infection, which may require other antibiotics like clindamycin and other enhanced spectrum penicillins or cephalosporins. Bullous impetigo in newborns, children, or adults who are immunocompromised can develop into a more severe and generalized form called Staphylococcal scalded skin syndrome, which typically causes systemic symptoms like fever and malaise.

The mainstay of treatment is supportive care with rehydration and antipyretics like ibuprofen or paracetamol, as well as IV antibiotics - initially giving penicillinase-resistant penicillin, such as nafcillin or oxacillin, while vancomycin should be considered in areas with a high prevalence of MRSA or for individuals who fail to respond to initial therapy.

LINEAR IGA BULLOUS DERMATOSIS (CHRONIC BULLOUS DISEASE OF CHILDHOOD): is a sub-epidermal auto-immune disorder associated with the deposition of IgA at the basement membrane zone of skin and mucosal tissues.

The cutaneous bullae often have a distinctive grouped appearance that resembles a cluster of jewels, while mucosal lesions primarily present as erosions or ulcers. This disorder may be idiopathic or drug-induced.

Some drug classes that cause blisters include antibiotics like vancomycin, antihypertensives, and NSAIDs.

DRUG INDUCED AND IDIOPATHIC BLISTERS:

Drug-induced bullous dermatosis often resolves after stopping the causative drug. On the other hand, idiopathic cases may persist for a decade or longer, and thus systemic therapy with dapsone is generally required until the individual shows clinical remission with gradual tapering toward treatment cessation. If no signs of improvement

EPIDERMOLYSIS BULLOSA: is a rare blistering disorder that may affect both skin and mucous membranes.

Normal skin has special proteins that anchor the epidermis to the dermis to prevent the two layers from moving separating from one another in case of shearing forces. But if these protein are lacking, then the skin become extremely fragile skin. That is why any form of trauma, even minor mechanical friction like rubbing or pressure, will separate the layers of the skin and form blisters and painful sores.

Epidermolysis bullosa may be genetic, called congenital epidermolysis bullosa, in which individuals affected present mutations; or it can be acquired, called epidermolysis bullosa acquisita, in which the affected individuals have antibodies against type VII collagen.

There is no cure for epidermolysis bullosa. **Management involves wound care, pain control, controlling infections, nutritional support, and prevention and treatment of complications.**

So after suspecting such disease should refer as soon as possible.

PEMPHIGUS: is a rare group of blistering auto-immune diseases that affect the skin and mucous membranes.

Now, in healthy individuals, a protein called desmoglein attaches adjacent epidermal cells via attachment points called desmosomes.

In pemphigus, autoantibodies form against desmoglein, so the epidermal cells become separated from each other, a phenomenon called acantholysis. This causes blisters that slough off and turn into sores.

There are several types of pemphigus, which vary in severity and include:

PEMPHIGUS VULGARIS: This is characterized by the formation of bullae in the skin and mucosae that quickly evolve to very painful erosions, making it hard for these individuals to eat.

A positive **Nikolsky sign is indicative** of the disease, in which there's induction of blistering in normal skin or at the edge of a blister when applying pressure. This occurs because the friction on the skin causes detachment of skin layers, since cell-to-cell adhesions are very weak and fragile.

IgA pemphigus: Is the only pemphigus subtype that's mediated by IgA antibodies instead of IgGs.

IgA pemphigus is characterized by the subacute development of vesicles that evolve into pustules, and may be accompanied by erythematous plaques. The trunk and proximal extremities are common sites for involvement, while mucous membranes are usually spared.

Pemphigus foliaceus: is the mildest form of pemphigus, since typically the skin lesions that develop are superficial.

They present as small, scattered superficial blisters that rapidly evolve into scaly, crusted erosions, and are much less painful. Also, there's no mucosal involvement.

And finally, the most severe form of pemphigus is paraneoplastic pemphigus, which is caused by an underlying cancer, especially hematological malignancies.

Paraneoplastic pemphigus: resembles the vulgaris type, and it's characterized by painful erythematous macules, papules, blisters, and erosions involving the skin and mucosa. There can also be conjunctival involvement and that can lead to blindness.

Treatment:

If treatment is not started early, pemphigus can be fatal, usually from an opportunistic infection of the lesions. Broadly, the aim is to decrease blister formation, promote healing of blisters and erosions, and determine the minimal dose of medication necessary to control the disease process.

For treatment, oral steroids, especially prednisone, are given in high doses. Immunosuppressive agents like Azathioprine, Mycophenolate mofetil, Cyclophosphamide, IVIG, or Rituximab may be used as adjuvant therapy as well, for individuals that don't respond to steroids.

With paraneoplastic pemphigus, management of the underlying cancer is often the only effective treatment.

PEMPHIGOID: is the most common auto-immune blistering disorder, and the most common type is called bullous pemphigoid. Pemphigoid is characterized by sub-epidermal blisters but is similar in general appearance to pemphigus, but a key difference is that pemphigoid has tense blisters and also does not feature acantholysis.

The autoantibodies bind to hemidesmosomes, and cause complement deposition and inflammation, leading to keratinocyte death and formation of blisters.

Classic skin lesions are plaques (raised flat topped lesions measuring >1 cm in diameter) and tense bullae on the trunk and extremities. There are also intense pruritus is common, and lesions typically do not scar. Bullous pemphigoid may also develop mucosal involvement.

NB: The treatment is the same as for pemphigus.

PEMPHIGOID GESTATIONIS: is another type of pemphigoid that occurs during pregnancy or in the immediate postpartum period. It has itchy papules or plaques and vesicles typically begin around the umbilicus prior to spreading elsewhere with large bulla formation.

Treatment essentially is the same, but some immunosuppressants like Cyclophosphamide and Methotrexate are not used because they are teratogenic. Ultimately, the most effective treatment is delivery of the baby.

DERMATITIS HERPETIFORMIS: is a cutaneous manifestation of gluten sensitivity. The sensitivity leads to the formation of IgA antibodies to gluten tissue transglutaminases found in the gut, and these can then cross-react with epidermal transglutaminases. This causes deposition of IgA-transglutaminase complexes in the papillary dermis, which triggers the formation of vesicles and papules on the extensor aspect of extremities, scalp, and buttocks.

The lesions are intensely pruritic, leading to erosions and excoriations after some weeks. The only effective treatment is a **gluten-free diet**, which often leads to resolution of these skin lesions over months to years. In addition, **dapsone** is an effective initial treatment in most people, resulting in the resolution of active skin lesions within days of the start of therapy.

Topical corticosteroids may be given in conjunction with dapsone to help alleviate the itching.

15. Genito-Urinary Diseases: Urinary Tract and Renal Conditions

15.1 Lower Urinary Tract Infections

This is an infection affecting the urinary system.

Classification

- ◆ Uncomplicated UTI: a bacterial infection of the bladder and associated structures with no structural abnormality, no comorbidities (diabetes, immunocompromised state, or pregnancy). It is also known as cystitis or lower UTI.
- ◆ Complicated UTI: when it occurs in the presence of structural abnormalities and comorbidities. In males, UTI should be considered complicated.

Risk factors

- ◆ Being female (short urethra, proximity to anus and hormonal changes),
- ◆ Catheterization
- ◆ Sexual intercourse
- ◆ Spermicides
- ◆ Frequent pelvic examination
- ◆ Immunosuppression
- ◆ Kidney transplant
- ◆ Use of antibiotics
- ◆ Diabetes mellitus.

Pathogenic bacteria ascend from the perineum, causing the UTI.

Escherichia coli is the most common organism in uncomplicated UTI. Other organisms include *proteus mirabilis*, *klebsiella*, and *enterococcus* (gram negatives).

Clinical Features

- ◆ Urinary frequency
- ◆ Urgency
- ◆ Suprapubic discomfort
- ◆ Dysuria.

Diagnosis

- ◆ Mostly clinical diagnosis from history
- ◆ Urinalysis (WBCs, pus cells).

Management

- ◆ Many cases of uncomplicated UTIs will resolve spontaneously, without treatment. Most patients seek therapy for symptoms relief.
- ◆ Encourage increased fluid intake unless there is renal/heart failure.
- ◆ Treatment is aimed at preventing spread to the kidneys or developing into upper tract disease or pyelonephritis.
- ◆ Oral antibiotics: *Nitrofurantoin 100mg bd* Fluoroquinolones; *ciprofloxacin 500mg bd, ofloxacin, 2nd/3rd generation cephalosporins; cefixime 400mg od, cefpodoxine 100mg bd*. Trimethoprim/sulphamethoxazole (TMP/SMX) or amoxicillin/clavulanate can be used if sensitive. A lot of resistance has been reported with TMP/SMX for 3-5 days.
- ◆ Complicated UTI (Fevers $\geq 38^{\circ}\text{C}$, flank pain, vomiting): **Refer to higher level for care.**

15.2 UPPER URINARY TRACT INFECTION

15.2.1 ACUTE PYELONEPHRITIS

Acute pyelonephritis is a bacterial infection causing inflammation of the kidneys. Also referred to as upper tract UTI.

It usually occurs as a complication of an ascending UTI from the bladder. Less commonly, it can result from hematogenous spread especially in those with ureteral obstructions, immunocompromised and debilitated patients.

Classified as complicated when it occurs in pregnancy, kidney transplant, urinary tract anatomical abnormalities, renal failure, immunocompromised patients and those with hospital-acquired bacterial infections.

Aetiology

- ◆ Mostly gram-negative bacteria (*Escherichia coli, Proteus mirabilis, Klebsiella pneumonia, Enterococci faecalis and Enterobacter*) from fecal flora.
- ◆ In ICUs, antibiotic-resistant enterococci, *Klebsiella pneumoniae, Pseudomonas aeruginosa*, and *Candida albicans*.

Complications: untreated acute pyelonephritis can lead to abscess formation, septic shock, and kidney damage.

Clinical Features

- ◆ Fever
- ◆ Flank pain
- ◆ Nausea
- ◆ Vomiting
- ◆ Burning on urination (dysuria)
- ◆ Increased frequency
- ◆ Urgency.

Investigations

- ◆ Good history taking and physical examination.
- ◆ Tests: urinalysis (pyuria), presence of nitrite suggests E. coli infection; proteinuria, microscopic hematuria; TBC, renal function tests (where available).
- ◆ Imaging: May not be required routinely. Indicated in those with complicated acute pyelonephritis. Include renal/ureter/bladder ultrasound (**Refer if imaging is indicated**).

Management

- ◆ Can be managed as either outpatient or inpatient for 7-14 days.
- ◆ Healthy, young, non-pregnant women can be managed as outpatients while the very young, elderly, immunocompromised, poorly controlled diabetes, post-renal transplant, pregnant, structural abnormalities, those who cannot tolerate oral intake should be managed as inpatients.

Drugs: Antibiotics, analgesics, and antipyretics.

- ◆ **Antibiotics:** Uncomplicated infection:

Empirical treatment based on the local antibiotic resistance patterns.
Adjust treatment with urine culture and sensitivity results.

I)Outpatient oral management

- Fluoroquinolones: Ciprofloxacin 500mg bd, Ciprofloxacin sustained release 1000mg od, Levofloxacin 500mg or 750mg od 7 days.
- Cotrimoxazole (Trimethoprim/sulphamethoxazole) 960mg bd 14 days
- Cephalosporins: 2nd and 3rd generation: cefixime 400mg od; cefpodoxime 100mg bd.

- ◆ Complicated pyelonephritis (Fevers, flank pain, vomiting): **Refer to higher level for care.**

15.3 Renal Disease Signs and Symptoms

15.3.1 HAEMATURIA

Presence of blood in urine confirmed by presence of at least 5 RBCs/HPF in 3 consecutive specimens obtained at least 7 days apart.

- ◆ Among the causes are:

- Infections (urinary tract infection, tuberculosis, schistosomiasis),
- Acute glomerulonephritis,
- Trauma,
- Meatal ulcers
- Blood disorders (bleeding disorders, leukaemia, purpura, scurvy, sickle cell disease),
- Tumours, and Congenital abnormalities.

Classification

- ◆ Microscopic (seen only by microscopy or urinalysis) vs. Gross hematuria (visible to the eye).
- ◆ Intermittent Vs Persistent.
- ◆ Symptomatic Vs. Symptomatic
- ◆ Initial hematuria Vs. all-stream hematuria and terminal hematuria.

Clinical Features

- ◆ Flank pain/mass, lower abdominal pain, dysuria, urinary urgency or frequency, fever, active menstruation, passing stone, recent throat or skin infection, joint pains, oral ulcers, rash, hemoptysis, leg swelling, hearing loss, constitutional symptoms (weight loss, anorexia, cachexia), back-pain
- ◆ In the history taking, enquire about: previous history of hematuria, family history of hematuria, any procedures in the recent past, drug history.
- ◆ Perform a complete medical examination: Blood pressure, edema, suprapubic/ flank tenderness or mass, palpable kidneys.

Investigations

Urinalysis

Management

- Refer to higher level urgently for appropriate management.

15.3.2 PYURIA

The finding of more than 10 white blood cells per high-power field on a urine specimen is suggestive of urinary tract inflammation. Pyuria as an isolated finding is almost commonly associated with bacterial urinary tract infection. When associated with haematuria or proteinuria, pyuria is suggestive of parenchymal renal disease such as glomerulonephritis or interstitial nephritis. Sterile pyuria is often due to TB; cultures for TB recommended.

Investigations

- ◆ Urinalysis
- ◆ 24-hour urine collection for Mycobacteria and brucellosis

Management

Empirically with quinolones e.g. *Nitrofurantoin 100mg bd, Ciprofloxacin 500mg bd* for 5-7 days.

Refer all pyuria associated with hematuria and/or proteinuria, flank pain, fevers $\geq 38^{\circ}\text{C}$.

15.4 Acute Prostatitis

Prostatitis refers to inflammation of the prostate gland due to bacterial and non-bacterial causes.

Table 15.1: Causes of Prostatitis

Category	Description
I	Acute bacterial prostatitis
II	Chronic bacterial prostatitis
III	Chronic prostatitis/chronic pelvic pain syndrome
	a. Inflammatory
	b. non-inflammatory
IV	Asymptomatic prostatitis

15.4.1 ACUTE BACTERIAL PROSTATITIS

Aetiology: *E. coli*, *Pseudomonas aeruginosa* and *Enterococci*

Risk factors: Urinary tract catheterization, benign prostatic hypertrophy.

Clinical Features

- ♦ Symptoms of UTIs (dysuria, frequency, urgency).
- ♦ Symptoms of prostatitis (perineal pain, genital pain, painful urination, and rectal pain).
- ♦ Symptoms of bacteremia (fever, chill, joint pain, and muscle pain).

Digital Rectal Examination (DRE): a soft, swollen, and tense state of the prostate and severe pressure pain. NB: Avoid prostate massage due to severe tenderness and risk of inducing bacteremia/sepsis.

Complications: acute UT obstruction, epididymitis, prostatic abscess, sepsis, and chronic bacterial prostatitis, septicaemia, chronic bacterial prostatitis, prostatic abscesses.

Diagnosis: Refer to higher facility level.

Treatment: Refer to higher level facility.

15.4.2 HYPERKALAEMIA

Serum potassium levels persistently above 5.5mmol/L. Usually, there are no clinical consequences until the levels rise to 6mmol/L and above.

♦ Causes include:

- Acute renal failure
- Severe chronic renal failure
- Use of potassium retaining drugs (e.g., spironolactone, ACE inhibitors).

♦ Consequences include:

- Muscle weakness
- Abdominal distension
- Tingling of the face, hands and feet
- Irregular pulse
- Heart block
- Increased amplitude of the T-wave on the ECG

Management

- ♦ Give 10 IU of soluble insulin with 50mls of 50% dextrose. Combination of insulin and dextrose facilitate the uptake of glucose into the muscle cells accompanied by potassium via the Na-K-ATPase pump.
- ♦ Administrate 10–30ml of 10% calcium gluconate over 10–20 minutes for cardiac cell membrane stabilization. (This requires constant ECG monitoring for widening of QRS interval, loss of P wave, or cardiac arrhythmia).
- ♦ Nebulize with salbutamol an adrenergic agonist via ($\text{Na}^+ - \text{K}^+$ -ATPase) pump stimulation, thereby shifting potassium into the intracellular compartment.
- ♦ Loop diuretics (e.g., furosemide) results in potassium excretion.

♦ Refer to higher level for definitive management.

15.4.3 HYPOKALAEMIA

Serum potassium levels persistently below 3.5mmol/L.

♦ Causes include:

- Inadequate dietary intake(rare)
- Gastrointestinal fluid loss (vomiting, diarrhoea, fistulae, paralytic ileus)
- Renal loss (diuretics, uncontrolled diabetes mellitus)
- Systemic metabolic alkalosis
- Dialysis

♦ Clinical features:

- Muscle weakness
 - Tetany
 - Fatigability
 - Thirst
 - Polyuria
 - Paralytic ileus
-
- Cardiac arrhythmias
 - Elevated serum bicarbonate
 - Low serum chloride
 - ST segment depression and appearance of V waves on ECG

Management

Refer to higher level facility.

15.4.4 ABDOMINALLY PALPABLE RENAL MASSES

Causes include nephroblastoma, polycystic kidneys, horseshoe kidneys, neuroblastoma, and hydronephrosis.

- ♦ Refer to higher level for appropriate management.

15.5 Acute Glomerulonephritis

This is an inflammatory renal disease commonly following streptococcal infection of skin and tonsils.

Clinical features include: haematuria or tea coloured urine. Oedema, puffiness of the eyes more noticeable in the morning. The oedema is seldom severe or generalized. Back pain. Hypertension commonly presenting as headaches, visual disturbances, vomiting, and occasionally pulmonary oedema with dyspnea; convulsions and coma due to encephalopathy. Evidence of primary streptococcus infection, most often as an acute follicular tonsillitis with cervical adenitis and less often as skin sepsis. Altered urine output; occasionally there will be oliguria followed by diuresis (oliguric and diuretic phases).

- ♦ ~ Refer to higher level for appropriate management

15.6 Nephrotic Syndrome

Nephrotic syndrome is defined as a clinical syndrome comprising of features of heavy proteinuria and hypoalbuminemia due to an increased permeability of the glomerular basement membrane. The consequence of this protein loss of low serum albumin is edema, dyslipidemia, coagulation/fibrinolysis abnormalities, reduced renal function, and immunological disorders.

The components of nephrotic syndrome are summarized in the table below

Table 15.2 Clinical Definition of Adult Nephrotic Syndrome

Clinical Definition of Adult Nephrotic Syndrome	
Heavy proteinuria	=>3.5grams per day
Hypoalbuminemia or hypoproteinemia	Serum albumin: =<30mg/dl Total protein: =<60mg/dl
Edema	Peripheral, ascites
Dyslipidemia	Elevated LDL cholesterol

NB: The heavy and hypoalbuminemia are indispensable prerequisites for the clinical diagnosis of nephrotic syndrome.

Classification

- ♦ Primary nephrotic syndrome has no background diseases or idiopathic.
- ♦ Secondary nephrotic syndrome has background cause such as

Clinical Features

- ♦ Symptoms of bacteremia (fever, chill, joint pain, and muscle pain).
- ♦ Oedema is the predominant symptom of nephrotic syndrome (NS). In the early phase of NS, it appears on the eyelids. Progresses gradually to involve the lower limbs, sacrum. When severe, it is generalized with ascites, pleural/pericardial effusion (Anasarca).

Complications: venous thromboembolism due to loss of the coagulation proteins in urine (anti-thrombin III, protein C, protein S), renal failure. Complications related to treatment of nephrotic syndrome (steroids, cytotoxic/immunosuppressant agents).

Diagnosis: urinalysis (proteinuria =>3+)

Management:

- ♦ **Supportive Treatment**
 - Low salt diet
 - Protein intake: 1.0–1.1 g/kg body weight (BW)/day in minimal change nephrotic syndrome and 0.8 g/kg BW/day in other nephrotic syndromes.
 - Calorie intake of 35 kcal/kg BW/day to maintain the nitrogen balance
 - Fat restricted diet
 - ♦ **Refer to higher level for definitive management.**

15.7 Glomerulonephritis (GN)

Defined as a group of renal diseases characterized by immune-mediated damage to the glomerular basement membrane (GBM), mesangium, or the capillary endothelium, leading to hematuria, proteinuria, and renal failure. The blood pressure become elevated, and patient develop edema.

Classification

- ♦ Acute vs. Chronic Glomerulonephrits
- ♦ Primary vs. Secondary GN
- ♦ Nephrotic vs. Nephritic GN

Examples of nephritic GN: IgA nephropathy, Henoch Schonlein purpura (HSP); Post streptococcal glomerulonephritis (PSGN), Polyarteritis nodosa, Goodpasture syndrome, Lupus nephritis, Hepatitis C infection.

Some patients may also manifest symptoms of nephrotic syndrome in addition to nephritic syndrome as term referred to as **nephritic nephrotic syndrome**.

15.7.1 ACUTE GLOMERULONEPHRITIS

RAPIDLY PROGRESSIVE GLOMERULONEPHRITIS (RPGN)

The clinical features are presented in the table below.

Table 15.3: Clinical Features of Rapidly Progressive Glomerulonephritis

Type of glomerulonephritis	Age at risk	Extrarenal features	Investigations
Post-Streptococcal GN	Children 2-12 years	7-10 days after a throat 2-3 weeks after skin infection(impetigo)	Low C3, ASOT, throat or skin swab.
IgA Nephropathy	20-30 years		IgA may be elevated in half of the cases Normal complement
Henoch-Schonlein purpura	< 20 years	Purpuric rash on legs, arthritis, abdominal pain	Complement normal
Wegener's granulomatosis	50-60 years	Weight loss, malaise, upper/lower RTI, arthritis	ANCA, complement normal
Lupus nephritis	20-30years (more females)	Arthritis, photosensitivity (malar rash), pleurisy, pericarditis,	Low C3, ANA, Anti-DS DNA,anti-cardiolipin antibodies.

NB: Rapidly progressive glomerulonephritis (RPGN)

Associated with the clinical picture of sudden and severe acute renal failure. It occurs in the background of any of the above types of acute GN.

Investigations

- ◆ Urinalysis: dysmorphic red blood cells and RBC casts are pathognomonic of glomerular inflammation.
- ◆ Total Blood count
- ◆ Urea, Creatinine electrolytes

Treatment (should be managed in consultation with physician/nephrologist).

- ◆ Salt (sodium/potassium) restriction
- ◆ Fluid restriction
- ◆ Loop diuretics:
 - Furosemide: IV if edema is severe/ then oral.
 -
- ◆ **Antihypertensives**
 - Renin Angiotensin inhibitors (ACE-I e.g. Enalapril or ARBs e.g. Losartan).
 - Calcium channel blockers-Nifedipine
- ◆ **Corticosteroids**
- ◆ **Antibiotics:** indicated for Post streptococcal GN with evidence of streptococcal infection. Early treatment of streptococcal infection with antibiotics reduces the severity and incidence of glomerulonephritis.
 - Penicillins
 - Erythromycin (alternative in patients with penicillin allergy).

Refer for definitive treatment.

15.8 Renal Failure

Renal failure refers to the inability of the kidneys to perform excretory function leading to retention of nitrogenous waste products from the blood.

Functions of the kidney include

- ◆ Regulation of electrolytes and volume
- ◆ Excretion of nitrogenous waste products
- ◆ Elimination of exogenous molecules, e.g., many drugs
- ◆ Endocrine function (synthesis of hormones, e.g. erythropoietin and vitamin D).

Classification

- ◆ Acute Kidney Injury (AKI)
- ◆ Chronic Kidney Disease (CKD)
- ◆ Acute on Chronic Kidney Disease

15.8.1 ACUTE KIDNEY INJURY (AKI)

The term acute kidney injury (AKI) has replaced acute renal failure because AKI indicates the entire clinical spectrum from a mild increase in serum creatinine to overt renal failure. It is an acute condition associated with sudden and often

reversible reduction in kidney function where GFR declines abruptly within hours to days. It was previously referred to as acute renal failure. It is very common especially in hospitalized patients.

According to Kidney Disease: Improving Global Outcomes (KDIGO), AKI is defined by the presence of any of the following.

- ◆ Increase in serum creatinine by $\geq 26.5 \text{ mmol/l}$ (0.3 mg/dL) within 48 hours.
- ◆ Increase in serum creatinine to ≥ 1.5 times from baseline within the prior seven days.
- ◆ Urine volume $< 0.5 \text{ mL/kg/hr}$ for at least 6 hours.

Table 15.4: Aetiologies of Acute Kidney Injury

Type of AKI	Pathophysiology	Aetiologies
Pre-renal Any cause of reduced blood flow to the kidney Comprises of 60% of AKI	Hypovolaemia	Vomiting, diarrhoea, severe burns, hemorrhage, renal fluid loss (overdiuresis),
	Hypotension from decreased cardiac output:	cardiogenic shock, massive pulmonary embolism, acute coronary syndrome, congestive cardiac failure
	Hypotension from systemic vasodilation:	Hypotension from systemic vasodilation: septic shock, anaphylaxis, anaesthesia administration, hepatorenal syndrome
	Renal vasoconstriction:	NSAIDs, iodinated contrast, amphotericin B, calcineurin inhibitors, hepatorenal syndrome
	Glomerular efferent arteriolar vasodilation:	ACE inhibitors, Angiotensin receptor blockers (ARBs)
Renal Causes Intrinsic renal diseases that affect the glomerulus or tubules. Comprises 35% of AKI	Acute tubular necrosis:	Ischemia from prolonged pre-renal injury, Drugs: aminoglycosides, vancomycin, amphotericin B, Rhabdomyolysis, Intravascular hemolysis
	Acute interstitial nephritis:	Drugs beta-lactam antibiotics, penicillins, NSAIDs, proton pump inhibitors (PPIs), 5-ASA. Infections, Auto-immune conditions (SLE, IgG related disease)
	Glomerulonephritis	Anti-GBM, Immune complex-mediated diseases (SLE, post-infectious GN, cryoglobulinemia, IgA nephropathy, Henoch-Schonlein purpura).
	Intratubular obstruction	Monoclonal gammopathy in multiple myeloma, Tumor lysis syndrome, Toxins (ethylene glycol).
Post-Renal causes Obstructive conditions Comprises of 5% of AKI NB: a unilateral obstruction may not always present as AKI	<p><i>Extrarenal obstruction</i></p> <ul style="list-style-type: none"> ✓ Benign prostate hyper trophy (BPH) ✓ Improperly placed catheter ✓ Bladder, prostate or cervical cancer ✓ Retroperitoneal fibrosis <p><i>Intrarenal obstruction</i></p> <ul style="list-style-type: none"> ✓ Nephrolithiasis ✓ Blood clots ✓ Papillary necrosis 	

Clinical Features

- ◆ The history and physical exam should focus on determining the etiology of AKI and to differentiate AKI from CKD.
- ◆ **Examine for:** dehydration, cardiovascular system examination;(pulse rate, blood pressure, and jugulovenous pulse in establishing volume status).
- ◆ Features suggestive of vasculitis (livedo reticularis, digital ischemia, butterfly rash, and purpura).
- ◆ Features of liver disease, band keratopathy in multiple myeloma.
- ◆ Signs of diabetes mellitus, atheroemboli in retinopathy.
- ◆ Signs of hypertension.
- ◆ Keratitis, iritis, and uveitis in auto-immune vasculitis.
- ◆ Hearing loss in Alport disease.

Investigations

Search for all possible etiologies of AKI, including prerenal, renal, and post renal disease. Pay special attention to those reversible ones.

- ◆ Full blood counts (infection and anaemia).
- ◆ Urinalysis (proteinuria).
- ◆ Urine microscopy: urine sediments; muddy brown casts (acute tubular necrosis), sterile pyuria (acute interstitial nephritis).
- ◆ **Refer for further investigations**

Management

- ◆ Fluid challenge with close monitoring of urine output U/E/Cs.
- ◆ Avoid nephrotoxic drugs (aminoglycosides, NSAIDs, contrast media).
- ◆ Loop diuretics (e.g., furosemide 1-5mg/kg) if fluid overload present and in the oliguric phase of acute tubular necrosis (ATN).
- ◆ Restrict dietary potassium and phosphorous intake.
- ◆ Manage hyperkalemia if present:
 - Give 10 IU of soluble insulin with 50mls of 50% dextrose. Combination of insulin and dextrose facilitate the uptake of glucose into the muscle cells accompanied by potassium via the Na-K-ATPase pump.
 - Administrate 10–30ml of 10% calcium gluconate over 10–20 minutes for cardiac cell membrane stabilization. (This requires constant ECG monitoring for widening of QRS interval, loss of P wave, or cardiac arrhythmias).
 - Nebulize with salbutamol an adrenergic agonist via ($\text{Na}^+ - \text{K}^+$ -ATPase) pump stimulation, thereby shifting potassium into the intracellular compartment.
 - Loop diuretics (e.g., furosemide) results in potassium excretion.
- ◆ Refer the patient as soon as possible if:
 - Anuria is present for more than 24 hours OR oliguria of more than 48 hours.
 - Hyperkalemia not responding to above medical treatment.

15.8.2 CHRONIC RENAL FAILURE

CRF or chronic kidney disease (CKD) is defined as a persistent impairment of kidney function. The serum creatinine remains abnormally elevated for 3 months or more with an estimated of GFR of $<60 \text{ ml per minute} / 1.73\text{m}^2$.

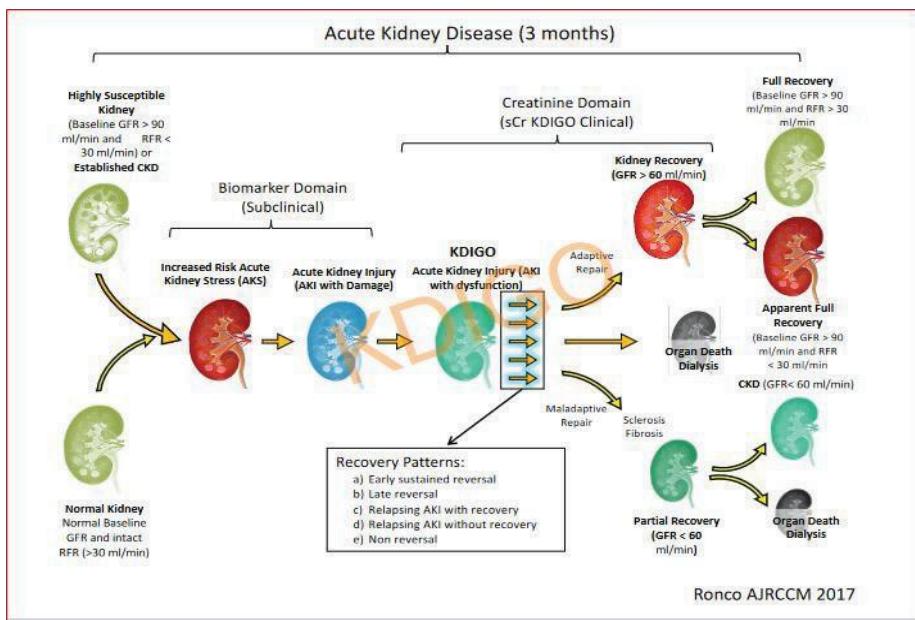


Figure 15:1 Spectrum of Acute Kidney Disease

Source: Ronco C, Ferrari F, Ricci Z. Recovery after Acute Kidney Injury: A New Prognostic Dimension of the Syndrome. *Am J Respir Crit Care Med.* 2017 Mar 15;195(6):711-714. doi: 10.1164/rccm.201610-1971ED. PMID: 28294655.

Table 15.5: Criteria for Chronic Kidney Disease

Criteria for CKD (either of the following present for >3 months)	
Markers of kidney damage (one or more)	Albuminuria (AER $\geq 30 \text{ mg}/24 \text{ hours}$; ACR $\geq 30 \text{ mg/g}$ [$\geq 3 \text{ mg}/\text{mmol}$]) Urine sediment abnormalities Electrolyte and other abnormalities due to tubular disorders Abnormalities detected by histology Structural abnormalities detected by imaging History of kidney transplantation
Decreased GFR	GFR $< 60 \text{ ml}/\text{min}/1.73 \text{ m}^2$ (GFR categories G3a-G5)

Abbreviations: CKD, chronic kidney disease; GFR, glomerular filtration rate.

Source: Levin A, Stevens PE. Summary of KDIGO 2012 CKD Guideline: behind the scenes, need for guidance, and a framework for moving forward. Kidney Int. 2014 Jan;85(1):49-61. doi: 10.1038/ki.2013.444. Epub 2013 Nov 27. PMID: 24284513.

Risk factors for CKD:

Hypertension, diabetes mellitus, proteinuria, obesity, smoking, dyslipidemia, genetic factors, older age, male gender, previous history of AKI.

Aetiology of CKD

- ◆ *Glomerular Diseases*: diabetes mellitus, auto-immune diseases, drugs
- ◆ *Vascular Diseases*: Hypertension, atherosclerosis, vasculitis, ischemia.
- ◆ *Tubulo-interstitial disease*: urinary tract infections, nephrolithiasis, obstruction, drug toxicity.
- ◆ *Structural kidney abnormalities*: polycystic kidneys, hydronephrosis due to obstruction, vesicoureteral reflux, renal masses, infiltrative renal diseases, renal artery stenosis.
- ◆ *Renal tubular disorders*: Renal tubular acidosis, cystinuria.

Clinical Features of Chronic Renal Failure

- ◆ *Biochemical*: Acidosis, hyperkalaemia. Elevated blood urea, elevated serum creatinine.
- ◆ *Cardiovascular*: Pulmonary edema, hypertension, pericarditis and cardiac tamponade, heart failure.
- ◆ *Skeletal*: Bone pain and fractures(rare).
- ◆ *Nervous system*: Encephalopathy (confusion, convulsions), peripheral neuropathy.
- ◆ *Haematological system*: Anaemia, excessive bleeding, e.g., from gums, skin, nose.
- ◆ *Skin*: Scratching (pruritus), darkening of skin.

Investigations

Refer to higher level facility.

Management

- Avoid nephrotoxic drugs, contrast media.
- Stop smoking. Reduce alcohol intake
- Maintain healthy BMI 20-25kg/m².
- Physical activity: 30 minutes 5 times a week.
- Restrict salt intake <2gm/day.
- Additional dietary advise: potassium, phosphates.

Refer to higher level facility for further management.

16. Mental Disorders

16.1 Acute Confusion (Acute Psychosis)

Sudden onset of mental symptoms in an otherwise previously normal person.

Aetiology involves:

- ◆ Organic causes: Cerebrovascular accidents (CVA), brain tumours, subdural haematomas, brain abscess, infections, acute meningitis, encephalitis, malaria, HIV
- ◆ Metabolic/toxic causes: Metabolic derangements, e.g. DKA hypoglycaemia, drug intoxication
- ◆ Psychiatric causes: Schizophrenia, depression, and manic episode

Clinical Features

A good history and physical examination are essential. The patient may be ill-looking, not appreciating surroundings, not alert, not aware of time, place or who they are. They may also be unable to remember and may forget easily, with poor attention and concentration. They may have visual/auditory hallucinations or delusions (grandiose or paranoid) or may be aggressive and excited. They may also have illusions (e.g., a stick is mistaken for a snake). In general, symptoms get worse at night.

Investigations

HB, blood slide for MPS, sugar

Management – General

Identify and manage physical (underlying) causes.

Management – Pharmacologic

Chlorpromazine 50–100mg TDS **OR** haloperidol 5–10mg TDS.

~ Refer if no physical cause is found (to a psychiatrist for treatment of schizophrenia, mania, or depression).

16.2 Alcohol Withdrawal (Delirium Tremens)

Clinical Features

Suspect if a patient with acute psychosis also has history of excessive drinking, tremors, weakness, restlessness, insomnia, hallucinations (visual), profuse perspiration. May develop features of withdrawal when admitted to hospital for another disease.

Investigations

- ◆ Blood sugar to exclude hypoglycaemia

Management

- ◆ Sedate the patient:
 - Diazepam 10–40mg QDS for the first 24hrs and then gradually taper off. Aim of therapy is to sedate until patient is calm.
 - Refer for admission in level 4 and above
 - Give supportive care:
 - Give multivitamins containing folic acid.
 - Manage head trauma and treat pneumonia, both of which are common in alcohol abusers.
 - Treat specific disorders symptomatically, e.g., cirrhosis, neuropathy.
 - Treat seizures with diazepam IV.
 - Give 50ml of 50% dextrose to correct hypoglycaemia.
 - Avoid long-term use of sedatives as they may lead to addiction.

~ Delirium tremens has a high mortality if not diagnosed and treated early.

Patient Education

- ◆ Counsel the patient; abstinence may be essential.
- ◆ Encourage healthy diet.
- ◆ Involve the family in the long-term management.
- ◆ Encourage participation in 12-step programmes for both the abuser and the family members.

16.3 Substance Abuse Related Disorders

These are syndromes arising out of repeated maladaptive use of substances – substance being defined as any chemical with brain altering properties. They are characterized by significant impairment of psychological, social, and occupational functioning as observed over a 12-month period. Commonly abused substances in

Kenya include tobacco, Cannabis sativa, khat (miraaj), opioids (heroin), cocaine, and solvents (glue, petrol, wood varnish).

Substance-related syndromes include intoxication, dependence, withdrawal, psychosis, mood disorders, anxiety, sleep disorders, sexual disorders.

More broadly, substance abuse can result in co-dependence, broken families, child abuse, road traffic casualties, generational substance abuse. Medical personnel need to be alert to abuse-related problems when treating family members.

High Risk Groups

- ◆ 12–20-year-olds
- ◆ Patients with primary mental disorders
- ◆ Upwardly mobile professionals trying “keep up”.
- ◆ Children of parents who are substance abusers.

16.3.1 SUBSTANCE ABUSE BY THE ADOLESCENT

Usually present with a self-neglect, slovenliness, deteriorating school performance, excessive sleeping, rough appearance, increasing and unexplained demand for money from care givers, involvement in petty crime (pilfering), running away from home in addition to aforementioned substance-related disorders.

~ Refer to higher level for appropriate management.

16.3.2 MANAGEMENT OF SELECTED SUBSTANCES OF ABUSE

OPIOID DETOXIFICATION

Opioids abused include heroin, morphine, dihydrocodeine and pethidine. Tolerance develops rapidly and withdrawal features include agitation, lethargy, sweating, goose-flesh pimples, running nose, shivering, musculo-skeletal pains, diarrhoea and abdominal cramps. These effects peak at 48 hours and subside over a period of 10

days. Owing to the highly addictive nature of opioids, admission to hospitals is necessary for effective management.

Management – Pharmacological

- ◆ For agitation, use diazepam 20–80mg PO daily to be tapered off in 10 days.
- ◆ For the parasympathetic upsurge, use clonidine 0.15 mg to 3mg PO daily for 10 days.
- ◆ For any behaviour tending towards assault, use haloperidol 5–10mg TDSPO
OR chlorpromazine 50–100mg TDS as necessary.
- ◆ For pain, use paracetamol 1g PO every 3 hours as necessary.

CANNABIS DEPENDENCE

Chronic users may develop psychosis, anxiety, mood disorders, and a withdrawal state. Admission is usually necessary for initiating abstinence. Treatment of the psychiatric complications is the same as for the primary syndromes.

KHAT (MIRAA) DEPENDENCE

Chronic users (“2 kilos” or more per day) may develop anxiety, mood disorders, and schizophrenia-like psychosis. Abstinence is to be encouraged. Treatment of the related psychiatric disorders is the same as for the primary syndromes.

SOLVENT ABUSE

Solvents are mainly abused by street children and the homeless. They have powerful euphoriant properties. Chronic users may develop organ damage (liver, heart, kidney), as well as neurological damage. Patient education is vital. Involve family and relevant authorities in rehabilitation.

16.3.3 ANXIETY

An unpleasant, vague, and diffuse feeling of apprehension. It is an alerting signal. Usually, the threat is unknown and patient's functioning becomes impaired.

Pathological anxiety includes panic disorder, which may be dramatic in presentation; phobias, which are fears that are out of proportion; obsessive compulsive disorder, which is characterized by an irresistible urge to act; and generalized anxiety disorder.

Clinical Features

The patient presents with an empty feeling in the stomach, lightness in chest, pounding heart, perspiration, urge to void, non-exertion dyspnoea, blurred vision, hyper reflexia, dizziness, and light-headedness. Hypertension (transient) may be noted with some restlessness (e.g., pacing). A good history and physical examinations are of crucial importance. It is important to exclude physical causes like thyrotoxicosis, pheochromocytoma, hypoglycaemia, and temporal lobe epilepsy.

Management

- ◆ Correct hypoglycaemia if present
- ◆ For uncomplicated anxiety, initiate calming therapy:
 - Reassure patient
 - Benzodiazepines, e.g., diazepam 20mg/24hrs. Taper off once symptoms abate.
- ◆ Refer for:
 - Investigations to exclude organic causes, thyrotoxicosis, temporal lobe epilepsy, etc.
 - Complicated anxiety with presence of phobias, panic attacks, etc. Start on benzodiazepines and consult psychiatrist for:
 - Psychotherapy
 - Behaviour therapy
 - Other pharmacological interventions, which may include selective serotonin reuptake inhibitors (SSRIs), tricyclic antidepressants, and monoamine oxidase inhibitors (MAOIs).

16.4 Post-Traumatic Stress Disorder

This is a common anxiety disorder that develops after exposure to a terrifying event or ordeal in which grave physical harm occurred or was threatened. This gives rise to both psychological and social effects.

Psychological effects are those that affect different levels of functioning including cognitive (perception and memory as a basis for thought and learning), affective

(emotions), and behavioural. "Social effects" pertain to altered relationships with the family and community networks, and the impact on the economic status.

Clinical Features

In the acute phase, these may include intrusive flash backs, grief reaction, denial, disbelief, numbness, restlessness, anxiety, social withdrawal, and uncontrollable crying.

Management

- ◆ Provide psychological first aid for those showing acute distress. This is an informal, non-clinical intervention that entails:
 - Basic, on-intrusive care with a focus on listening but not asking to talk.
 - Showing empathy by validating the person's feelings.
 - Reminding the distressed person that what they are feeling is a normal reaction to an abnormal situation, and that it is expected that the uncomfortable or bothersome feelings or painful symptoms will disappear over time.
 - Assessing needs and ensuring that these needs are met.

 - Encouraging but not forcing friendships, companionship and otherwise positive interactions with others. For example, if the person is ready, help him or her to join a social activity group.
 - Providing as much information as possible about access to services and any plans for the affected communities that may have been made.
- ◆ Refer to higher level for appropriate management.

16.5 Psychosexual Disorders

These range from the criminal sexual behaviour such as rape/sexual assault and paedophilia to the deviant (homosexuality/lesbianism, sex change, and transvestism – tendency to appear to be of different sex).

Management

Refer to higher level for appropriate management.

16.6 Conversion Syndromes

These are mental disorders in which there is a psychogenic disturbance of either motor or sensory function in some parts of the body.

Clinical Features

- ◆ May present as paralysis of a part of the body, tremors, blindness, deafness, seizures, aphonia. The severity of disability fluctuates, and the patient fails to exhibit the seriousness the disability accords
- ◆ A good psychiatric history may reveal the source of conflict.
- ◆ A thorough physical examination should be done, even though the patient seems normal.

~ Refer to higher level for appropriate management.

16.7 Depression

The primary and dominant characteristic is a change in mood, consisting of depressive mood with characteristic changes in behaviour, attitude, thinking efficiency, and physiological functioning.

Clinical Features

Dysphoric mood characterized by sadness, crying spells, or irritability. Negative views of self, the environment, and the future, indicated by guilt, loss of interest, difficulties in concentrating, or suicidal thoughts. There is insomnia with loss of, or increase in, appetite. There may be weight loss or gain with multiple somatic complaints, e.g., fatigue, weakness, headaches, backache, etc. A meticulous history is important as

under-diagnosis is common and patients suffering from depression are often missed and receive inadequate/inappropriate treatment.

Many depressed patients have a precipitating factor, e.g., loss of income or spouse/partner/child, or are on drugs that produce depression as a side effect, e.g., methyldopa.

Management – General

Most patients are managed as outpatients. It is important for the care provider to maintain a positive and hopeful attitude towards the patient and if possible, to involve the relatives in the management of the patient, especially to improve compliance. Sessions with a psychologist or counsellor may be called for.

Management –Pharmacological

Antidepressants:

- ◆ Amitriptyline 50–150 mg daily: Start with 75mg on the first day and increase by 25mg weekly.

OR

- ◆ Maprotiline 25–75mg/day initially and aim at 100–300mg/day.

OR

- ◆ Fluoxetine 20mg OD: Start with 75 mg on the first day and increase by 25mg weekly.

OR

- ◆ Phenelzine 15–45mg/day initially and aim at 45–75mg/day.

Give antidepressants at bedtime to reduce daytime sedation. This timing may improve patient compliance. Antidepressants take about 2 weeks to take effect. If medications are effective, they should be continued for 3 months and then reduced at 25mg/week.

Failure to respond to therapy may be due to:

- ◆ Poor compliance
- ◆ Inadequate dosage
- ◆ Misdiagnosis

Inadequate therapeutic trial (usually 6 weeks). Refer for

- ◆ Re-evaluating the diagnosis.
- ◆ Instituting chronic treatment (prophylaxis) in those with recurrent serious depression.
- ◆ Changing to second generation antidepressants, e.g., maprotiline, monoamine oxidases inhibitors.
- ◆ Considering electroconvulsive therapy (ECT).

Patient Education

- ◆ Inform the patient that there will be a delay of 2 weeks before beneficial effects of treatment are experienced.
- ◆ Explain about the side effects, e.g., dry mouth, constipation, hypotension, daytime sedation (drowsiness).
- ◆ Warn patient about dangers of alcohol consumption.
- ◆ Review the patient at least once every 2 weeks until maintenance dose is reached and then once a month until total drug withdrawal or as necessary.
- ◆ Involve the relatives in long term management.

~ **Do not give large prescriptions to patients.** There is risk of suicidal overdose. Drug II administration should be monitored while at home.

16.8 Bipolar Mood Disorder (Manic Episode)

The primary characteristic is a change in mood consisting of a sense of wellbeing and enhanced, even exaggerated, self-esteem.

Clinical Features

The clinical features include hyperactivity that is usually goal oriented, over generosity, extravagance, disinhibition (promiscuity, drug abuse), irritability, accelerated speech, infectious elated congruent mood, grandiose delusions, enhanced/exaggerated self-esteem, insomnia, and weight loss (no time for food). In severe forms patients appear disorganized and may be violent; legal involvement may be necessary in their management. History and physical examination are essential; it is necessary to establish whether the patient was ever depressed in the past.

~ Refer to higher level for appropriate management.

16.9 Schizophrenia

A form of mental illness characterized by loss of contact with reality, hallucination, delusions, abnormal thinking, flattened effect and disturbed work and social function, occurring in a setting of clear consciousness, memory, and orientation.

Clinical Features

The clinical features include withdrawal and generalized loss of interest in the environment, with thought disorder. The normal association of ideas is lost and there is characteristic incongruity of affect. There are also delusions, hallucinations in any sensory modality, and disturbances in behaviour and motor function, e.g., grimacing, odd postures.

History obtained from the patient and relatives is most important. Continuous signs of illness should be present for 6 months at some point in the patient's life, with some clinical features at the time of diagnosis.

Management – General

- ◆ Apply both psychological and social approaches.
- ◆ Use psychiatric community nurses and social workers in involving family to understand the illness and help with rehabilitation of the patient into community activities. Importance of drug compliance should be explained to relatives and patients.

Management – Pharmacological

- ◆ If the patient is severely disturbed, admit and give:

- Chlorpromazine 100–200mg IM and then start on oral chlorpromazine 100–200mg TDS
 - Perphenazine 8–64mg/day orally
 - Fluphenazine 2.5–40mg orally daily
 - Trifluoperazine 1–5mg orally daily
 - Haloperidol 2–25mg orally daily
 - Thioridazine 25–80mg orally daily
 - Thiothixene 2–5mg orally daily
- ◆ Manage mildly disturbed patient as outpatient:
- Give chlorpromazine 100mg TDS **OR** haloperidol 5mg TDS. If patient was diagnosed as a schizophrenic and missed taking the drugs, restart the drug as before.
 - Maintenance therapy: Chlorpromazine 100–200mg TDS **OR** haloperidol 5–10mg TDS.
 - Onset of extrapyramidal side effects: reduce dose and start on benztropine 2.5–5mg TDS.
- ◆ For patients who are not dependable about taking oral drug, use available depot preparations:
- Fluphenazine decanoate 25mg IM monthly
 - Haloperidol decanoate 50mg IM monthly
 - Clopenthixol decanoate 200mg IM monthly
 - Flupenthixol decanoate 40mg IM monthly.
- ◆ Caution: Aim to use lowest dose that is therapeutic in cases of long-term use to minimize risk of side effects.

Refer if

- ◆ Poor compliance.
- ◆ Inadequate dosage/therapeutic treatment up to 6 weeks.
- ◆ Misdiagnosis.

- ~ **Electroconvulsive therapy (ECT) can be administered for refractory cases.**
- ~ **Admit if patient is severely disturbed, violent, or catatonic.**

Patient Education

- ◆ Compliance with therapy is important to prevent relapses.
- ◆ Relatives should bring the patient to the hospital at early signs of relapse.
- ◆ Drugs may have to be taken for a long time depending on response

16.10 Sleep Disorders

Insomnia is difficulty in initiating or maintaining sleep, leaving the patient feeling unrested. Insomnia can be a symptom of many other psychiatric and physical disorders, as well as menopause, all of which should be excluded. Rule out use of addictive drugs (caffeine, etc.). The insomnia itself can be disturbing because people worry about it.

Management

- ◆ Give hypnotics, e.g., diazepam 5–10mg nocte for 1–2 weeks and then taper off.
~ **Caution: Avoid chronic use (over 30 days) of hypnotics.**
- ◆ Advise patient to adhere to a consistent sleeping schedule, to avoid food at bedtime (except for a glass of warm milk or something soothing), to listen to soothing music before bedtime, etc.
- ◆ Refer if no response in 4 weeks.

Other Sleep Disorders

Hypersomnia (narcolepsy/cataplexy): Complains of excessive sleep without any demonstrable cause.

Management

- ◆ Forced naps at regular times of the day.
- ◆ Methylphenidate 30mg morning and 20mg midday until symptoms disappear, maximum dose 60mg daily.

16.11 Suicide Attempts

Unsuccessful attempt to end one's own life.

Clinical Features

Suicide threats. May occur in the following conditions: depression, schizophrenia, under influence of alcohol/drugs, under severe social problems or stress, personality disorder. Often the attempted suicide itself is the first symptom.

~ **Take suicide threats seriously; the next attempt may be successful.**
Refer to higher level for appropriate management

PART II: Paediatrics

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17. Paediatric Emergencies

17.1 Recognizing a Seriously Ill Child (Triage)

It is important that all health care workers learn to quickly recognize a child needing emergency care as soon as the child is brought to a health facility. Fortunately, this depends on a few clinical features that are easy to learn with practice. Parents/ care givers may have tried to treat the child at home or the child may have fallen sick quickly. They are advised to come to the health care facility as soon as possible if the child is weak, not able to drink, has severe diarrhoea, cold hands and feet, high fever, difficulty in breathing or convulsion.

17.2 Causes of Cardiorespiratory Arrest after Neonatal Period

These include:

- ◆ Fluid loss: Diarrhoea, blood loss, burns,
- ◆ Fluid maldistribution: Anaphylaxis, septic shock, cardiac disease,
- ◆ Respiratory distress: Pneumonia, asthma,
- ◆ Foreign body (obstructed airway)
- ◆ In addition to the above severe malnutrition is a common cause of death in young Children,
- ◆ Trauma can also be a cause.

The figures shown below assist you to triage and manage these children as they arrive at the health facility. Management in all these states includes the ABC's: Airway, Breathing, Circulation.

17.3 Summary of Steps Taken: ABCD of Resuscitation

~ Always have a resuscitation tray ready.

- ◆ Always have a resuscitation tray ready. Suction equipment (ambu bag and mask, oxygen delivery equipment, IV fluids including dextrose. Drugs – adrenaline and diazepam
- ◆ Airway/breathing: Remove any airway obstruction. Start immediate treatment to restore or support breathing.
- ◆ Circulation: Restore circulating blood volume by giving 20ml/kg of Ringer's lactate or normal saline over 15 minutes. Repeat until return of pulse; this may be repeated up to 3 times. For shock without diarrhoea, to. Be given slowly over 2 hours.
- ◆

- ◆ If severe anaemia start urgent blood transfusion.
- ◆ Convulsions: Give anticonvulsants if child is convulsing. Diazepam (IV or rectally) and then phenobarbital (IM) if no response to two doses of diazepam.
- ◆ Carry out emergency investigation if you are able: Blood glucose, malaria test, haemoglobin.
- ◆ Reassess every 2-3 minutes until stabilized following the same format—airway, breathing, circulation and intervene as needed.
 - When ventilation and chest compression are effective, carotid and femoral pulses become palpable, pupils constrict, and the colour of mucous membranes improves.
- ◆ NOTE: Chest compressions: apply appropriate pressure over the sternum:
 - For newborn or small infants, effective cardiac output can be produced by applying maximum pressure with the tip of 2 fingers placed on the sternum just below the intermammary line or hands round the infant's chest.
 - For larger infants and small children, use the heel of one hand over the sternum one finger breadth above the xiphisternum.
 - For big children, the heel of the right hand is placed over the heel of the left hand to provide the strength of both arms and shoulders. Hands are placed 2 finger breadths above the xiphisternum.
 - Refer urgently after stabilizing the child, if need be. During transport ensure adequate airway, breathing, and circulation. Make sure you write a comprehensive report of what you have done to the receiving hospital clinician.

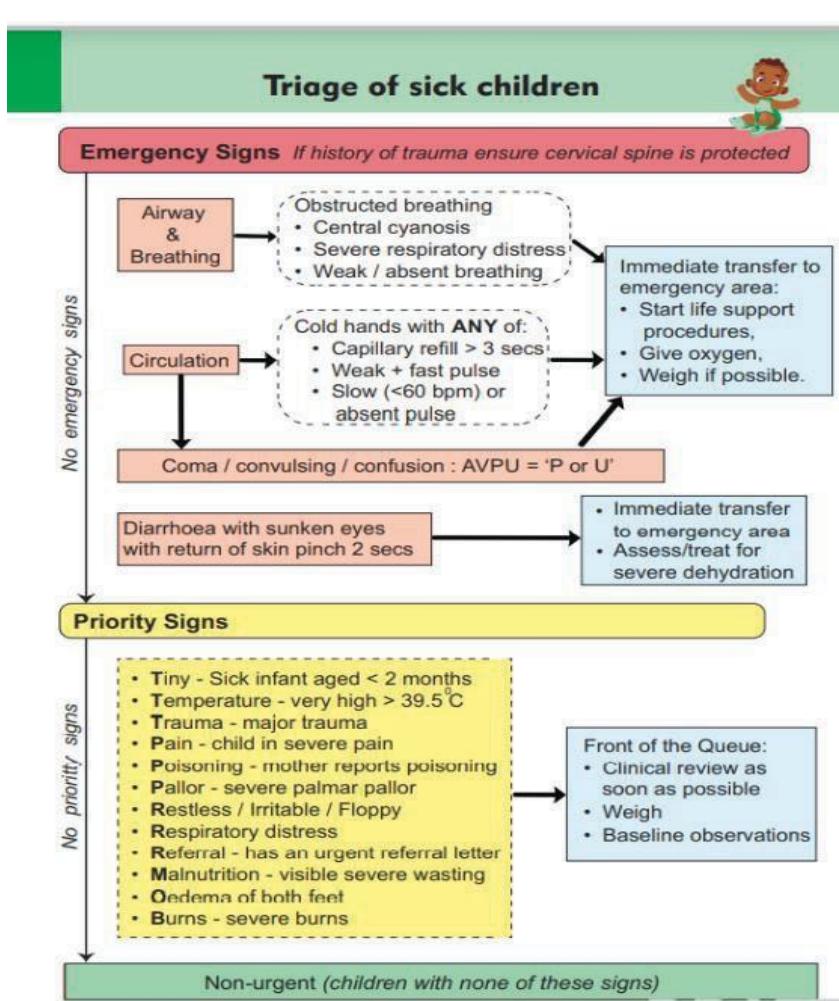


Figure 17:1 Triage of a sick child

Source: Kenya Basic Paediatric Protocols, 2022

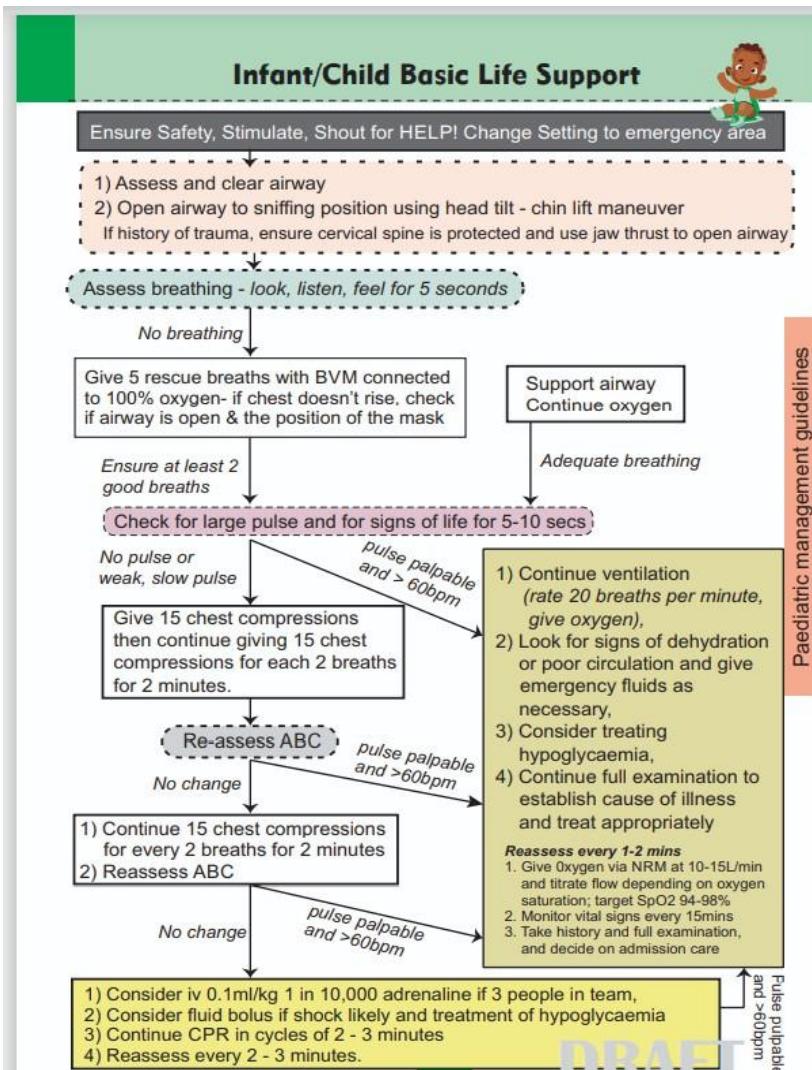


Figure 17:2 Infant/Child Basic Life Support

Source: Kenya Basic Paediatric Protocols, 2022

17.4 Shock

Causes of shock include

- ◆ Bleeding
- ◆ Severe infection (septic shock)
- ◆ Severe dehydration
- ◆ Cardiac disease
- ◆ Trauma

Clinical Features

- ◆ Cold hands
 - ◆ Capillary refill >3seconds
 - ◆ Weak fast pulse
 - ~ **Children with these signs are in shock and need emergency treatment.**
- Treatment**

For a child without severe malnutrition:

- ◆ Infuse 20ml/kg of normal saline or Ringer's lactate over 15 minutes for hypovolemic shock and over 2 hours for distributive (septic and anaphylactic) shock.
- ◆ Reassess and give a second dose if there is no improvement. You may need 2 or 3 repeats to restore circulating blood volume.

For a child with severe malnutrition:

- ◆ Give 20ml/kg of Ringer's lactate with 5% dextrose or half normal saline with 5% dextrose and infuse over 2 hours.
- ◆ After resuscitation, refer urgently for admission. Monitor vital signs during the journey and continue IV fluids.

17.5 Anaphylaxis

This is severe potentially life-threatening allergic reaction to drugs, food, stings, etc.

Clinical Features

These include

- ◆ Extensive skin rash
- ◆ Pruritus
- ◆ Urticaria
- ◆ Respiratory distress that may be accompanied by a wheeze or a stridor (due to laryngeal oedema or bronchospasm), and hypotension.

Management

Parents and care givers are advised to take to a health care facility as soon as possible any child with extensive skin rash or difficulty in breathing.

Follow the ABC of resuscitation. In addition, do the following

- ◆ Adrenaline: give IM 0.01ml/kg of 1:1,000 solution; or 0.1ml/kg of 1:10,000 solution. Can be repeated every 5 minutes 2 doses; if no response after 2 doses secure IV access and infuse adrenaline IV 0.5–1ml/kg/hour and titrate according to response.
- ◆ Antihistamine: Chlorpheniramine 0.1mg/kg IV slowly or diphenhydramine. Then continue IM/SC 8 hourly for 24–48 hours.
- ◆ Hydrocortisone 4mg/kg IV is of secondary value but useful to prevent delayed recurrences.

Subsequent management

- ◆ Patients with mild to moderate reaction, e.g. urticaria or mild bronchospasm, should be observed for at least 6 hours because attacks may recur after full recovery.
 - ◆ Admit those with severe reactions e.g. poor circulation, severe bronchospasm.
 - ◆ Continue intravenous fluid replacement, and closely monitor during transfer.
- ~ **Avoid offending agents. Inform parent/child the cause of reaction so as to know and to avoid the offending agent in future**

17.6 Choking

Infants and young children can easily choke on any number of things. Often, they are playing with seeds, buttons, or any small object, which when put in the mouth easily goes the wrong way. All health care providers should learn how to dislodge the objects and it would be good if the parents are taught the procedure. This is because the procedure may be required urgently: by the time the child arrives at the health facility they may have already choked to death. Figures 17.3 and 17.4 show how this is done.

Advise parents that someone needs to always keep an eye on toddlers and crawling babies. They won't necessarily be able to hear the baby choking.



a) Back slaps

b) Chest thrusts

1. Lay the infant on your arms or thigh in a head down position.
2. Give 5 blows to the infant's back with heel of hand (Figure 17.3a).
3. If obstruction persists, turn infant over and give 5 chest thrusts with 2 fingers one on top of the other, one finger breadth below nipple level in midline. (Figure 17.3b)
4. If obstruction persists, check infant's mouth for any obstruction that can be removed.
5. If necessary, repeat the sequence with back slaps again.

Figure 17:3 How to manage the choking infant



a) Slapping the back to clear airway obstruction in a choking child



b) Heimlich manoeuvre in a choking older child

1. Give 5 blows to the child's back with heel or hand with the child sitting, kneeling or lying (Figure 17.4a).
2. If obstruction persists, go behind the child and pass your arms around the child's body. Form a fist with one hand. Immediately below the child's sternum place the other hand over the fist and quickly press upwards into the abdomen (Figure 17.4b). Repeat this Heimlich manoeuvre 5 times.
3. If obstruction persists check child's mouth for any obstruction that can be removed.
4. If necessary, repeat the sequence with back slaps again.

Figure 17:4 How to manage a chocking child

18. Diarrhoeal Diseases

Diarrhoea is defined as occurrence of at least 3 loose or watery stools in a day. Diarrhoeal illness is classified for dehydration, presence of blood in the stool and duration.

Definitions

- ◆ **Acute watery diarrhoea:** Watery stools lasting less than 14 days.
- ◆ **Dysentery:** The presence of fresh blood in the diarrhoeal stool.
- ◆ **Persistent diarrhoea:** Diarrhoea that has lasted for 14 days or more.
- ◆ **Dehydration:** Loss of water and electrolytes

Common causes of diarrhoea in children include:

- ◆ Young children <5 years: Rotavirus, E.coli
- ◆ All ages except neonates: Shigella, cholera, salmonella spp., amoeba, giardia, Candida.
- ◆ Others: Lactose intolerance, food poisoning.
 - The major cause of death from diarrhoea is dehydration, especially in infants and young children.
 - Management of diarrhoea is aimed primarily at evaluation, prevention, and treatment of dehydration.

18.1 Acute Watery Diarrhoea

Assess for signs of shock; if present manage as outlined above in Section 17.4. Then classify diarrhoea in young children as given in Figure 18.1, and rehydrate as shown in Table 18.2. For older children, the clinical evaluation of dehydration is summarized in Table 18.3, and the rehydration protocol in Table 18.4.

Levels 2–3—Primary Care

Table 18. 1: Assessment and classification of management of diarrhoea in children below 5 years

Age of child	No dehydration (2 signs or less)	Some dehydration (2 signs)	Severe Dehydration
Young infants			
1 month to 11 months	Normal	Sunken eyes Restless/irritable Skin pinch goes back slowly	Lethargic/unconscious Sunken eyes Skin pinch goes back very slowly (>2 sec)
12 months to 59 months	Normal	Thirsty Able to drink	Lethargic/unconscious
		Restless/irritable Skin pinch goes back slowly Eyes sunken	Sunken eyes Not able to drink or drinking poorly Skin pinch goes back

Table 18. 2: Rehydration protocol for young children

Degree of dehydration	Age	Where	Type of liquid	Volume	Rate
No dehydration	1 week–2 months	Home	ORS	50–100ml	After every bout of diarrhoea
Plan A	?2 months – 5 years	Home	ORS	100–200ml	After every bout of diarrhoea
Some dehydration					
Plan B	1 week – 5 years	Health unit	ORS	75ml/kg	4 hours, then reassess
Severe dehydration	1 week–2 months	Health unit	Ringer's lactate or Hartmann's solution	100ml/kg	30ml/kg in 1 hr 70ml/kg in 5 hrs
Plan C	2 months – 5 years	Health unit	Ringer's lactate or Hartmann's	100ml/kg	30ml/kg in ½ hr 70ml/kg in 5 hrs

Table 18.3:Clinical evaluation of dehydration in older children

Clinical features	Mild dehydration (2 signs present)	Moderate dehydration (2 signs present)	Severe dehydration (2 signs present)
General appearance: older children And adults	Thirsty, alert	Thirsty, alert	Generally conscious, anxious, cold extremities, clammy, cyanosis, wrinkled skin of fingers, muscle cramps, dizzy if standing
Pulse	Normal	Rapid	Rapid, thready, sometimes absent
Respiration	Normal	Deep, some- times rapid	Deep and rapid
Systolic BP	Normal	Normal	Low, sometimes unmeasurable
Skin elasticity/ skin pinch	Immediate recoil	Decreased	Fold disappears very slowly (>2seconds)
Eyes	Normal	Sunken	Severely sunken
Tears	Present	Absent	Absent
Mucous membranes (test mouth with a clean finger)	Moist	Dry	Very dry
Urine output	Normal	Reduced, urine dark Anuria, empty bladder	
% of body weight loss	1–5%	6–9%	10% or plus
Estimated fluid deficit	10–50ml/kg	60–90ml/kg	100ml/kg

Table 18. 4 Clinical evaluations of dehydration in older children

Clinical features	Mild dehydration (2 signs present)	Moderate dehydration (2 signs present)	Severe dehydration (2 signs present)
General appearance: Older children and adults	Thirsty,alert	Thirsty,alert	Generally conscious, anxious, coldextremities, clammy, cyanosis,wrinkled skin of fingers, muscle cramps, dizzy if standing
Pulse	Normal	Rapid	Rapid, thready,sometimes absent
Respiration	Normal	Deep,some- times rapid	Deep andrapid
Systolic BP	Normal	Normal	Low,sometimes unmeasurable
Skin elasticity/ skin pinch	Immediate recoil	Decreased	Fold disappears very slowly (>2seconds)
Eyes Tears	Normal Present	Sunken Absent	Severely sunken Absent
Mucous membranes (test mouth with a clean finger)	Moist	Dry	Verydry
Urine output % of body weight loss	Normal 1–5%	Reduced, urine dark 6–9%	Anuria, empty bladder 10% orplus
Estimated fluid deficit	10–50ml/kg	60–90ml/kg	100ml/kg

Table 18. 5: Rehydration protocol for older children

Degree of dehydration	Age	Type of liquid	Volume to give	Rate
Mild	All	ORS	50ml/kg	In 4 hrs
Moderate	All	ORS	100ml/kg	In 4 hrs
Severe	Older children	Hartmann's solution, Ringer's lactate	110 ml/kg	In 4 hrs: at first as rapidly as possible until a radial pulse is palpable

NOTES: (a) Initially, older children can drink 300 ml/hour. (b) If Ringer's lactate or Hartmann's solution is not available, use normal saline.

18.2 Diarrhoea/GE Protocol (Excluding Severe Malnutrition)

- ◆ Antibiotics are NOT indicated unless there is dysentery or persistent diarrhoea and proven amoebiasis or giardiasis (Refer to table 18.6).
- ◆ Diarrhoea >14 days may be complicated by intolerance of ORS—worsening diarrhoea – if seen change to IV regimens.
- ◆ All cases to receive zinc.

Management of diarrhoea and rehydration are illustrated in Figure 18.1, and summarized in the subsequent text.

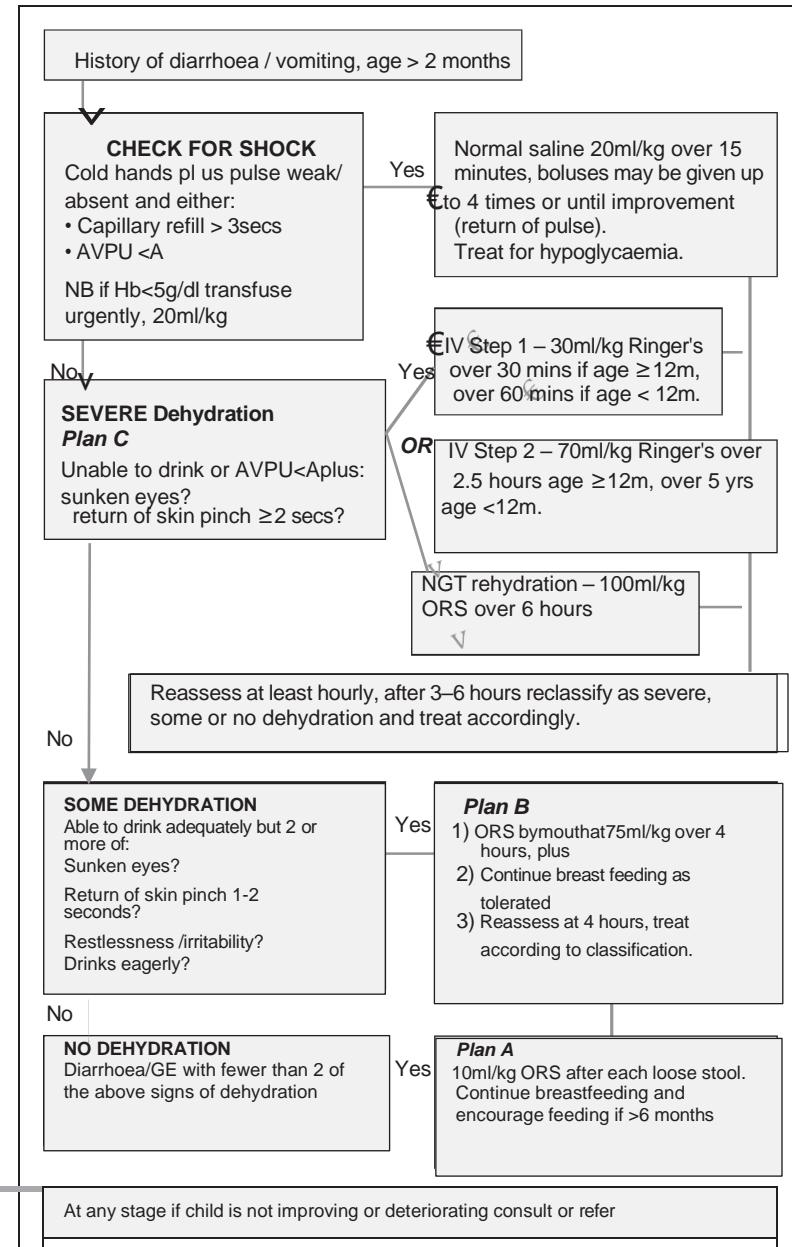


Figure 18:1 Management-Rehydration Protocol for young children

Management - Rehydration Protocol For All Ages (Summary)

For children with severe dehydration:

- ◆ Consider the volumes indicated as guidelines only.
- ◆ Evaluate rehydration in terms of clinical signs, NOT in terms of volume of fluids given.
- ◆ Monitor the child with shock every 15–30 minutes until pulse is palpable. Thereafter monitor other signs of dehydration.
- ◆ If signs of severe dehydration persist, repeat the rehydration in plan C.
- ◆ If improving and child can drink, start ORS (about 5ml/kg/hr.). Show the mother how to give ORS.
- ◆ Evaluate preferably every hour until signs of dehydration disappear (usually within 4hrs).
- ◆ If diarrhoea is severe (> 1 stool every 2 hrs), continue with IV fluids.
- ◆ For other children, continue ORS (Plan A).

Fluid to be given after correction of dehydration:

- ◆ Up to 2 years: 50–100ml for every stool passed
- ◆ 2–5 years: 100–200ml for each loose stool
- ◆ 5 years and above: 300ml and more as desired. Thirst is the best guide for maintenance fluid therapy in older children.
- ◆ If child vomits wait 10 minutes and give same volume slowly.
- ◆ Periorbital oedema is a sign of fluid overload.
- ◆ If this occurs, stop the ORS, and give plain water or breast milk in breast feeding children.

All children under 5 years give zinc for 10–14 days

- ◆ Up to 6 months 10mg/day
- ◆ 6 months and above 20mg/day

Ask caregiver to return to health facility if no improvement in 3 days or if the patient develops the following:

- ◆ Many watery stools, very poor drinking, repeated vomiting, fever, marked thirst, and blood in stool.
- ◆ Also, if the caregiver is not happy with the child's condition.
- ◆ At any stage if child is not improving or deteriorating, consult or refer.

Management - Nutrition

It has been shown that there is no physiological reason for discontinuing food during bouts of diarrhoea and that continued nutrition is beneficial to all children. Continued feeding should be encouraged, for example

Levels 2–3—Primary Care

- ◆ Under 6 months: Breastfeed on demand as soon as baby is able to feed
- ◆ 6–24 months: Breastfeed on demand and offer complementary food.
- ◆ 2 years and above: Provide family foods while continuing ORS:

- Give cereal or starchy food mixed with some vegetable or protein foods.
- Give fresh fruit or mashed bananas to provide potassium.
- Food-based fluids (soups, enriched *uji*, *madafu*, *mala*) can be used during the oral rehydration phase.
- Give an extra meal per day for 2 weeks after recovery.
- Give vitamin A if child has not received a dose in the last 3 months.

Management – Pharmacological

- ◆ Majority of acute gastroenteritis in young children is viral.
- ◆ Anti-diarrhoea drugs (e.g., absorbents) and antiemetics are contraindicated in children.
- ◆ If child has fever consider other diseases associated with diarrhoea (e.g., malaria, otitis media, pneumonia).
- ◆ Antimicrobial drugs should be used for children only as follows:
 - Antibiotics only for dysentery and suspected cholera.
 - Antiprotozoal drugs: metronidazole for:
 - Amoebiasis only after antibiotic treatment of bloody diarrhoea has failed or feaces shows trophozoites of *E. histolytica*.
 - Giardiasis when diarrhoea has lasted over 14 days and cysts or trophozoites of giardia are seen in feaces.
- ◆ Antibiotics for specific intestinal infections are listed in Table 18.5.

~ **Most acute diarrhoea in children is viral and does NOT require antibiotics.**

Table 18. 6: Antimicrobials used in the treatment of diarrhoea

Aetiology/Clinical Features	Management
Cholera: Very profuse watery diarrhoea (rice-water stools), often vomiting	Doxycycline 2 to 4mg/kg max 300mg as single dose Or Azithromycin 20mg/kg max 1g single dose
Shigella dysentery: Blood & mucus in stools, cramps, tenesmus, fever	Ciprofloxacin 15mg/kg bdx3days

18.3 Persistent Diarrhoea

This is diarrhoea that starts acutely but lasts 14 days or more. It can be watery or with blood. The degree of dehydration assessed as in acute diarrhoea. Causes include:

- ◆ Malnutrition
- ◆ Occult infections
- ◆ HIV
- ◆ Candidiasis
- ◆ Amoebiasis
- ◆ Giardiasis

Note: Persistent and prolonged diarrhoea predisposes to malnutrition, especially if the nutritional status was borderline.

Management

Management for dehydration is the same as that for acute diarrhoea. Then:

- ◆ Treat underlying condition if present.
- ◆ Do not give antibiotics unless there is specific indication.
- ◆ Refer all children with severe dehydration and when diarrhoea persists despite treatment.

Feeding Recommendation for a Child with Persistent Diarrhoea

- ◆ Successful diet is characterized by:
 - Weight gain
 - Adequate food intake according to age
 - Disappearance diarrhea
- ◆ If still breastfeeding, give more frequent, longer breastfeeds, day and night.
- ◆ If not, breast feeding, use fermented milk products such as *mala* or yoghurt or any other high protein but low lactose food or drinks as these are tolerated better. The aim is to give 110 calories/kg/day, of which 10% is protein. Use locally available food.
- ◆ For other foods, follow feeding recommendations for the child's age. Ensure adequate intake.
- ◆ Encourage the child to feed.
- ◆ Give an extra meal per day and continue until one month after diarrhoea has stopped.
- ◆ Give micronutrients:
 - Multivitamin supplements
 - Vitamin A,
 - Folate
 - Iron, and
 - Zinc

18.4 Prevention of Gastrointestinal Tract (GIT) Infections

- ◆ **Adequate nutrition:** Breastfeeding exclusively up to age 6 months, and continue together with adequate complementary foods at least up to age 2 years.
- ◆ **Food hygiene:** All food consumed by the whole household must be prepared and stored hygienically. This also depends on the availability of a safe and adequate water supply. Water for drinking to be boiled or treated with chlorine (household bleach, e.g Jik).
- ◆ **Environmental sanitation:** Disposal of wastes (human and household) in the homes and communal areas is essential. Practice hand washing after using the toilet, after changing baby's nappy, and before preparing/eating food. Teach children, even young children, to wash their hands regularly.
- ◆ **Managing food handlers:** Food handlers should be examined regularly, especially in schools, and when necessary, treated appropriately.

19. Fever

Fever is a common but nonspecific presenting sign in children. Any child with a temperature of 37.5°C or above is said to be febrile. Fever accompanies a wide variety of illnesses and need not always be treated on its own. In general, the cause should be ascertained before therapy as far as possible.

Clinical Features

History should take into account the duration, place of residence or travel to areas of high malaria transmission, pain on passing urine, pain in the ears, and whether there is a rash or not. A thorough physical examination to find localizing signs should also be done.

- ◆ Fever without localizing signs can be due to:
 - Malaria
 - Septicaemia
 - Urinary tract infection
 - HIV
- ◆ Fever with localizing signs can be due to:
 - Ear or throat infection
 - Pneumonia
 - Septic arthritis
 - Osteomyelitis
 - Meningitis
 - Skin and soft tissue infection
- ◆ Fever with a skin rash is commonly due to:
 - Viral infections
 - Meningococcal infection
- ◆ Fever lasting longer than 7 days can be due to:
 - Abscesses
 - Infective endocarditis
 - Tuberculosis
 - HIV
 - Salmonella infections,
 - Any chronic infection or inflammatory conditions or malignancies.

Levels 2–3—Primary Care

Management – General

- ◆ Ask parent to reduce clothing to a minimum in all cases.
- ◆ Ensure adequate fluid intake.
- ◆ Ensure adequate nutrition.
- ◆ If fever is high(>39°C) or child in pain, give paracetamol(seeTable19.1).
- ◆ Treat the cause if identified.
- ◆ Give an antimalarial if at risk (refer to Section 20, below, on malaria).
- ◆ Review child after 5 days.
- ◆ Ask parent to return any time if child not improving or getting worse.

Table 19. 1: Paediatric paracetamol doses, every 6 hours

Age	Weight(kg)	500mg tablet	120mg/5ml syrup
2–12 months	6–9	¼	2.5–5ml
12 months up to 3 years	10–14	¼	5–10ml
3–5 years	15–19	½	10ml

~ **Fever alone is not a reason to give antibiotic except in a young infant (age less than 2 months).**

Management – Specific

Identification of the cause is the key to management and helps to prevent over use of specific drugs, e.g., antibiotics or antimalarials.

Management of Fever at the Community Level

Since most of the cases of fever occur at the community level, it is essential to train health care providers and caregivers where applicable on early recognition and prompt initiation of treatment at the community level.

The patient should be taken immediately to a health facility if there are any features of severity as described in the section on severe malaria below.

20. Malaria

Malaria parasites are usually transmitted by the bite of an infected female anopheles mosquito. Plasmodium falciparum is the commonest type in Kenya and is associated with significant morbidity and mortality. The other species are; P. malariae, P. vivax, and P. ovale.

20.1 Clinical Features of Malaria

20.1.1 UNCOMPLICATED MALARIA

- ◆ Classically malaria presents with paroxysms of fever, chills, rigors, and sweating.
Other features include:
 - ◆ Malaise
 - ◆ Headache
 - ◆ Myalgia
 - ◆ Joint pains
 - ◆ Refusal to feed
 - ◆ Nausea
 - ◆ Vomiting
 - ◆ Abdominal discomfort
 - ◆ Diarrhoea.

-Remember not all fevers are due to malaria. These signs are nonspecific.

20.1.1 SEVERE AND COMPLICATED MALARIA

This presents with a combination of most of the above plus either one or more of the following:

- ◆ Severe anaemia ($Hb < 5g/dl$)
- ◆ Lethargy or altered unconsciousness or coma
- ◆ Generalized convulsions
- ◆ Jaundice
- ◆ Hypoglycaemia (blood sugar $< 2.2 \text{ mmol/L}$)
- ◆ Respiratory distress, pulmonary oedema
- ◆ Acidosis
- ◆ Disseminated intravascular coagulopathy (DIC – spontaneous bleeding)
- ◆ Malaria haemoglobinuria (cola coloured urine)
- ◆ Oliguria
- ◆ Shock
- ◆ Fluid electrolyte imbalance

20.2 Diagnosis of Malaria

Children under 5 years old

- ◆ In high malaria endemic areas, any child with fever or history of fever should be presumptively classified and treated as malaria. The use of parasitological diagnosis is not a prerequisite for treatment.
- ◆ In low malaria endemic areas, any child with fever or history of fever in the absence of measles, running nose, or any other identifiable cause of fever should be presumptively classified and treated as having malaria. The use of parasitological diagnosis is recommended where possible.

Older children >5 years of age

- ◆ In all patients 5 years and above with fever or history of fever the use of parasitological diagnosis is recommended.
- ◆ At health facilities where malaria diagnostics (microscopy or RDT) are not available, patient with fever or history of fever in whom the health worker strongly suspects malaria and has eliminated other possible causes of the fever, should be presumptively classified and treated as malaria.

20.3 First Line Treatment of Uncomplicated Malaria

Treatment for All Age Groups

- ◆ The recommended first line treatment for uncomplicated malaria in Kenya is artemether-lumefantrine (AL) currently available as a co-formulated tablet containing 20mg of artemether and 120mg of lumefantrine. This is administered as a 6-dose regimen given over 3 days (see Table 20.1).
- ◆ Malaria patients with HIV/AIDS should be managed according to the same regimen.
- ◆ In children below 5kg (under 2 months of age), malaria is not a common cause of fever. Evaluation of other causes should be undertaken. Where malaria is diagnosed, the recommended treatment is oral quinine.

Table 20.1: Dosing schedule for artemether-lumefantrine

Body Weight (kg)	Age	Dose of AL to be administered at 0 hrs, 8 hrs, 24 hrs, 36 hrs, 48 hrs, 60 hrs
5 to < 15kg	5 months to < 3 years	20 mg artemether and 120 mg lumefantrine
15 to < 25kg	3 to < 8 years	40 mg artemether and 240 mg lumefantrine
25 to < 35kg	8 to < 12 years	60 mg artemether and 360 mg lumefantrine
≥ 35	≥ 12 years	80 mg artemether and 480 mg lumefantrine

Counselling, Supportive Treatment, and Follow Up

For all patients the following counselling messages should be provided

- ◆ Explain dosing schedule: Use probing questions to confirm patient's understanding.
- ◆ Emphasize that all 6 doses must be taken over 3 days even if patient feels better after few doses.
- ◆ Directly observe the first treatment dose.
- ◆ If vomiting occurs within 30 minutes after drug administration, repeat the dose.
- ◆ Advise that artemether-lumefantrine should preferably be taken with a meal.
- ◆ Advise caregiver to bring the patient back to the nearest health facility immediately if the condition deteriorates at any time, or if symptoms have not resolved after 3 days.

Supportive treatment

- ◆ Fever management: In cases of hyperpyrexia (temp>39.5°C) administer antipyretic. The recommended options are paracetamol or ibuprofen.
- ◆ Encourage adequate fluids and nutrition: Caregivers should be encouraged to give extra fluids and where applicable continue breastfeeding. Feeds and fluid should be administered in small quantities at frequent intervals, especially when the child is still very sick.

Treatment failure

Treatment failure can be defined as a failure to achieve the desired therapeutic response after the initiation of therapy. Treatment failure is not synonymous with drug resistance. Treatment failure may result from poor adherence to treatment, unusual pharmacokinetic properties in that individual, or drug resistance.

Treatment failure could also arise because of a wrong diagnosis and thus initiation of the wrong treatment. In evaluating a patient with treatment failure, it is important to determine whether the patient vomited previous treatment or did not complete a full treatment course.

Treatment failures should be suspected if patient deteriorates clinically at any time or symptoms persist 3–14 days after initiation of drug therapy in accordance with the recommended treatment regimen.

Development of symptoms 14 days after initiation of therapy where there has been prior clearance of symptoms should be considered as a new infection and be treated with the first line drug.

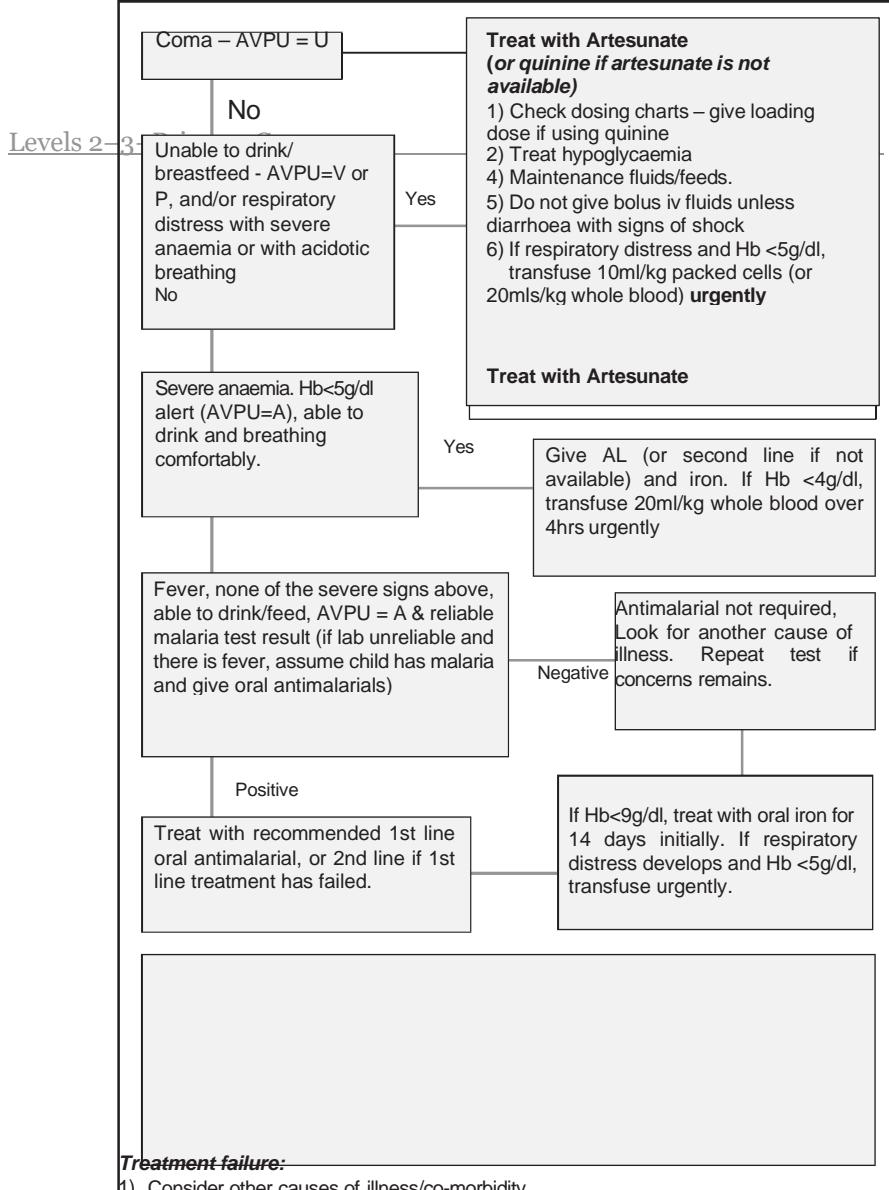
~ Remember that not all fevers are due to malaria. A fever that does not respond to adequate antimalarials may be due to other causes.

20.4 Second Line Treatment for All Age Groups

The recommended second line treatment for uncomplicated malaria in Kenya is dihydroartemisinin-piperaquine (DHA-PPQ). This is currently available as a fixed dose combination containing 20mg dihydroartemisinin and 160mg of piperaquine. These are administered once daily for three days (refer to Table 20.2).

Table 20. 2: Dosing schedule for dihydroartemisinin + piperaquine

Body weight (kg)	Dihydroartemisinin + piperaquine dose (mg) 5
to < 8 kg	20mg dihydroartemisinin + 160 mg piperaquine
8 to < 11 kg	30mg dihydroartemisinin + 240mg piperaquine
11 to < 17 kg	40mg dihydroartemisinin + 320mg piperaquine
17 to <25 kg	60mg dihydroartemisinin + 480mg piperaquine
25 to <36 kg	80mg dihydroartemisinin + 640mg piperaquine
36 to <60 kg	120mg dihydroartemisinin + 960mg piperaquine
60 to <80kg	160mg dihydroartemisinin + 1280mg piperaquine
>80 kg	200mg dihydroartemisinin + 1600mg piperaquine



Treatment failure:

- 1) Consider other causes of illness/co-morbidity
- 2) A child on oral antimalarials who develops signs of severe malaria (Unable to sit or drink, AVPU=U or P, and/or respiratory distress) at any stage should be changed to IV quinine.
- 3) A child on oral antimalarials who has fever and a positive blood slide after completing 3 days (72hours) therapy should receive a full course of quinine.

Figure 20:1 Management of complicated malaria

20.5 Management of Complicated Malaria

- ◆ Carry out emergency care (see Chapter 17, paediatric emergencies).
- ◆ Secure airway, breathing, circulation.
- ◆ After stabilization, give pre-treatment drugs and transfer urgently.
- ◆ Correct hypoglycaemia if present. Treat convulsions if present. Measures for unconscious patients.

Malaria Treatment in Malaria Endemic Areas

If a high-quality blood slide is negative, then only children in coma or those with severe anaemia should be treated presumptively for malaria.

The recommended treatment for severe malaria is parenteral artesunate. The preferred route of administration is intravenous (IV). However intramuscular (IM) can be used as an alternative where the intravenous route is not feasible. In the absence of artesunate, parenteral quinine or IM artemether should be administered.

20.5.1 ARTESUNATE

Artesunate is dispensed as a powder of artesunic acid. This must be dissolved in sodium bicarbonate (5%) to form sodium artesunate. The solution is then diluted in approximately 5ml of normal saline and given by intravenous (IV) injection or by intramuscular (IM) maximum 5ml per site. The solution should be freshly prepared prior to administration and should be used within 1 hour. The solution should NEVER be stored.

Dosage and administration of artesunate

- ◆ For children ≤ 20kg administer 3.0 mg/kg
- ◆ For other patients >20kg administer 2.4 mg/kg
- ◆ Intravenous routes are preferred.
 - Weigh the patient to determine the dosage needed and therefore the number of vials required.
 - Dissolve each vial of artesunic powder with all the 5% sodium bicarbonate solution provided with each vial. Shake gently until the resultant solution is clear. (If it doesn't dissolve and become clear, discard the vial and reconstitute a new one).
 - Dilute resultant solution in each vial with 5ml normal saline if normal saline is not available 5% dextrose* can be used.
 - The final solution has a strength of 10mg/ml.

- Calculate the volume of solution containing the required amount to be given
seed skill in calculation of artesunate (refer to national malaria management guidelines)
- Administer by slow IV over 3-5 minutes.
- ◆ Intramuscular
 - Weigh the patient to determine the dosage needed and therefore the number of vials required.
 - Dissolve each vial of artesunic powder with all the 5% sodium bicarbonate solution provided with each vial. Shake gently until the resultant solution is clear. (If it doesn't dissolve and become clear, discard the vial and reconstitute a new one)
 - Dilute resultant solution with 2ml normal saline if normal saline is not available 5% dextrose* can be used.
 - The final solution has a strength of 20mg/ml.
 - Calculate the volume of solution containing the required amount to be given see skill on calculation of artesunate (refer to national malaria management guidelines).
 - Administer by IM route.
 - Spread the doses of more than 2ml over different sites for babies and 5ml for adults. * This refers to 60mg artesunate.
 - For all other strengths refer to product insert for diluent volume.

20.5.2 ARTEMETHER

Artemether is dispensed as a clear oily solution of differing concentrations. Artemether must only be given by intramuscular (IM) injection.

Dosage and administration of artemether

- ◆ Artemether is administered by the intramuscular route at a loading dose of 3.2mg/kg IM stat then 1.6mg/kg IM once every 24 hrs until the patient is able to tolerate oral medications (Maximum of 7 days).
- ◆ Thereafter a complete course of Artemether-lumefantrine is given.

20.5.3 INTRAMUSCULAR QUININE

- ◆ The dosage of IM quinine injection for pre referral treatment is a loading dose of 20mg/kg up to a maximum of 1,200mg.
- ◆ How to give the intramuscular injection:
 - Weigh the patient (if he/she cannot be weighed the following formula can be used to estimate the weight of children under 5 years: **(Age (in years) x 2) + 8 = wt in kg**).
 - Use a 10ml sterile syringe. Draw up 5ml of sterile water for injection. Then into the same syringe, draw up 300mg (1ml) from an ampoule of quinine. The syringe now contains 50mg quinine per ml.

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- Mix the drug by shaking the syringe before injection. *For the formulation of 600mg/2ml, only one ml is drawn out into the syringe. For the 300mg/ml the whole vial is drawn out while for the 150mg/ml, two vials will be required to make 300mg.
- In all situations a maximum of 3ml should be injected into one injection site. If the amount to be injected exceeds 3ml, half the amount should be injected into each injection site (refer to Table 20.3 and 20.4 below for number of sites).

Table 20.3: Dosage of intra-muscular injection of quinine dihydrochloride after dilution to 50mg/ml and give based on 10mg/kg dose (children below 30kg)

Weight range(kg)	Volume of quinine injection (ml)	No. of injection sites
<5	1.	1
5 - 7.5	1.5	1
7.6 -10	2.0	1
10.1-12.5	2.5	1
12.6-15	3.0	1
15.1-17.5	3.5	2*
17.6-20	4.0	2*
20.1-22.5	4.5	2*
22.6-25	5.0	2*
25.1-27.5	5.5	2
27.6-30	6.0	2

* Inject half to each thigh

Table 20. 4: Dosage of intra-muscular injection of quinine dihydrochloride After dilution to 100mg/ml (older children above 30kg)

Weight range (kg)	Volume of quinine injection (ml)	No. of injection sites
31– < 36	3.2	2
36– < 41	4.0	2
41– < 46	4.5	2
46– < 51	5.0	2
51– < 56	5.5	2
56– < 60	6.0	2
60 +	6.0	2

Dilution to 100mg/ml:

- Use 10ml sterile syringe.
- Draw up 4ml of sterile water for injection. Then into the syringe, draw up 600mg(2ml)from an ampoule of quinine and shake. The syringe now contains 100mg quinine per ml.
- NOTE: Each injection should not be more than 3ml per injection site. The maximum dose is 600mg.

~ Oral quinine via NG tube can be used when parenteral quinine is not available.

Chemoprophylaxis

Anti-malaria prophylaxis should be given to the following groups:

- ◆ All non-immune visitors to malarious areas use mefloquine or proguanil
- ◆ Long-term residence >4weeks
- ◆ Short-term residence <4weeks

Use proguanil for

- ◆ Patients with sickle cell disease and thalassaemia
- ◆ Patients with tropical splenomegaly syndrome or splenectomy

Chemoprophylaxis regimes

- ◆ Proguanil (daily dosing), as shown in Table 20.5.
- ◆ Nonimmune visitors: Start daily one week before arrival and continue for 4 weeks after leaving malarious area.
- ◆ Others use indefinitely.

Table 20. 5: Dosage schedule for proguanil (daily PO)

Age	Dose
<1yr	25mg ($\frac{1}{4}$ tablet)
1–4yrs	50mg ($\frac{1}{2}$ tablet)
5–8yrs	75mg ($\frac{3}{4}$ tablet)
9–12yrs	100mg (1tablet)
Adult	200mg daily (2tablets)

Reduce Chances of Being Bitten by Mosquitoes

- ◆ Insecticide treated nets (ITNs): In high malaria areas it is recommended that all sleep under ITNs but especially children under age 5years.
- ◆ Use wire mesh to reduce entry of mosquitoes into the house.
- ◆ Use insect repellents, especially for visitors.
- ◆ Cover exposed skin in the evenings.
- ◆ Participate in indoor residual spraying programmes in epidemic prone areas.

Vector control

- ◆ Encourage all households to clear bushes around the house, drain any stagnant water, and avoid throwing away containers that may collect water.

Patient Education

- ◆ Seek early treatment for fever and remember that not all fevers are due to malaria.
- ◆ Always seek medical care if the fever does not respond to antimalarials.
- ◆ If they take antimalarials, complete the dose as prescribed for effectiveness of treatment and to prevent development of resistance.

21. Measles

Also called rubella, measles is one of the commonest childhood infectious exanthems. Measles is never subclinical, but the severity of the disease is related to the infective dose of the virus and the nutritional status of the child. Crowding tends to increase spread of the disease.

Clinical Features

Incubation 7–10 days. Fever. Catarrhal phase 2–3 days with cough, red eyes and runny nose followed by maculopapular rash. Assess for danger signs, clouding of the cornea, or extensive mouth ulcers.

Management

Uncomplicated Measles

- ◆ Give vitamin A to all children
- ◆ Review after 2 days and look for complications (eye, ear, mouth ulcers, pneumonia)

Complicated Measles

- ◆ Treat complications:
 - Conjunctivitis: With tetracycline eye ointment; review after 2 days. If improving ask mother to complete treatment. If not improved, refer.
 - Acute otitis media: With cotrimoxazole or amoxicillin. Review after 5 days.
 - Mouth ulcers: With nystatin gel or drops if child has thrush.
 - Pneumonia: See Section 24.7, on pneumonia.
 - Malnutrition: Commonly follows an infection of measles. It is precipitated by anorexia, stomatitis, fever, vomiting, diarrhoea, and other complications. Also important are frequent harmful cultural practices that impose fasting upon a child with measles.
- ◆ Counsel caregivers on the importance of nutrition. Increasing the frequency of feeding (an extra meal per day over the usual feeding) after measles illness is very important to help the child regain lost weight adequately.
- ◆ Refer all children with danger signs or those who fail to respond to outpatient treatment.
- ◆ If the child has no indication for referral take blood and send for confirmation.

Levels 2–3—Primary Care

Prevention

Immunization

Measles is preventable. Immunizations are given to infants who are 9 months or above, irrespective of whether they have suffered from measles/measles like illness. Measles immunization should be given to infants 6 months and above in the following circumstances:

- ◆ Siblings of a child with measles illness
- ◆ Children living in crowded places, refugee camps, children's homes
- ◆ Children admitted to hospital for any condition (age 6–9 months)
- ◆ Children in a locality with measles epidemic

Education

Advice to mothers/caregivers should include:

- ◆ Ensure all her children are fully immunized.
- ◆ Child should attend under 5 years children clinic on discharge.

~All children 9 months of age or older who are not immunized against measles and are brought to a health facility for any reason should be immunized and given Vitamin A supplements before leaving that facility.

22. Meningitis

Meningitis is an acute inflammation of the pia and arachnoid coverings of the brain with spread into the cerebro-spinal fluid (CSF). It is important to diagnose and start treatment early in order to prevent complications. The predominant causative bacterial organisms (pyogenic meningitis) vary with the age of the child.

Haemophilus influenzae commonly affects children under 5 years, while *streptococcus pneumoniae* (*pneumococcus*) tends to be more common after age of 5 years. Hib immunization, however, is reducing the incidence of meningitis due to *H. influenzae*. Viruses (aseptic meningitis), *Tubercle bacilli* (tuberculous meningitis) or fungi (fungal meningitis) also cause meningitis. *Neisseria meningitidis* (*meningococcus*) tends to cause meningitis in epidemics and affects all ages.

Predisposing factors for meningitis in children are: low immunity, prematurity, septicaemia, infections in the nose, sinuses, ears, throat and lungs penetrating injuries of the skull and spinal column and congenital malformations of the brain and spine.

Clinical Features

In a child >2 months, these include Fever, refusal to feed, vomiting, repeated convulsions, irritability, altered level of consciousness, headaches, photophobia, neck stiffness, and positive Kerning's sign.

Young children may also have bulging anterior fontanelle and high pitched cry. Signs of increased intracranial pressure include sutural diastasis, increased head circumference, unequal pupils, focal neurological signs, and irregular breathing. Patients presenting late in

the progression of the disease may have decerebrate rigidity or opisthotonus. The onset of tuberculous meningitis is more gradual and nonspecific. Child may complain of headache, vomiting, and poor feeding for several days before features of meningitis appear. Gradually the child becomes stiff and loses consciousness

Complications

These include subdural effusion, hydrocephalus, blindness, deafness, secondary epileptic seizures, mental retardation, and cerebral palsy. The child may also have retarded physical development.

Management

- ◆ Investigation and treatment should be done in higher level facility where admission and appropriate management are possible. Initiate treatment immediately (See Figure 22.1).
- ◆ Refer all patients to higher level if meningitis is suspected.

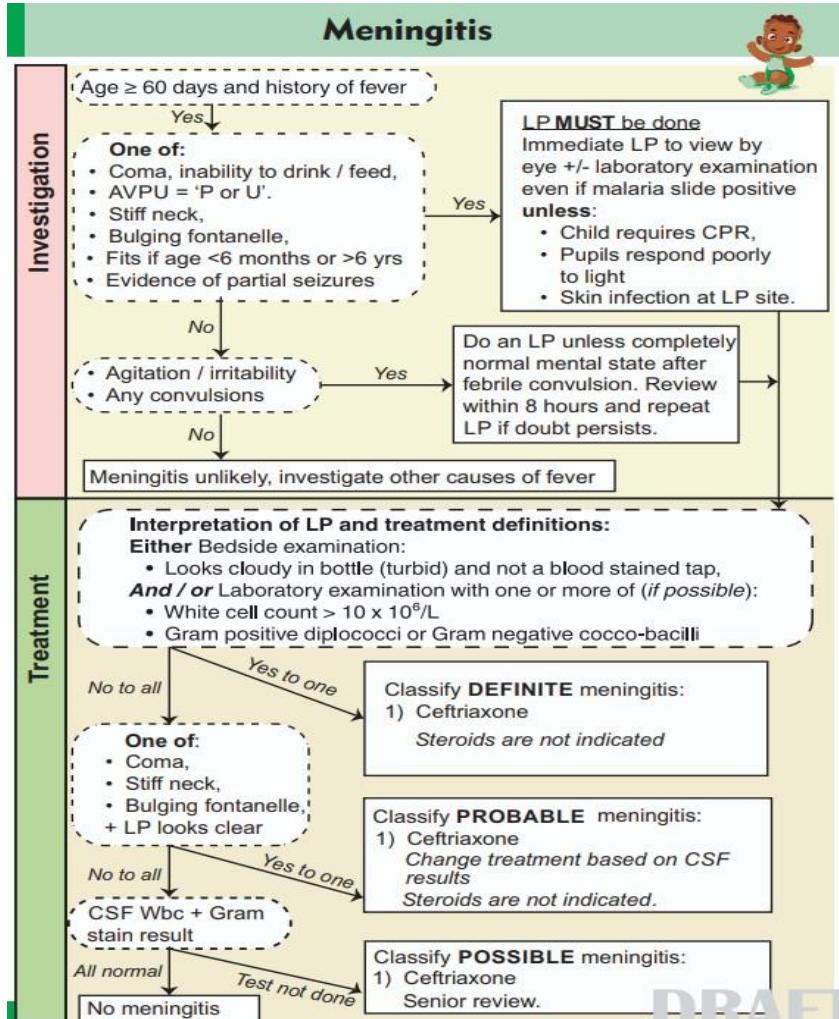


Figure 22:1 Flow chart for assessment and management of meningitis

Source: Kenya Basic Paediatric Protocols, 2022

23. Altered Consciousness or Convulsions

A detailed history from parent or caregiver to establish the cause and duration is crucial. The convulsion should be described in detail.

Aetiology

Infections (malaria, meningitis, encephalitis), trauma, tumours, cerebro-vascular accidents, complications of diabetes mellitus, epilepsy, liver failure, drug ingestion, poisoning and shock

Clinical Features

- ◆ The child should be put on the side to avoid aspiration.
- ◆ Clinically diagnostic abnormalities should be noted as the following emergency paediatric care is instituted:
 - Assess airway, breathing, and circulation.
 - Assess level of consciousness.

Complications

These include subdural effusion, hydrocephalus, blindness, deafness, secondary epileptic fits, mental retardation and cerebral palsy. The child may also have retarded physical development.

Management

- ◆ Investigation and treatment (Figure 23.1) should be done in higher level facility where admission and appropriate management are possible.
- ◆ Children older than 5 years can be assessed using the Glasgow coma scale.
- ~ **Refer all patients if meningitis is suspected. Initiate treatment immediately.**

Treatment of Convulsions

- ◆ If the child is convulsing:
 - Resuscitate as needed and give anticonvulsants (see flowchart)
 - When the child is stable: Refer. Continue observing airway and breathing, as well as position during transfer.
- ◆ For convulsions in the first 1 month of life:
 - Treat with phenobarbitone 20mg/kg IM STAT. A further 5–10mg/kg IM can be given within 24 hours of the loading dose (maximum 30mg/kg in 24hrs).
 - Give maintenance doses of 2.5–5mg/kg IM 24 hourly.

Figure 23. 1: Flowchart for the management of a convulsing child

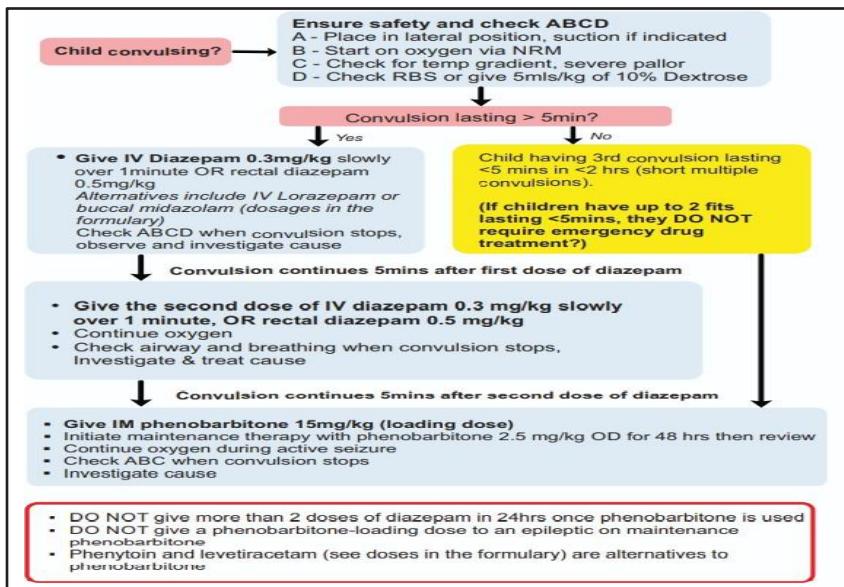


Figure 23:1 Flow chart for assessment and management of meningitis

Source: Kenya Basic Paediatric Protocols, 2022

24. Respiratory Diseases

Acute respiratory infections are common and have varying severity. Severe forms are responsible for high mortality in children under 5 years. Early diagnosis and proper treatment of pneumonia is essential to reduce mortality.

24.1 Acute Upper Respiratory Tract Infections

These include the common cold (acute rhinitis, coryza), and present as an acute, usually afebrile, viral infection of the respiratory tract with inflammation of all the airways including the nose, paranasal sinuses, throat, larynx, and often the trachea and bronchi.

Causes

Among these are rhinoviruses, influenza viruses, parainfluenza viruses, respiratory syncytial viruses, coronaviruses, adenovirus, and Coxsackie viruses.

Clinical Features

Nasal obstruction, watery rhinorrhoea, sneezing, sore throat, cough, watery red eyes, headache and general malaise.

Most children with these features do not present to health facility. Young infants may have difficulty in breastfeeding due to blocked nostrils.

Management

Most colds resolve spontaneously in 7–10 days. The following are recommended:

- ◆ Avoid aspirin, which may increase the risk of Reye's syndrome in children
- ◆ Avoid cough and cold remedies in the form of antihistamines, cough suppressants, expectorants, and mucolytics.
- ◆ Advise that treatment includes:
 - Analgesics and antipyretics, e.g., paracetamol if febrile.
 - Adequate fluid intake.

Patient Education

- ◆ The child's nose should be cleared regularly and the child should be returned to the health facility if their condition gets worse.
- ◆ The child should be kept warm, breastfed frequently, and the nose cleared if it interferes with breastfeeding.
- ◆ The child should be brought back to the health facility if breathing is difficult or feeding becomes a problem.

~ **Note: Antibiotics are of no value in viral infections.**

24.2 Pharyngitis and Tonsillitis

Acute inflammation of the pharynx and tonsils caused by streptococcus, viruses and occasionally diphtheria.

Clinical Features

Sore throat, painful swallowing, general malaise, fever, body aches, rhinitis. In children, vomiting and abdominal pain may be present. Tender cervical or submandibular lymph nodes usually indicate streptococcal infection.

~ Look for membrane in case of diphtheria.

Complications

Streptococcal infection include otitis media, rheumatic fever with or without carditis.

Management

- ◆ If conjunctivitis is present, consider viral infection and treat symptomatically at home.
- ◆ If there are yellowish spots or membrane on tonsils or tender lymph nodes, treat as streptococcal infection at home with amoxicillin (25mg/kg/dose every 12hrs). If patient is allergic to penicillin use erythromycin.
- ◆ Refer if child develops:
 - Severe difficulty in breathing.
 - Has suspected diphtheria.

24.3 Deep Neck Infection

These are infections (cellulitis or abscesses) in the potential spaces around the neck, e.g., peritonsillar space, retropharyngeal space, submandibular space and parapharyngeal space.

Management

Start on systemic antibiotics, e.g., amoxicillin + clavulanic acid, then refer because of the risk of airway obstruction.

~ Treatment with antibiotics for LESS THAN 7 days may NOT prevent Rheumatic fever.

24.4 Diseases of the Adenoids

Adenoid hypertrophy commonly occurs in children. It may be due to simple enlargement, to inflammation, or to both. It is the size of the mass relative to the nasopharyngeal space rather than the absolute size that is important.

Clinical Features

Nasal obstruction leading to mouth-breathing, difficulty in breathing and eating, drooling of saliva, snoring and toneless voice. Other features are persistent nasal discharge, cough, cervical adenitis. Mental dullness and the apathy may be marked. Eustachian tube obstruction leads to deafness.

Management

Refer all suspected cases to higher level for appropriate management.

24.5 Sinusitis

This is usually a complaint following a URTI or is seasonal. It can be acute or chronic. It can be infective or allergic in origin.

Clinical features

Child will have pain over affected sinus.

Management

- ◆ If the nasal discharge is purulent, with nasal obstruction, an early nocturnal cough, and inflamed nasal mucosa, treat with antibiotics for a week.
- ◆ If the nasal discharge is watery, with nasal obstruction, sneezing, and pale/ bluish nasal mucosa, treat with antihistamines.
- ◆ For children who have bilateral purulent nasal discharge of more than 10 days duration, treat with amoxicillin for 7 days. If the purulent nasal discharge is unilateral, exclude foreign body especially in young children.
- ◆ Refer if child does not respond to treatment

24.6 Conditions Presenting with Stridor

Stridor is a harsh sound heard during inspiration when there is narrowing of the upper airways. including oropharynx, sub glottis, larynx, and trachea.

Conditions presenting with stridor include:

- ◆ Viral croup including that due to measles

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- ◆ Retropharyngeal abscess
- ◆ Foreign body inhalation
- ◆ Diphtheria
- ◆ Pressure on the airways by masses in the neck or mediastinum
- ◆ Congenital laryngeal anomaly
- ◆ Epiglottitis

Clinical Features

- ◆ **Viral group:** Barking cough, hoarse voice, respiratory distress if obstruction is severe (tachypnoea, supraclavicular, suprasternal, subcostal, and intercostal inspiratory retractions, cyanosis). Fever in 50% of children. Signs of measles if it is the cause.
- ◆ **Retropharyngeal abscess:** Swelling in the neck, difficulty in swallowing, drooling, fever.
- ◆ **Foreign body:** History of choking, sudden onset respiratory distress.
- ◆ **Diphtheria:** Severe neck swelling, membrane on throat and tonsils.
- ◆ **Congenital anomaly:** Stridor from birth.
- ◆ **Pressure on airways:** Obvious masses in neck or mediastinum on x-ray.

Management

- ◆ Mild croup can be treated at home: encourage adequate intake of fluids and feeding according to age.
- ◆ Ask the mother to bring child back immediately if she notices difficulty in breathing or feeding.
- ◆ Refer all children with respiratory distress.
- ◆ Foreign body: **This may be life threatening** if main airway is blocked. Action should be immediate if the child is to survive (see Section 17.6, choking).

24.7 Lower Respiratory Tract Infections: Pneumonia

24.7.1 PNEUMONIA IN CHILDREN AGED BELOW 5 YEARS

Clinical Features in Infant Aged Less than 2 Months

Pneumonia, sepsis, and meningitis in infants less than 2 months of age can rapidly lead to the death of the infant. Specific symptoms may be lacking.

These conditions should be suspected if any of the following are present:

- ◆ Stopped feeding well (if feeding well before)
- ◆ Convulsions
- ◆ Abnormally sleepy or difficult to wake
- ◆ Stridor in calm child
- ◆ Wheezing

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- ◆ Fever (38°C or more) or low body temperature (below 35.5°C)
- ◆ Severe chest indrawing
- ◆ Fast breathing (60 per minute or more)
- ◆ Central cyanosis (of the tongue)
- ◆ Grunting
- ◆ Apnoeic episodes
- ◆ Distended and tense abdomen

Clinical Features in Child Aged 2 months – 5 years

- ◆ The following are important to find out about in history:
 - Duration of cough or difficulty inbreathing
 - Choking or sudden onset in a previously well child
 - Exposure to someone with TB
 - Known HIV infection
 - Family history of asthma
 - Presence and duration of fever
- ◆ The following features are danger signs and their presence makes the illness very severe:
 - Not able to drink or breastfeed
 - The child had convulsions or is convulsing now
 - Abnormal sleepiness (lethargy) or difficult to wake (unconscious)
- ◆ Examination should be carried out in a calm child to determine the following:
 - Respiratory rate (breaths per minute)
 - Lower chest indrawing
 - Stridor
 - Wheeze

NOTE: Presence or absence of either fever or crepitations (rales) on auscultation are NOT reliable clinical features for diagnosing pneumonia in young children.

The features listed above are more sensitive in identifying these diseases and facilitating their effective intervention.

Severe malnutrition

Evaluate carefully to make a diagnosis of the cause of cough or difficult breathing, which might be caused by a number of conditions that include the following: Pneumonia and its complications (pleural effusion, empyema, pneumothorax), malaria, cardiac disease with cardiac failure, severe anaemia, foreign body aspiration, and tuberculosis infection.

Management for Acute Respiratory Infection and Pneumonia

See Figure 24.1, ARI/Pneumonia protocol for children aged 2 months to 4 years, and Table 24.1, which provides a guide to fast breathing cutoff points.

Classification of Pneumonia (Age 2 Months – 5 Years)

- ◆ **Very severe pneumonia:** Presence of any one danger sign or central cyanosis or severe respiratory distress. Auscultatory signs of pneumonia or presence of complications
- ◆ **Severe pneumonia:** Presence of one of the following—lower chest retraction, flaring alae nasi, grunting. Auscultatory signs of pneumonia but no signs of very severe pneumonia.
- ◆ **Non severe pneumonia:** Child with fast breathing, signs of pneumonia on auscultation but no signs of severe or very severe pneumonia.

~ Management of pneumonia depends on age and severity. Non Severe Pneumonia in Children over 2 Months of Age

- ◆ Treat as outpatient – Use amoxicillin 25–50mg/kg/day
- ◆ Give first dose of antibiotic in clinic
- ◆ Instruct mother on how to give the antibiotic for the five days at home (or to return to clinic for daily procaine penicillin injection).
- ◆ Ask mother to bring the child for review after 2 days or earlier if child gets worse (see danger signs).
- ◆ If child can be treated as outpatient advise mothers:
 - Feed the child during illness
 - Increase feeding after illness
 - Clear the nose if it interferes with feeding
 - Increase fluids: Offer the child extra drink, increase breastfeeding

NO Pneumonia: Cough or Cold

A child classified as having NO Pneumonia: Cough or Cold, should be monitored at home on home treatment. However, the caregiver should be told to bring the child quickly back to the health facility if the child develops any of the following:

- ◆ Breathing becomes difficult
- ◆ Breathing becomes fast
- ◆ Child is not able to drink
- ◆ Child becomes more sick.

~ Refer all infants and children with severe disease and any child not responding to treatment.

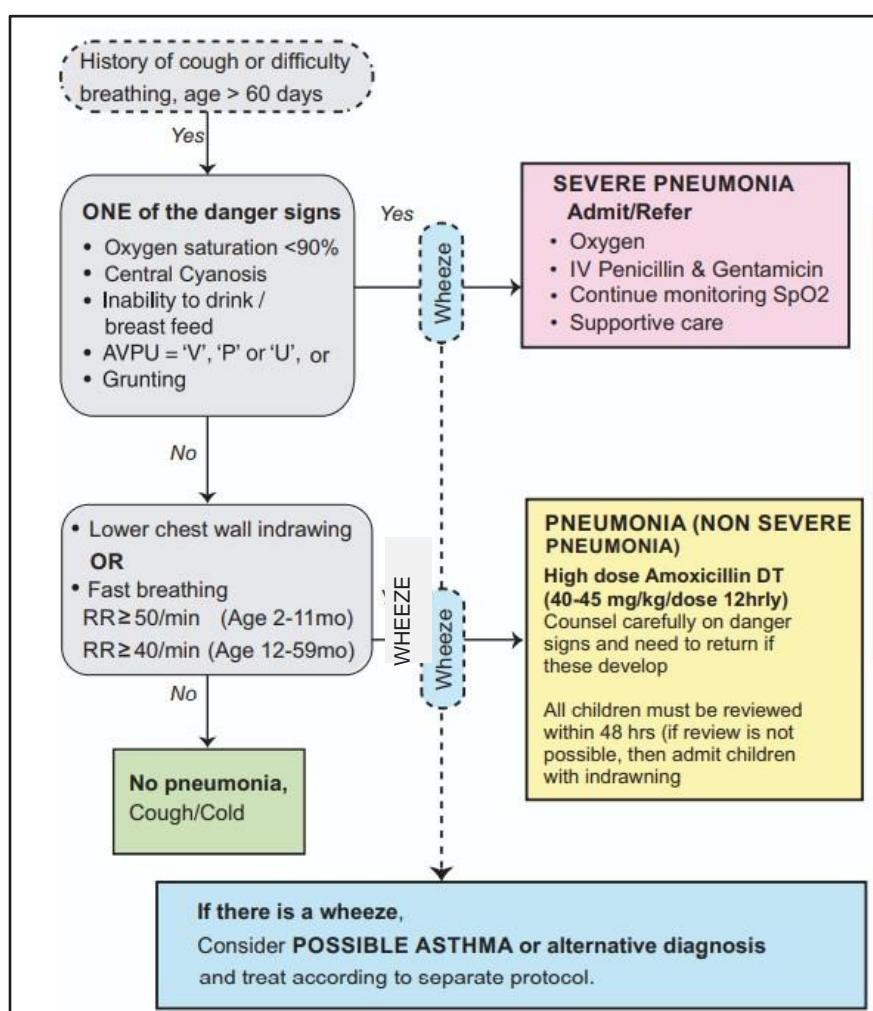


Figure 24:1 Pneumonia protocol for children aged 2-59 months without severe

Source: Kenya Basic Paediatric Protocols, 2022

Levels 2–3—Primary Care

Counselling Parents

All parents should be informed about child's illness and what to do to prevent recurrence. They should be encouraged to seek medical attention early in the disease to prevent severe features which are associated with poor outcomes and are more difficult and costly to treat.

Table 24.1: Fast breathing cut off points

Age	Fast breathing
Under 2 months (young infant)	60 breaths per minute or more
2 months upto 12 months	50 breaths per minute or more
>12 months up to 5 years	40 breaths per minute or more

24.1.1 PNEUMONIA IN CHILDREN OLDER THAN 5 YEARS

Children older than 5 years are less likely to suffer from pneumonia than the younger children, unless they have another underlying condition. In a previously well child, the causative organism in this age group is usually pneumococci leading to consolidation of the lung parenchyma (lobar pneumonia). Organisms vary if child is immunocompromised, has chronic lung disease, developed pneumonia operatively or after aspiration, or is debilitated.

Clinical Features

- ◆ **Lobar pneumonia:** Breathlessness, cough with or without sputum which may be rust coloured, fever, pleuritic chest pain. Bronchial breathing, reduced chest movements, reduced breath sounds, tachypnoea, crackles, and percussion dullness.
- ◆ **Nonlobar pneumonia:** The clinical features are similar to those of lobar pneumonia except that there is no bronchial breathing. Complications are similar to those for younger children.

Management – Non-Severe Pneumonia

- ◆ Treat as outpatient:
 - IM benzyl penicillin STAT, then amoxicillin for 7days.
 - If penicillin allergy present: Erythromycin for 7days.
 - Analgesics: paracetamol
 - Child should be reviewed after 5 days.
- ◆ Instruct parents to bring the child back to the health facility earlier if condition worsens or there is no response after 2 days.

- ◆ Refer to higher level for appropriate management if:

- Cyanosis is present
- Respiratory distress (RR >25 per minute) is present
- Heart failure or pleural effusion is present
- More than one lobe is involved
- There is poor response as outpatient
- Patient is dehydrated
- Child has additional problems
-

24.8 Conditions Presenting with Wheeze

A wheeze is a high-pitched sound during expiration due to narrowing of the small airways. Infection or an allergic reaction can cause narrowing of the airways. Examples include asthma, bronchiolitis, foreign body, viral and bacterial infections.

24.9 Management of Children with First Episode of Wheeze

◆ Give a rapid-acting bronchodilator – salbutamol via metered dose inhaler two puffs(200mcg) with or without a spacer according to age. Spacer can be made using a 1-litre plastic container (see Figure 24.2). If inhaler is not available use nebulizer, 2.5ml salbutamol in 2–5ml of normal saline. If neither is available give adrenaline 0.05ml/kg of 1:1,000 solution subcutaneously.

◆ Assess response after 15 minutes. Signs of response are:

- Less respiratory distress
- Less low chest retraction
- Improved breath sounds

◆ Manage according to the cause and severity

- Bronchiolitis: Classify and treat as for pneumonia under age 5 years.
- Wheeze associated with cough or cold: Treat at home.
- Foreign body: Foreign body with partial airway obstruction will need removal via bronchoscopy.



Figure 24:2 Inhaler with a spacer. If unaffordable, use plastic 750ml or 1liter

Levels 2–3—Primary Care

For children with Recurrent wheeze

- Response to a rapidly-acting bronchodilator is an important part of the assessment of a child with recurrent wheezing to determine whether the child can be managed at home or should be admitted for more intensive treatment.
- Rapid acting bronchodilator should be given as above and the child's condition should be assessed 20 minutes later. If respiratory distress has resolved – the child should be treated with inhaler at home. The care giver should be taught how to use the inhaler.
- Table 24.2 presents drugs and dosages for treating a child with wheeze.
- Refer for admission if still distressed with or without cyanosis.

Table 24.2 Treatment of child with wheeze

Rapid acting bronchodilator	Oral salbutamol 3 times daily for 5 days Age or weight 2mg tablet 4mg tablet
Subcutaneous epinephrine (adrenaline) (1:1,000 = 0.1%)	0.01ml/kg Body weight 2–12 mon (10kg) 2 $\frac{1}{4}^*$
Salbutamol inhaler in a spacer 750–1,000ml	2 puffs per dose. 1 dose in 10 min. 12 mon to 5 yrs (10–19 kg) 1
Nebulized salbutamol 5mg/ml Under 1 yr 0.5ml salbutamol in 2.0ml sterile water >1yr 1.0ml salbutamol in 2.0ml sterile water	

Note:

- In all cases use of inhaler is better and cheaper than nebulizer or oral salbutamol.
- Steroids should be used early. Oral steroids are as effective as parenteral ones.
- When this is done aminophylline is rarely needed.
- Fluids should be limited to two thirds of the daily requirement.
- Antibiotics should be given only if there are clear signs of infection.
- Adrenaline is only used if use of inhaler is not possible.

24.10 Status Asthmaticus

This is a clinical diagnosis defined as increasingly severe asthma that is not responsive to usual drugs. Child is too breathless to feed or talk and there is severe chest retraction and tachypnoea. There may also be features of respiratory failure:

- ◆ Altered consciousness
- ◆ Poor respiratory effort
- ◆ Silent chest
- ◆ Cyanosis

~~Refer urgently for admission. Child may need ICU care.~~

During transfer:

- ◆ Monitor vital signs every 15–30 minutes.
- ◆ Administer oxygen by intranasal catheter flow rate of 1–2 litres per minute.
- ◆ Ventilate if necessary using bag and mask.

24.11 Long-Term and Home Care of Asthma

Routine care for asthma patients

Asthma is a chronic illness and therefore the clinical team and patients need to develop a long-term plan for the patient management. The patient – health provider partnership includes:

- ◆ Personalized education: ensure the following is included in the patient education.
 - Basic information about the disease
 - Medication including relievers and preventers.
 - Potential side effects of medicines.
 - Training on the medicine inhaler technique.
 - Recognition of worsening asthma and actions to be taken.
- ◆ Self-monitoring of asthma control.
 - If no response, consider investigation for tuberculosis.
 - Regular review to assess control and adjust treatment as may be necessary.
- ◆ Clear and preferably written instructions on how and when to use the inhaler at home.
- ◆ Regular assessment of patients for their symptom control
- ◆ Report immediately to a health facility when home treatment is ineffective
- ◆ Avoidance or reduction of triggers/allergens in the home, e.g. tobacco smoke, indoor or outdoor air pollution, medications including betablockers and NSAIDS.
- ◆ Child in school with exercise induced attacks should use the inhaler before exercise

24.12 Children Presenting with Chronic Cough

Definition: Cough lasting 14 days or more.

The following conditions are associated with chronic cough:

- ◆ Tuberculosis
- ◆ Asthma
- ◆ Foreign body aspiration, usually children under 5 years. Parents may not remember history of choking. Unilateral wheeze, or pneumonia with poor response to antibiotics suggests diagnosis.
- ◆ HIV infection: In addition, these children have chronic chest signs with clubbing of fingers and toes but usually no cyanosis.
- ◆ Bronchiectasis: Purulent sputum, bad breath, finger clubbing.

- ◆ Lung abscess: Reduced breath sounds over affected part.
- ◆ Heart disease: Due to either congestive failure or recurrent pneumonias

Management

More details for respective clinical features are found in the respective sections for the diseases listed above. Management is specific to the underlying disease.

- ~ Refer all children to a higher facility for appropriate management.

25. Poisoning

Accidental poisoning is common in children under 3 years of age. Usually, a previously well child suddenly falls sick. For the older child, especially the adolescent, it may be intentional e.g. a suicide attempt. The most common poisons include: paracetamol, aspirin, pesticides (organophosphates), kerosene (paraffin). Other poisons include medicines being taken by any member of the family.

25.1 Principles of Management

General Principles

Parent/caregiver is encouraged to try to identify the type of poison the child has taken, and if possible, to carry the container to the health facility. Do not give the child anything to drink and do not make the child vomit. In the case of insecticides like diazinon, remove the child's clothing and give the child a bath. In all cases, parents should be encouraged to take the child to a health facility as soon as possible.

Note that most childhood poisoning is preventable by putting drugs and dangerous chemicals out of sight and reach of children.

Take full history and try to identify the poisoning agent. Severe poisoning requires hospital admission for appropriate management.

Decontamination

- ◆ Stomach: Do not induce vomiting. A gastric lavage is possible if poison was ingested within an hour of presentation to the health facility. Activated charcoal if available can be given. Gastric decontamination is contraindicated in unconscious patients or those who have ingested corrosives or kerosene.
- ◆ Skin: Remove clothing and wash thoroughly
- ◆ Eyes: Irrigate with water or saline.
- ◆ Give specific antidote if indicated.

25.2 Paracetamol Poisoning

Paracetamol is a commonly used antipyretic/analgesic and is therefore prone to accidental poisoning.

Clinical Features

Four stages of paracetamol poisoning are recognized if a child has ingested 140mg/kg or more:

Stage 1: First 24 hrs – Anorexia nausea and vomiting

Stage 2: 24–48 hrs – Signs of hepatic dysfunction – jaundice, bleeding **Stage 3:** 72–96 hrs – Peak liver dysfunction with possible hepatic encephalopathy

Stage 4: 4 days–2 weeks – Resolution of liver dysfunction

Management

Gastric emptying and administration of activated charcoal are most effective if done within 1–2 hrs of ingestion.

~ Refer urgently if the child is symptomatic.

25.3 Kerosene (Paraffin)Poisoning

Paraffin poisoning is the most common form of poisoning in children. Although death from Kerosene poisoning is rare, patients can develop severe respiratory complications.

Clinical Features

Features depend on amount ingested and if there is aspiration. Aspiration results in coughing, gagging, chocking and respiratory distress. Severe respiratory distress may result from pulmonary oedema.

Absorbed kerosene may lead to CNS symptoms such as Headache, Lethargy, transient Euphoria and encephalopathy with varying degrees of altered consciousness. Cardiovascular symptom such as Syncope and Dyspnea may also result

Management

Refer child for admission.

25.4 Organophosphate (e.g., Diazinon) Poisoning

Clinical Features

Headaches, weakness, vomiting, colicky abdominal pain, profuse cold sweating, hypersalivation, muscular twitching, fasciculations, diarrhoea, tenesmus, convulsions, dyspnoea with bronchoconstriction, constricted pupils (meiosis), bilateral crepitations.

Management

- ◆ Decontaminate skin (see above).
- ◆ Gastric lavage.

Refer to higher level urgently for appropriate management.

25.1 Prevention of Home Accidents and Poisoning

Every parent is encouraged to keep dangerous items including kerosene and drugs out of sight and reach of young children. Protect children from fires. Avoid leaving small children locked up in houses. Do not store pesticides and other potentially harmful liquids in soft drink bottles.

26. Neonate and Young Infant (0–2 Months)

26.1 Routine Care at Delivery

Dry the baby with a clean cloth. While drying observe breathing, muscle tone, and colour. If all appears normal, remove the wet cloth and wrap baby in a dry one. Give to the mother to initiate breastfeeding. Breastfeeding should start within the first hour of life to ensure good positioning and attachment. Cover baby well to prevent over-cooling. ***If not breathing, initiate resuscitation as shown in Figure 26.1.***

For babies not requiring resuscitation do the following:

- ◆ Initiate breastfeeding as soon as possible.
- ◆ Weigh the baby.
- ◆ Keep warm next to mother (skin to skin is the best way of keeping baby warm).
- ◆ Apply tetracycline eye ointment within 1 hr in both eyes and given only once.
- ◆ Examine carefully to exclude congenital malformation.

26.2 Postpartum Care of the Normal Newborn

The infant should be given to the mother as soon as possible. The following are important:

- ◆ Breastfeeding should start as soon as possible to ensure good positioning and attachment.
- ◆ Feed babies on demand, at least 8–12 times/24hrs.
- ◆ Encourage HIV-positive mothers who have chosen not to breastfeed to cuddle their babies.
- ◆ Observe cord for bleeding and keep it clean.
- ◆ Administer OPV '0' and BCG.
- ◆ On discharge: Counsel the mother on cord care and breastfeeding at home and tell her to bring baby back immediately if she notices a problem e.g. poor feeding or jaundice.

Essential Newborn Care

1. Keep warm and maintain body temperature 36.5-37.5°C
2. Apply 7.1% Chlorhexidine digluconate on the cord immediately after cutting the cord and then once daily up to the 7th day or until the cord falls off, whichever comes first (see next page on procedure)
3. **Vitamin K**
 - All babies born in hospital should receive Vitamin K soon after birth
 - All infants aged < 14 days should receive Vitamin K on admission if not already given.
 - If born at home and admitted aged < 14 days give Vitamin K unless already given
 - **1mg Vitamin K IM if weight < 1.5kg, 0.5mg IM if weight < 1.5kg**
4. Administer TEO to all newborns

5. Growth

Preterm babies should gain about 10-15g/kg/d of body weight every day after the first 7 days of life. Term babies gain weight at 20-30g/d. If they are not, check that the right amount of feed is being given.

6. Vitamins and Minerals

All premature infants (< 36 weeks or < 2kg) should receive the following vitamins and minerals daily once they are on full feeds and/or at age of 2 weeks for a minimum of 6 months:

- 2.5 mls of multivitamin syrup daily once they are on full milk feeding at the age of about 2 wks
- Folate 2.5mg weekly
- Give iron supplementation (refer to page 7 for dosages)
- Give Vit D 400IU orally daily
- Add daily calcium supplements(120-140mg/kg/d elemental calcium) from day 28 of life after checking calcium
- Daily phosphorus (60-90mg/kg/d)

7. Kangaroo mother care (KMC)

KMC recommended for stable pre-terms (refer to National KMC Guidelines)

Figure 26:1 Essential Newborn Care

Source: Kenya Basic Paediatric Protocols, 2022

On discharge

- ◆ Counsel the mother about cord care. She needs to know that babies often acquire infection through the cord. If she delivers in the community, cutting of the cord with clean instrument is needed. After delivery harmful practices need to be discouraged. Mothers should keep the cord dry until it drops off.

26.3 Neonatal Asphyxia and Resuscitation

A newborn who fails to establish regular breathing and appears blue and or pale is likely to have asphyxia. Anticipate asphyxia in all high-risk pregnancies or if there is irregular foetal heart, foetal bradycardia or tachycardia, and meconium-stained liquor during labour. Occasionally asphyxia occurs unexpectedly.

~ All persons conducting deliveries should be able to resuscitate a baby at birth. Always be prepared to resuscitate.

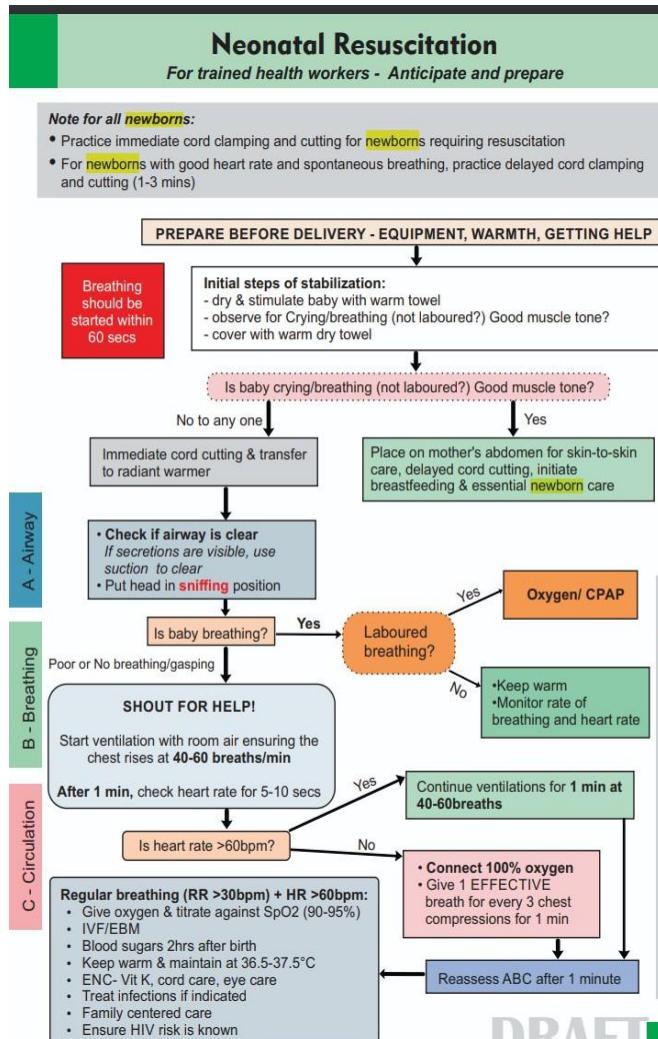


Figure 26:2 ABC's of neonatal resuscitation – Call for help!

Source: Kenya Basic Paediatric Protocols, 2022

Clinical Features

APGAR scoring (Table 26.1) can be used for assessing the degree of asphyxia.

Table 26.1: APGAR scoring

Clinical Features	Score		
	0	1	2
Heart rate (per minute)	Absent	Less than 100	Over 100
Respiration effort	Absent	Irregular, slow	Regular
Muscle tone	Limp(floppy)	Some flexion of active motion	Well flexed, arms, legs
Reflex irritability (nasal catheter)	No response	Some motion, grimace	Cries
Colour	Blue, pale	Pink body, blue extremities	Completely pink

Management

Management is dependent on the APGAR of the baby. The management recommended at the various APGAR scores is indicated below:

- ◆ Apgar score 7–10: None. Do not suction baby.
- ◆ Apgar score 5–6: Give oxygen.
- ◆ Apgar score 0–4: Initiate resuscitation with bag and mask.
- ◆ If the mother had received pethidine: Give naloxone 0.01mg/kg/IV STAT

Harmful practices in handling a baby who is not breathing include slapping the baby, holding baby upside down, and pouring cold water. These should not be practiced. The act of drying the baby is enough stimulation. After resuscitation refer the baby to a facility that can deal with complications. Keep the baby warm throughout the journey by using “kangaroo mother care” (Section 26.11.1).

Complications

The following complications are known to occur:

- ◆ Convulsions
- ◆ Apnoea or irregular breathing
- ◆ Respiratory distress
- ◆ Poor feeding
- ◆ Floppiness
- ◆ Cerebral palsy if still neurologically abnormal at 1 week of age.

26.4 Birth Injuries

Difficult deliveries may lead to birth injuries

Clinical Features

Common injuries requiring no treatment include:

- ◆ Caput succedaneum – Oedema over presenting part.
- ◆ Massive oedema of scalp
- ◆ Conjunctival haemorrhage
- ◆ Subgaleal/aponeurotic haemorrhage—Fluctuant swelling on the head not limited by suture lines. Can be extensive to cause anaemia and jaundice.
- ◆ Cephalohaematoma—Firm but fluctuant swelling limited by suture lines. Takes very long to resolve.

Injuries that require attention include those to the nerves and bones, among others:

- ◆ Nerve injuries
 - Erb's palsy—Injury to the upper roots of the brachial plexus: affected limb held extended at the elbow and forearm pronated.
- ◆ Fractures
 - Clavicle—Mother notes the baby cries on being lifted and after a few days swelling along the affected clavicle.
 - Femur or humerus—Affected limb swollen and very painful on movement. There is pseudoparalysis.
- ◆ Less common but serious injuries include the following:
 - Intracranial—Can be subdural or intracerebral haemorrhage: baby is lethargic with signs of raised intracranial pressure; may have convulsions.
 - Intrathoracic – Presents with respiratory distress.
 - Intrabdominal – Usually ruptured liver either subcupsular or hemoperitoneum. If severe, baby shows features of hypovolaemic shock without obvious evidence of external bleeding; consider intrabdominal haemorrhage.

Management

- ◆ Caput succedaneum, and massive oedema of scalp do not need any special treatment.
- ◆ Severe scalp bleed requires no specific treatment. Never aspirate as this predisposes to infection. If anaemia is severe, transfusion may be needed.
- ◆ Refer all nerve and bone injuries and any suspected internal injury.

26.5 Born Before Arrival (BBA)

This is a baby born either at home or on the way to the health facility. Most mothers will not have had a skilled attendant at delivery. Sometimes when the delivery was at night there may be a lapse of several hours before presenting to the health facility.

Management mirrors that for a baby born at the facility. First weigh the baby and assess for danger signs (see below). Then do the following if the baby is stable:

- ◆ Keep baby warm if cold.
- ◆ Ensure the cord is properly clamped and not bleeding.
- ◆ Do a thorough physical examination.
- ◆ Clean the cord with chlorohexidine.
- ◆ Apply 1% tetracycline ointment in both eyes once.
- ◆ Initiate breastfeeding unless the baby is unable to breastfeed.
- ◆ Treat any underlying condition.

~ Refer any baby with danger signs to higher level for appropriate management.

26.6 Organizing Care of Sick Baby 0–2 Months

- ~ Ensure that all small babies do not wait in the queue.
- ~ Arrange for babies to be attended quickly.
- ~ Assess baby for danger signs before general administrative procedures.
- ~ Manage the danger signs.

Place the baby in a warm environment, weigh the baby, establish IV access, and manage accordingly:

Respiratory distress and apnoea

- ◆ Not breathing (apnoea) or gasping (respiratory rate<20/min): Start resuscitation immediately.
- ◆ Respiratory distress: Rate>60/min, chest retraction, grunting, central cyanosis – give oxygen by nasal prong or nasal catheter

Shock:

- ◆ Shock can be due to severe blood loss at birth, or dehydration through failure to feed, vomiting or diarrhoea. Dehydration is covered in the section on diarrhoea.
- ◆ For the baby who has lost a lot of blood there will be severe pallor in addition to signs of shock.

- ◆ Signs of shock: Cold hands and feet; capillary refill >3 seconds (this may be difficult to elicit in a baby with severe blood loss because of severe pallor); altered consciousness.
- ◆ For both causes restore circulating blood volume by giving normal saline or Ringer's lactate at 20ml/kg intravenously as rapidly as possible. Reassess and if still in shock repeat the dose. For the baby that has bled, get blood as quickly as possible and transfuse.

Altered consciousness and /convulsions:

- ◆ These could be due to serious bacterial infection, birth asphyxia, neonatal tetanus, or bilirubin toxicity.
- ◆ Establish the cause through history and treat accordingly. Control convulsions using phenobarbital preferably IM 20mg/kg.

Inability to breastfeed:

- ◆ Causes include: serious bacterial infection, birth asphyxia, or low birth weight (preterm baby). Give dextrose 10ml/kg IV or nasogastric tube to prevent or treat hypoglycaemia immediately. This can be followed by giving breast milk as soon as possible according to the condition of the baby.

Very or extremely low birth weight:

- ◆ Refer or admit urgently for specialized care. If referring, the “Kangaroo” mother position (Section 26.11.1) can be used to keep baby warm during the journey; pass a nasogastric tube and give expressed breast milk to prevent hypoglycaemia.
- ◆ All babies with danger signs will need admission to a unit that can treat them. Transfer by the quickest means available, preferably an ambulance so that you can administer oxygen if the baby has breathing problems.

~ NEVER TRANSFER A BABY BEFORE STABILIZATION. THE BABY MAY DIE ON THE WAY.

26.7 Serious Bacterial Infections and Meningitis

Clinical Features

There may be history of maternal fever, prolonged rupture of membranes, and foul-smelling amniotic fluid. There may be danger signs and the infant may also have deep jaundice, abdominal distension, or extensive septic skin lesions.

~ Up to 30% of neonates with late onset sepsis will have meningitis without the obvious features of bulging fontanelle or neck stiffness.

Levels 2–3—Primary Care

Management

- ◆ Parents are advised to seek medical care as soon as a small baby falls sick.
- ◆ Refer for admission URGENTLY.
- ◆ Give expressed breast milk before transfer to prevent hypoglycaemia.
- ◆ Keep baby warm (kangaroo care, Section 26.11.1).
- ◆ Give pre-referral penicillin and gentamicin.

Complications of Meningitis

The following neurological sequelae occur: Hydrocephalus, blindness, mental retardation, hearing loss, motor disability, abnormal speech patterns.

Prevention

The following preventive measures are important:

- ◆ Increased and improved prenatal care
- ◆ Clean,atraumatic delivery
- ◆ Regular cleaning and decontamination of equipment
- ◆ Sound hand-washing principles by all personnel handling babies
- ◆ Regular surveillance for infection
- ◆ Early exclusive breastfeeding

26.8 Other Infections

- ◆ Skin: May have a few to extensive septic skin lesions. If few lesions, they tend to occur in flexures and are easily missed. If few lesions, treat as outpatient with either amoxicillin or cloxacillin. Refer if lesions are extensive; treat as for serious bacterial infection.
- ◆ Eye infection: Treat with tetracycline eye ointment for 5 days.
- ◆ Umbilical sepsis: Presents with pus discharge, foul smell, and redness around the umbilicus. If child has no systemic signs treat as outpatient; clean the umbilicus with antiseptic and show mother how to clean at home. Review baby after 5 days or earlier if systemic signs develop. If there is periumbilical redness, the baby needs to be treated with antibiotics. Give amoxicillin 50mg/ kg/day for 5 days. If baby has systemic signs refer for admission.

26.9 Respiratory Distress

Respiratory distress occurs when there is failure to maintain adequate exchange of oxygen and carbon dioxide by the lungs for a variety of reasons. It is characterized by a respiration rate of 60/minute or more (tachypnoea), expiratory grunt, chest or subcostal recession, cyanosis, and flaring of alae nasi.

Levels 2–3—Primary Care

The causes of respiratory distress include:

- ◆ Respiratory distress syndrome (RDS)
- ◆ Neonatal sepsis (Pneumonia)
- ◆ Aspiration of meconium or feeds
- ◆ Transient tachypnoea of newborn
- ◆ Congenital heart disease
- ◆ Congenital anomalies of the oesophagus, airways, or diaphragm

Clinical Features That May Assist in Diagnosis

- ◆ Respiratory distress syndrome is most common in premature babies, but can occur in infants of diabetic mothers and following caesarean section.
- ◆ Neonatal sepsis: May be suspected with a history of prolonged rupture of membranes (more than 12 hours) and maternal fever, offensive liquor, or vaginal discharge. These are features of sepsis in the mother.
- ◆ Meconium aspiration: Meconium stained liquor and staining of skin, nails, and cord.
- ◆ Transient tachypnoea of newborn: Difficult to differentiate from RDS but usually in term/near term babies. Resolves within 24 hours.
- ◆ Cardiac lesion: May or may not have murmurs depending on the defect.

Management

Refer to higher level for appropriate management. Meanwhile, stabilize the baby as outlined under serious bacterial infection.

26.10 Apnoeic Attacks

These are cessation of breathing for more than seconds, or less than 20 seconds if accompanied by bradycardia. Apnoeic attacks are most commonly due to prematurity, but may accompany sepsis, hypoglycaemia, hypoxaemia, hypothermia, hyperthermia.

Clinical Features

Apnoea, bradycardia, and cyanosis. Features of the predisposing condition.

Management

- ◆ Re-establish breathing by gentle stimulation. If poor response ventilate using bag and mask.
- ◆ Establish IV access if possible and give 5ml/kg 10% dextrose.
- ◆ Avoid oral feeding to prevent aspiration.
- ◆ Refer to higher level for appropriate management.

26.11 Low Birth Weight and Preterm Infant

Definitions

- ◆ Low birth weight: Weight less than 2,500g at birth.
- ◆ Very low birth weight: Weight below 1,500g at birth.
- ◆ Extremely low birth weight: Weight below 1,000g at birth.
- ◆ Preterm: An infant born before 37 completed weeks of intrauterine life at birth.

Problems Associated with Prematurity

- ◆ Poor thermal regulation, hypothermia
- ◆ Respiratory problems: RDS, apnoeic attacks
- ◆ Feeding problems leading to hypoglycaemia
- ◆ Infections
- ◆ Hyperbilirubinaemia
- ◆ Anaemia of prematurity
- ◆ Congenital malformations

General Management

Babies weighing 2,000—2,499g can be cared for as normal weight babies. Some of them may have feeding difficulties. Observe for a day or two before discharging from maternity ward.

Babies weighing 1,750–1,999g need extra care. Kangaroo mother care will provide enough warmth unless the baby has another problem. They are usually able to breastfeed adequately, but some may tire quickly and may need tube or cup feeding.

Babies weighing below 1,750g are at increased risk of respiratory distress, infection, apnoea, and hypothermia, and are usually not able to feed especially if very low birth weight. They need to be admitted to a specialized area that will cater for their needs. For these babies, treat any intercurrent problem and when they stabilize, start kangaroo mother care.

Thermal Environment

- ◆ Keep baby dry and well wrapped and nurse away from open windows.
- ◆ Avoid unnecessary exposure.
- ◆ Keep the room warm (at least 25°C).

26.11.1 KANGAROO MOTHER CARE (KMC)

KMC is cheap and easy to carry out in many facilities. Use KMC when you have a stable LBW baby.

KMC consists of:

- ◆ Kangaroo position— Skin to skin contact between mother's breasts or those of any other adult female.
- ◆ Breastfeeding.
- ◆ Follow up to ensure adequate growth and development.

Procedure for KMC:

- ◆ Mother wears a dress that opens to the front.
- ◆ Baby wears nappy/diaper, cap, and socks.
- ◆ Let the mother sit comfortably on a chair.
- ◆ Mother opens the dress.
- ◆ Place the naked baby in froglike posture on mother's chest between her breasts.
- ◆ Secure baby firmly but not too tight with a cloth round mother and baby.
- ◆ Breast feed frequently. Top up with cup if not able to suck adequately.
- ◆ Mother in recliner position during rest and sleep.
- ◆ Monitor growth at least 3 times per week.

26.11.2 FLUID AND FEED MANAGEMENT

- ◆ Encourage mother to breastfeed frequently if baby is able. Check positioning and attachment.
- ◆ Ensure adequate intake by calculating the requirement per day. Calculation of feeds/fluids: Start with 60ml/kg/day on day1. Increase by 20–30ml per day to a maximum of 180–200ml/kg /day if using breast milk. For formula or IV fluid, do not exceed 180ml/kg. A rough guide is given in Table 26.2.
- ◆ Record all intake (oral and IV) and check every 6hrs to see if the desired intake is achieved.
- ◆ Feeding should be done within the first hour of birth to avoid hypoglycaemia.
- ◆ Give micronutrients
 - Multivitamins a preparation containing 400IU of vitamin D as soon as enteral feeding is established.
 - Include iron supplement 6mg/kg/day after age of 4 weeks.
- ◆ Refer to higher level for appropriate management any baby not able to feed.

**Table 26. 2: Feeding chart for preterm and low birth weight babies:
Amount of milk to give every 3 hours(ml)**

Birth weight(kg)	Age in days							
	1	2	3	4	5	6	7	8 or more
1.0–1.4	8	10	15	20	25	30	30	35
1.5–1.9	10	15	20	25	30	40	45	50
2.0–2.4	15	20	30	35	40	50	55	65
2.5–2.9	20	25	35	40	50	60	70	75
3.0–3.4	20	30	40	50	60	70	70	75
3.5–3.9	25	35	45	60	70	80	80	80

Note: Introduce feeds as soon as possible; preferably no later than 24 hrs after birth. Monitor weight at least 3 times a week. Weight gain after the first week is 15g/kg/day.

26.12 Anaemia of Prematurity

Anaemia occurring after the first week and often much later. It is due to a number of factors, including:

- ◆ Deficiency of haematinics
- ◆ Blood loss associated with repeated investigation
- ◆ Intracranial haemorrhage
- ◆ Erythropoietin deficiency

Management

- ◆ Treat with iron and folic acid.
- ◆ Refer for transfusion if:
 - Symptomatic: poor weight gain, recurrent apnoea, congestive cardiac failure,
OR
 - Hb<8g/dl

Prevention

Limit blood loss; give prophylactic iron starting from 4–6 weeks of age.

26.13 Infants of Diabetic Mothers

Clinical Features

Size at birth will depend on the degree of diabetic control in the mother as well as the stage. Hence the baby may be large, appropriate, or small for the gestation age.

Levels 2–3—Primary Care

Complications

These include perinatal asphyxia and injury, hypoglycemia, hypocalcaemia, hyperbilirubinaemia, respiratory distress syndrome (RDS), polycythaemia, and feeding problems.

General Management

Diabetic mothers should deliver in hospital where problems of the baby can be dealt with. Appropriate management of such mothers includes:

- ◆ Close cooperation between obstetrician and paediatrician.
- ◆ Maintenance of normoglycaemia in the mother. [see. diabetes in pregnancy]
- ◆ Decision on timing of delivery is made in consultation with the obstetrician.

In case the mother delivers outside the hospital, the baby should be fed within one hour after delivery and then 3 hourly until the baby has been transferred to the hospital.

26.14 Disorders of Glucose Metabolism

Hypoglycaemia is a common problem but there are no specific clinical features. Hypoglycemia should be suspected in low-birth-weight infants, infants born small for gestational age, infants of diabetic mothers, and any sick infant especially if the infant is not feeding well.

Steps to take to prevent hypoglycaemia include:

- ◆ Ensure early and adequate feeding for all babies.
 - ◆ Give IV 10% dextrose 5ml/kg and feed the baby to help maintain normal level.
- ~ Refer all suspected infants to higher level for appropriate management.

26.15 Neonatal Jaundice

26.15.1 PHYSIOLOGICAL JAUNDICE

Many babies have some jaundice in the first week of life. This is referred to as physiological jaundice.

Characteristics

- ◆ Appears on about the third day.
 - Peak levels 5–8mg/dl (85–135 μ mol/L) occur in term babies.
 - ◆ Reduces to normal in about a week.
 - Peak levels of 10–12mg/dl (170–205 μ mol/L) in preterm babies.
 - ◆ Falls to normal about 10days.
- ~ Serum bilirubin levels >12mg/dl in term babies and >15mg/dl (>255 mmol/L) in preterm require investigation.

Management

- ◆ Refer the baby for confirmation.
- ◆ Ensure adequate feeding and hydration.
- ◆ If jaundice is physiological, only observation is required.

26.15.2 ACUTE NON-PHYSIOLOGICAL JAUNDICE

A common condition, this is caused by:

- ◆ ABO incompatibility: Mother group O, baby A or B or AB
- ◆ Rhesus incompatibility: Mother Rh-negative, baby Rh-positive
- ◆ Sepsis

In ABO and Rhesus incompatibility, jaundice may appear from the first day, whereas in sepsis it may appear any day.

Hepatitis may be due to infection by Hepatitis B virus, congenital syphilis, and cytomegalovirus. Baby may show features of the specific infection, especially syphilis.

Complications

Bilirubin toxicity (Kernicterus): Brain damage due to deposition of bilirubin in the brain. Bilirubin toxicity presents with lethargy, poor feeding, and vomiting, opisthotonus, seizures, and coma. Death may result. If the baby survives, mental retardation, cerebral palsy, hearing loss and learning disorders are known sequelae.

Management

- ~ *Refer the baby for admission.*

26.15.3 PROLONGED NEONATAL JAUNDICE

Prolonged neonatal jaundice is due to hepatitis or biliary obstruction. In obstructive jaundice the stools are pale and the urine very dark.

- ~ *Refer urgently to higher level for appropriate management. For biliary atresia, surgery is best done within 6 weeks of birth to prevent hepatic damage.*

26.16 Congenital Anomalies

26.16.1 HYDROCEPHALUS

This is an increase in the volume of cerebro-spinal fluid (CSF) within the ventricular system and may be communicating or non-communicating.

Clinical Features

There is a uniform enlargement of the head before birth causing obstructed labour or developing insidiously after birth. There are prominent dilated scalp veins, wide, bulging and tense fontanelles, brow overhangs the roof of orbit, there is a “cracked-pot” sound when the head is percussed (McEwen’s sign), a clear margin of sclera beneath the upper lid (setting sun sign) and wide sutures. Nystagmus is common and transillumination is positive later. In isolated hydrocephalus there is usually no neurological deficit. But if there was intrauterine infection then it may be accompanied by other defects.

Management

In order to prevent brain damage, early evaluation and diagnosis is essential. The baby therefore needs to be referred as soon as possible to a specialized unit.

26.16.2 NEUROTUBE DEFECTS

These are the commonest CNS anomalies. The defect can occur in any part of the CNS starting from the head and down the spine. The abnormalities vary from the extreme anencephaly, through encephalomylocoele and encephalocoele, to spina bifida with or without myelocoele or meningo(myelocoele).

CRANIAL DEFECTS

Anencephaly is the complete absence of the brain apart from the brain stem, while encephalocoele and encephalomylocoele are most commonly occipital but can be frontal.

SPINA BIFIDA

This results from failure in development of vertebral arches and is frequently associated with mal development of the spinal cord and membranes. There are two main types: Spina bifida occulta and spina bifida cystica.

Spina Bifida Occulta

Many cases are asymptomatic and are undiagnosed. There may be tell-tale signs on the back such as lipoma, dimple, tuft of hair (hypertrichosis), naevus, and telangiectasia.

Levels 2–3—Primary Care

In other cases, the patient may present with nocturnal enuresis, footdrop, persistent urinary tract infections due to neurogenic bladder and recurrent meningitis due to a communicating dermal sinus.

Spina Bifida Cystica

In addition to the defect in the spine, there is an obvious mass on the back that may be a meningocele (that is, a bulge of the meninges usually covered with skin), or meningo(myelo)cocle (a bulge of the meninges that contains neural tissue). As a consequence, there is paralysis below the level of the lesion with or without incontinence of stool and/or urine.

Management

- ◆ Management requires a multidisciplinary team approach including surgeons, paediatrician, and physical therapists.
- ◆ The patient should therefore be referred to a specialized centre for care.
- ◆ Appropriate sterile dressing of the open lesions is necessary to prevent infection.
- ◆ The parents should be counselled carefully so as to accept the child and be aware of what can be done.

Prevention

- ◆ Pre-pregnancy folate supplementation is known to reduce chance of recurrence.

26.16.3 CLEFT LIP AND PALATE

Clinical Features

Cleft lip results from abnormal development of the medial nasal and maxillary processes. This may present as unilateral, bilateral, or median cleft lip (rare). The clefts may be complete or incomplete. Cleft palate results from a failure of fusion of the two palatine processes. These again may be unilateral, bilateral, or median. Cleft lip and cleft palate may occur singly or in combination.

Effects on Functions/Complications

- ◆ This may present as unilateral, bilateral, or median cleft lip. The clefts may be complete or incomplete.
- ◆ Sucking and swallowing is greatly affected. This predisposes a child to malnutrition.
- ◆ Speech development is impaired.
- ◆ Hearing impairment due to recurrent acute or chronic otitis media.

Counsel the caregiver/family and explain when repair will be done

Timing of repair

Operations for cleft lip may be done soon after birth or between 6 and 12 weeks. Cleft palate repair is best at 12–15 months. If repair is delayed it is important to ensure adequate nutrition. The baby with isolated cleft lip may be able to breastfeed but one with bilateral cleft lip and palate has difficulties in swallowing. Teach the mother how to feed the baby without choking. Isolated cleft palate can be fitted with a prosthesis while waiting for repair.

The aim of treatment is to prevent or diminish the complications and hence achieve:

- ◆ Normal appearance
- ◆ Well aligned teeth
- ◆ Normal sucking and swallowing
- ◆ Normal speech and normal hearing.

~Refer to a higher-level facility for appropriate management. All children with cleft lip and palate should be referred to a specialist. The parents must be assured that the results of operation are good.

26.16.4 TRACHEO-OESOPHAGEAL FISTULA

This is an anomaly in the development of the oesophagus involving a proximal atresia with a distal tracheo-oesophageal fistula.

~ This condition is an emergency. It must be diagnosed within the first 24 hours of birth. Diagnosis is best done before the baby is fed to prevent aspiration of feeds.

Clinical Features

Tracheo-oesophageal fistula is suspected:

- ◆ When there is history of polyhydramnios.
- ◆ When saliva drools continuously from the mouth.
- ◆ Where there is respiratory distress.

For such a baby exclude tracheoesophageal fistula before feeding is initiated. If feeding is inadvertently started in such a baby:

- ◆ Attacks of coughing and cyanosis (choking) are likely to occur.
- ◆ The abdomen is likely to be distended especially at the epigastrium (due to swallowed air in the stomach).

Management

Appropriate management of such a child includes:

- ◆ Not feeding the baby enteraly.
- ◆ Keeping the baby warm.

- ◆ Instituting intermittent suction/continuous drainage using the N/G tube to clear the secretions from the pouch.
- ◆ Turning the baby to the side, if possible, to facilitate drainage.
- ◆ Placing the baby in the head-up position to prevent gastric juice reflux.
- ◆ Initiating intravenous infusion with 10% dextrose solution.

~ **Arrange for urgent transfer:** The baby should be transported under the above circumstances to a specialist centre equipped for this type of operation.

~ **It is important to communicate on telephone with the respective surgeon before any movements are made.**

26.16.5 ANORECTAL MALFORMATIONS

Clinical Features

In anal atresia (imperforate anus), the child is born without an anal opening. This should be detected during the routine examination of a newborn. The mother may also report failure of the baby to pass stool. Congenital abnormalities are frequently multiple; a careful general examination of the baby is an important prerequisite.

Management

The baby should be referred to a specialized centre for surgical management. In the meantime, the following should be done:

- ◆ Nasogastric suction should be maintained until the baby arrives at the referral hospital.
- ◆ Intravenous fluids should be initiated and maintained until the baby arrives in the referral hospital.
- ◆ The baby should be kept warm.

27. Ear, Nose, and Throat Conditions

27.1 Acute Otitis Media

An acute inflammation of the middle ear, usually suppurative, occurring after an upper respiratory tract infection, rhinitis, and sinusitis. The commonest organisms are *Streptococcus pneumoniae* and *H. influenzae*.

Clinical Features

This is most common in children under 5 years. There is pain in the ear, loss, or impairment in hearing with or without ear discharge. There is also loss of appetite and fever. Examination shows signs of URTI, fever, hyperemic oedematous tympanic membrane with loss of normal contours. Purulent discharge with perforation (central) may be present.

Complications include mastoiditis and meningitis.

Management

This includes:

- ◆ Analgesics: Paracetamol 10mg/kg 8 hourly for 5 days.
- ◆ Antibiotics: Amoxicillin 25–50mg/kg 8 hourly for 5 days **OR** erythromycin 30–50mg/kg for 5 days.
- ◆ If there is perforation, treat as in chronic otitis media. Review after 5 days; if not improved continue antibiotic therapy for 5 more days.
- ◆ Refer if:
 - There is no response to treatment.
 - There are signs of complications: meningitis, mastoiditis.

27.2 Chronic Suppurative Otitis Media (CSOM)

Clinical Features

Discharging of pus from one or both ears for more than 2 weeks following untreated or unresolved acute otitis media with a central perforation. The discharge is usually not foul smelling. There is also impaired hearing. Recurrent ear discharge usually occurs after URTI. Secondary infection may be present with Gram-negative bacteria, yeast, and fungi.

Investigation

Carry out HIV test

Management

- ◆ If no antibiotics were administered recently, treat with antibiotics as in acute otitis media.
- ◆ Show the mother how to dry the child's ear by wicking:
 - Roll a piece of clean absorbent cloth or cotton wool into a wick and insert it gently into the child's ear.
 - Roll the wick in the ear, then remove it and replace with a clean wick.
 - Watch the mother repeat this until the wick is dry when it comes out. Tell the mother to continue to dry the ear by wicking at home at least 4 times a day, until the wick stays dry and perforation closes.
 - Tell her that nothing should be left in the ear between treatments.
 - The child should not go swimming until the ear heals.
- ◆ Reassess the child weekly. If the mother needs assistance in keeping the ear dry, reassess more frequently.

Refer to ENT specialist if:

- ◆ The patient develops mastoiditis.
- ◆ There is no improvement after 4 weeks.
- ◆ The patient has hearing impairment; the patient will benefit from tympanoplasty.
- ◆ Patient complains of headache, earache, vertigo, or facial paralysis: This indicates complications.

27.3 Mastoiditis

Infection of the mastoid air cells and mastoid bone occurring as a complication of acute otitis media or chronic otitis media.

Clinical Features

A painful swelling above the ear in children under 2 years of age. A painful swelling behind the ear in older children. There may be preceding otitis media and mastoid tenderness, with fever. There may be sagging of the posterosuperior meatal wall.

Complications

These include facial nerve palsy, meningitis, and brain abscess.

Management

Refer urgently to higher level for appropriate management.

27.4 Otitis Externa

Inflammation of external ear most commonly due to bacteria, but may also be due to fungi, e.g., *Candida* (whitish) or *aspergilla* (blackish) or *Herpes zoster* virus. It may also occur in generalized allergic and seborrhoeic states. The commonest bacterial organisms responsible are *Streptococcus pneumoniae*, *Staphylococcus aureus*, *Ps. pyocyanea*, *B. proteus*, and *E. coli*.

Clinical Features

Fever is uncommon. There is pain and tenderness accentuated by movement of the tragus. Pre or post auricular or cervical lymphadenitis may be present. Obliteration of the canal lumen may occur due to inflammation, causing deafness. There may be ear discharge with or without itching.

Management

- ◆ Admission is NOT necessary
- ◆ Relieve pain; give analgesics such as paracetamol
- ◆ In severe cases, e.g., a boil/furuncle give antibiotics:
 - Oral flucloxacillin 15mg/kg/dose 8 hourly.
 - Oral amoxicillin/Clavulanic acid 80mg-90mg/kg/day in divided doses every 12 hours for 10 days.
 - Gentamicin ear drops or 2% acetic acid eardrops.
- ◆ Fungal otitis externa (otomycosis) is treated with fungicides, e.g., Clotrimazole 1% drops applied 8-hourly for at least 10 days.
- ◆ Allergic (eczematous) otitis externa is treated with antihistamine drugs and hydrocortisone ointment or drops:
 - Chlorpheniramine 0.4mg/kg/day BD in children.
 - Hydrocortisone ointment or drops apply BD.

27.5 Epistaxis

Clinical Features

Bleeding through the nose, (usually 90% from a plexus of veins in Little's areas) due to nose-picking, trauma (fall in games, assault, etc.), nasal and paranasal neoplasms, nasal infection, systemic derangements, e.g., acute fevers, hypertension, renal disease with uraemia, abnormalities of blood clotting, and foreign bodies in the nose.

Investigations

Usually none unless systemic disease is suspected.

Management

- ◆ Immediate: Sit the patient up (to avoid aspiration); pinch the nose for 10–20 minutes. This is usually sufficient to stop bleeding
- ◆ Apply ice or cold packs on the bridge of the nose.
- ◆ Remove clots with suction catheter, then pack the nose:
 - Apply xylocaine nasal spray then pack (preferably using Tiley's forceps) with ribbon gauze or narrow strip of gauze impregnated with liquid paraffin.
 - Start packing from the floor of the nose towards the roof.
 - Ensure the pack fits lightly, as this is most effective. Do not use adrenaline.
- Remove the paraffin pack within 24–48 hours
- Put a patient with a nasal pack on a broad spectrum antimicrobial e.g., cotrimoxazole or amoxicillin for 7 days.
- ◆ Refer for admission if:
 - Bleeding is uncontrolled.
 - Patient requires fluid replacement or blood transfusion.
 - Patient requires in-patient management of the underlying causative factor.
- ◆ Treat the underlying cause.

27.6 Foreign Bodies in Nose and Ears

Young children may push any object into the nose or ears. If a parent notices this, the best thing to do is not to struggle with the child as this may push the object even further in. Sometimes the object is noted several days after it was inserted, in which case there may be a nasal or ear discharge. Take child to a health facility that has health workers who are capable and equipped to remove the object without causing injury to the child.

27.6.1 FOREIGN BODIES IN THE EARS

The types of foreign bodies inserted include metallic pieces (hair clips, smooth pellets, needle, etc), wooden pieces,(e.g., match sticks), vegetable matter(e.g., seeds), or insects.

Clinical Features

There is obvious history of foreign body insertion into the ear. The child may have conductive deafness, ear pain, discharging from the ear, may experience disturbing noise (if insects involved) and bleeding from the ear (especially following traumatic insertion of a foreign body by the child).

Management

- ◆ Most foreign bodies can be removed fairly easily with crocodile forceps, a hook, or an earprobe, or by suction and gentle syringing with warm, clean water
- ◆ Rounded objects may be pushed further into the ear and rupture the eardrum. Do not attempt to remove a foreign body from the ear if you have difficulty in removing it.

Refer in presence of the following:

- ◆ A complication such as perforation of eardrum.
- ◆ Foreign body in the middle ear is suspected.
- ◆ The foreign body is deeply seated in the external auditory meatus.

27.6.2 FOREIGN BODIES IN THE NOSE

Occurs usually in children. The foreign bodies include animate objects (e.g., maggots, regurgitated roundworms, etc.) and inanimate ones, for example vegetable (peas, beans, nuts), non-vegetable materials (for example pencils, paper, sponge, buttons, beads, pebbles, nuts, screws).

Clinical Features

There may be pain, sneezing and epistaxis or unilateral nasal discharge with nasal obstruction. There may also be pyrexia or headache especially with animate foreign bodies.

Unilateral purulent nasal discharge in children should be regarded as due to a foreign body until proven otherwise. Nasal examination is crucial for diagnosis of this condition.

Management

For animate foreign bodies, remove the object (for example roundworm) with forceps and then instil lignocaine 10% solution into the nasal cavities to kill those that are not dead (maggots, worms). Repeat twice a week for 6 weeks. Refer to higher level for appropriate management if the foreign body is difficult to remove or appropriate instruments are not available.

27.7 Wax in the Ear

Advise patients and parents to leave wax to come out of the ear on its own instead of attempting to remove with ear buds because these attempts may cause impaction of the wax in the ear.

Rarely if the wax is causing impaired hearing it may need removal. Refer if hearing impairment occurs.

27.8 Foreign Body in the Oesophagus

The commonest objects are coins in children, fish bones or meat in any age. Psychiatric patients may have many more types of foreign bodies in the oesophagus.

Clinical Features

Patients present with pain in retrosternal area and/or in the back, dysphagia, drooling of saliva in the mouth, regurgitation of food, dyspnoea and hoarseness if there is

laryngeal oedema from compression by the foreign body, and localized tenderness in the lower part of the neck.

Management

Refer patient for oesophagoscopy and removal of the foreign body.

27.9 Laryngotracheal Trauma

These can be blunt or penetrating injuries. The priority is to secure and maintain an airway. Then refer urgently to an ENT specialist for endoscopy and repair.

27.10 Allergic Rhinitis

This is IgE-mediated rhinitis characterized by seasonal or perennial sneezing, rhinorrhoea, nasal congestion, pruritis, and often conjunctivitis and pharyngitis. Symptoms vary in severity from day today or hour to hour.

Management

- ◆ Avoid the allergen (precipitating factor).
- ◆ Administer antihistamines: Chlorphenamine 0.4mg/kg in children in 4 divided doses.

Levels 2–3—Primary Care

Refer to specialist if:

- ◆ There is gross nasal obstruction (hypertrophied inferior turbinates).
- ◆ There are polyps.
- ◆ There is sinusitis.
- ◆ There is deviated nasal septum.

27.11 Parotid Masses

These may be true parotid swellings (e.g., parotitis, parotid abscess, cysts, tumours, etc.) or pseudo parotomegaly due to swellings in nearby structures (e.g., hypertrophy of the masseter, jaw swellings, parapharyngeal masses, lymph node enlargement, facial nerve tumours, etc.). Parotid swellings may also occur in other systemic conditions (e.g., malnutrition, diabetes mellitus and HIV/ AIDS). Infective masses may be associated with other features of infection like fever, pain, local inflammation, or discharge from the opening of the parotid duct. In children the commonest infection is mumps. Most parotid swellings are painless unless infected or malignant. Presence of facial nerve palsy is highly suggestive of a malignant process.

Viral parotitis may not require more than analgesics and bed rest. In the presence of bacterial infection, give amoxicillin.

Refer the patient:

- ◆ Where an underlying systemic disease is the causative factor for parotomegaly.
- ◆ If there are masses that may require surgical intervention.

27.12 ENT Manifestations of HIV/AIDS

27.12.1 CHRONIC EAR INFECTIONS

In children chronic otitis media and parotid enlargement are the commonest manifestations. Other manifestations include:

- ◆ Infections: These can be viral, bacterial or fungal, for example rhinitis, sinusitis, pharyngitis, glossitis, tonsillitis, laryngitis, parotitis, deep neck space cellulitis, abscesses, otitis externa, otitis media, and labyrinthitis.
- ◆ Tumours: There is an increase in head and neck cancers associated with HIV/ AIDS, especially Kaposi's sarcoma and lymphomas.
- ◆ Others: Adenoid hypertrophy, oropharyngeal and oral ulcers, atrophic rhinitis, lymphadenopathy, parotid cysts, otitis media with effusion, vertigo, deafness, tinnitus, and cranial nerve palsies.

Management

Refer child to a comprehensive care centre for diagnosis and treatment.

27.12.2 HEARING IMPAIRMENT

In the paediatric age group, pay special attention to children born prematurely, those with low birthweight, difficult delivery, yellowness of eye (neonatal jaundice), or whose mothers who had febrile illness during pregnancy, and those treated for meningitis.

Do not ignore parents' complaint of a child not hearing or a child who is slow to develop speech. Use changing voice intensity to assess grossly the state of hearing. If there is suspicion of hearing loss, refer at whatever age. A child who does not hear can be helped at any age but the earlier the better.

28. Selected Infections and Related Conditions

28.1 Septicaemia

This is suspected when there is fever with no localizing signs. Causes include staphylococcus aureus, meningococcus, and salmonella group. Severity may vary and some children affected by this condition may be severely ill.

Investigations

Diagnosis is that of exclusion by doing the following investigations:

- ◆ Full blood count (shows leukocytosis and neutrophilia)
- ◆ Blood smear for malaria (negative)
- ◆ Urinalysis (negative)
- ◆ Blood culture (positive)

Management

Refer child to higher level for appropriate evaluation and management.

28.2 Septic Arthritis and Osteomyelitis

Infections of the bone or joints are common in children. They commonly follow septicaemia although occasionally may result from a penetrating injury. In children with sickle cell disease, more than one bone may be affected.

Clinical Features

- ◆ The affected child looks sick and may be toxic. There is fever and limitation of movement of the affected limb. The affected limb is hot and extremely tender. The child may resist examination because of pain.
- ◆ Delay in treatment will result in bone or joint destruction. In the case of osteomyelitis, a chronic discharging sinus may develop.

Management

Refer all suspected cases to higher levels for appropriate management.

28.3 Salmonella Infections: Typhoid Fever

The organisms *Salmonella typhi* and *Salmonella paratyphi A, B, and C*, commonly cause enteric fever or typhoid fever, while *Salmonella enteritis* causes gastroenteritis.

Typhoid fever is a systemic disease and caused by *Salmonella typhi*. *Salmonella* bacilli are shed in the feaces of a symptomatic carriers or in the stool or urine of those with active disease.

Transmission

Transmission of the *Salmonella* bacilli is via contaminated food or water. This may occur through:

- ◆ Direct contamination by feaces or urine.
- ◆ Flies from feaces to food.
- ◆ Through healthy carriers especially if they are food handlers.
- ◆ Health personnel through inadequate hygiene when changing soiled linen.

Clinical Features

The patient may have high fever, headaches, anorexia, weight loss, diarrhoea, constipation, abdominal tenderness, changes in sensorium, splenomegaly, relative bradycardia and Rose spots (blanching lesions). High index of suspicion is required when handling any patient with unexplained fever. The clinical picture tends to be atypical in infants, who may develop shock and hypothermia.

Complications

The complications for typhoid fever include intestinal haemorrhage and/or perforation, with resultant acute abdomen, and “chronic carrier status”.

Management

Refer any child with persistent fever to higher level for appropriate management.

Prevention

Preventive measures for typhoid fever include the following:

- ◆ Using wholesome drinking water (water boiled for 10 minutes or chlorinated).
- ◆ Using pasteurized milk.
- ◆ Screening food handlers for typhoid and treating those infected, including healthy carriers.

Levels 2–3—Primary Care

- ◆ Ensuring proper hygiene while preparing or/and handling foods.
- ◆ Ensuring hygienic waste disposal.
- ◆ Vaccination (refer if not available):
 - Live attenuated oral vaccine 4 capsules given on alternate days. Avoid antibiotics for 1 week NB: contraindicated in immuno-suppression cases.
 - Typhim VI vaccine—single dose 0.5ml IM (70% efficacy; booster dose needed every 2–3 years).

28.4 Fever of Unknown Origin

This refers to fever of more than 3 weeks duration and whose cause is still unknown in spite of at least one week of intensive investigations. This definition excludes common conditions of shorter duration and/or where the cause of the fever has already been determined.

Assessment of such a patient should include observation of the fever pattern, detailed history and physical examination, laboratory tests and non-invasive and invasive procedures.

Common Conditions Manifesting as Fever of Unknown Origin

Most cases of prolonged obscure fever are due to well-known diseases. Aggressive diagnostic effort is recommended, as most of them are treatable. Do not just shift from one antibiotic to another because this confuses the picture even more. It may even be better to stop every treatment and watch for a few days.

Infections

- ◆ Tuberculosis—The commonest cause of pyrexia of unknown origin in Kenya. Miliary tuberculosis may not be visible on chest x-ray until the disease is well advanced. Tuberculosis in other body sites like the central nervous system or abdominal lesions may be difficult to diagnose early.
- ◆ Infections due to some bacterial infections, such as salmonellosis and brucellosis.
- ◆ Deep seated bacterial abscesses like intracranial, intra-abdominal, and hepatic abscesses.
- ◆ Infective endocarditis.
- ◆ Some slow viruses, the commonest of which is HIV.
- ◆ Visceral leishmaniasis.

Neoplasms

Lymphomas are the commonest among the neoplastic causes of pyrexia of unknown origin. Diagnosis may be difficult if lesions are deep seated retroperitoneal nodes.

Levels 2–3—Primary Care

Immunological Disorders

These include:

- ◆ Juvenile idiopathic arthritis JIA especially systemic JIA and
- ◆ Systemic lupus erythematosus and other systemic connective tissue disorders
- ◆ Auto-inflammatory disorders

Management

Refer all patients you are not sure of diagnosis.

28.5 Antibiotic Guide to Bacterial Infections

Bacterial infections are a leading cause of morbidity and mortality. Accurate diagnosis and appropriate, cost-effective treatment are essential. In correct and overuse of antibiotics facilitates the development and growth of drug resistant bacteria; treating infections due to such bacteria is difficult. Specific treatments for the various infections are discussed under their respective headings.

Generally, the following should be taken into account:

- ◆ The organisms responsible for infections depend on the age of the victims.
- ◆ The management of the infections depend on their severity.
- ◆ Underlying conditions like immune depression determine the bacterial infections involved and the type of treatment required.
- ◆ The organisms and the treatment for community acquired infections differ from those for hospital acquired ones.
- ◆ Antibiotic dosage and the side effects vary with age.
- ◆ Drug sensitivity to antibiotics is constantly changing.
- ◆ Treatments should be given using correct doses for the various conditions, and compliance with drug administration should be encouraged for complete treatment. Left over drugs should be discarded to avoid poisoning.
- ◆ Leftover drugs should be disposed appropriately to avoid poisoning.
- ◆ Penicillin refers to narrow spectrum penicillin such as benzyl penicillin, procaine penicillin, and phenoxyethyl penicillin. Benzyl penicillin is used in moderate to severe infections where high blood levels are required, and because of its short half-life is given 4–6 hourly.
- ◆ Gentamicin doses should be adjusted according to renal function.

28.6 Paralysis (Acute Flaccid)

Common differential diagnosis include:

- ◆ Poliomyelitis
- ◆ Acute transverse myelitis
- ◆ Spinal cord injury
- ◆ Guillain Barré syndrome
- ◆ TB spine (not always acute)
- ◆ Neoplasms of spine or cord

All the above except poliomyelitis will have sensory loss

28.6.1 POLIOMYELITIS

- ◆ About 195 out of every 200 infections are asymptomatic.
- ◆ Abortive poliomyelitis: This presents as a brief febrile illness with malaise, anorexia, nausea, vomiting, sore throat, constipation, coryza, cough, and diarrhoea.
- ◆ Non-paralytic poliomyelitis: This form presents with the symptoms of abortive poliomyelitis with more intense headache, nausea, and vomiting, with bladder paralysis and constipation that are both transient.
- ◆ Paralytic poliomyelitis: Occurs in 0.5% of infections. The symptoms are similar to those of non-paralytic polio with additional weakness and pain of one or more muscle groups. Flaccid paralysis may involve one or more limbs as well as respiratory muscles. Transient bladder paralysis and bowel atony is common. Paralysis may be precipitated by IM injection. After the acute phase muscular atrophy ensues due to denervation. There is no sensory loss.

Investigations

Stool specimen for viral detection and typing. The stool should be kept and transported to KEMRI laboratory under vaccine temperatures.

Management

- ◆ Avoid IM injections during epidemics or in suspected cases.
- ◆ Refer patients with paralytic features.

Prevention

- ◆ Immunization: On routine and National Immunization Days (NIDs).
- ◆ Active surveillance and mopping up.
- ◆ It is hoped that polio will be eradicated in the near future with intensified childhood immunization combined with successful disease surveillance.

~ For purposes of polio eradication, notify the local Medical Officer of Health of any acute flaccid paralysis

28.7 Tetanus

Neurological disorder characterized by muscle spasms due to endotoxin produced by Clostridia tetani. Tetanus occurs in several clinical forms including generalized, neonatal, and localized disease.

Clinical Features

These features include inability to open the mouth (trismus, or lock jaw), generalized muscle spasms initially on stimulation but may subsequently be spontaneous. There may also be opisthotonus (rigid arching of back muscles), dysphagia, laryngospasm with difficulty in breathing and there is no loss of consciousness. The port of entry for the infection in neonates is the umbilicus while in older children it can be thorn pricks, cuts or burns, or foot injuries from stepping on nails or broken glass.

Management

Refer urgently to higher level for appropriate management.

Prevention

- ◆ Against neonatal tetanus:
 - Pregnant mothers should receive tetanus toxoid 2 doses at least 4 weeks apart as early as possible in pregnancy. They should then receive one booster dose at every subsequent pregnancy for a total of 5 doses.
 - Mothers with a baby with neonatal tetanus should be given neonatal toxoid immunization.
- ◆ People with open wounds should be given adequate surgical toilet and should in addition receive 2 doses of tetanus toxoid at least 4 weeks apart. Only 1 dose of tetanus toxoid is given if patient was immunized during the last 3 years and adequate surgical toilet has been done.

~ All patients who recover from tetanus should be immunized.

28.8 Tuberculosis

Tuberculosis is caused by Mycobacterium tuberculosis that is also referred to as Acid-Alcohol Fast Bacilli (AAFB) because of its staining properties. Transmission is by droplet infection through coughing and sneezing. Children almost always get infected from an adult living in the same household. The incidence of TB is on the increase, and this is partly due to its association with HIV/AIDS, poverty, malnutrition, and overcrowding, which are all increasing.

Levels 2–3—Primary Care

Clinical Features

Most cases of tuberculosis in Kenya (80%) are pulmonary. Features of pulmonary tuberculosis include cough for 2 weeks or more, chest pain, fever, night sweats, weight loss and breathlessness. A persistent cough may be the earliest indication of TB infection.

Extra pulmonary tuberculosis is common in children and its symptoms depend on the organs that are affected. Symptoms include TB adenitis (or lymphadenopathy), TB arthritis (with painful swollen joints), TB meningitis (with signs of meningitis) TB peritonitis (with ascites), and TB involving the pleura (with pleural effusion).

Diagnosis of Tuberculosis in Children

The key elements for diagnosis of TB in children include:

- ◆ A history of contact with an adult who has TB or a long-standing cough is useful.
- ◆ Smear microscopy (3 specimens – spot, early morning, and spot) for those children who can produce sputum. Sputum induction should be carried out for those who cannot.
- ◆ Sputum for AAFB culture and sensitivity (before the start of treatment in suspected resistant cases).
- ◆ Gastric lavage for AAFB in children (taken early morning).
- ◆ Tuberculin skin testing (Mantoux test)
- ◆ Chest x-ray
- ◆ HIV testing
- ◆ Lymph node biopsy

A high index of suspicion is important in diagnosing TB in children, as they seldom produce sputum and often have non-specific symptoms. The diagnostic algorithm for TB in children is shown in Figure 28.1

Levels 2–3—Primary Care

History of TB	For all children presenting to a health facility ask for the following suggestive symptoms <ul style="list-style-type: none"> ✓ Cough ✓ Fever ✓ Weight loss/ poor weight gain (failure to thrive) ✓ Lethargy/ reduced playfulness less active <ul style="list-style-type: none"> • Suspect TB if child has two or more of these suggestive symptoms • Ask for history of contact with adult/adolescent with chronic cough or TB within the last 2 years.
Physical examination	Examine the child and check for: <ul style="list-style-type: none"> • Temperature > 37.5 °C (fever) • Weight (to confirm poor weight gain/weight loss) - check growth with monitoring curve • Respiratory rate (fast breathing) • Respiratory system examination - any abnormal findings
Investigations	Examine other systems for abnormal signs suggestive of extra-pulmonary TB Obtain specimen* for Xpert MTB/RIF (and culture when indicated**) Do a chest Xray where available Do a mantoux test*** where available Do a HIV test? Do other tests to diagnose extra-pulmonary TB where suspected
Diagnosis	<p>Bacteriologically confirmed TB: Diagnose if specimen is positive for MTB</p> <p>Make a clinical diagnosis of PTB if:</p> <p>Child has two or more of the following symptoms:</p> <ul style="list-style-type: none"> • Persistent cough, fever, weight loss/poor weight gain (failure to thrive), lethargy <p>PLUS two or more of the following:</p> <ul style="list-style-type: none"> • Positive contact, abnormal respiratory signs, abnormal CXR, positive mantoux

Note: If child has clinical signs suggestive of EPTB, refer to National TB guidelines.

* National Tuberculosis, Leprosy and Lung Disease Program, Ministry of Health - Kenya. Integrated guideline for Tuberculosis, Leprosy and Lung disease 2021.

* Specimen may include: Expectorated sputum (child >5 years), induced sputum, nasopharyngeal aspirate, and gastric aspirate. Attempt to obtain specimen in every child

* Do a culture and DST for the following children:

1. Rifampicin resistance detected by the Xpert test
2. Refugees and children in contact with anyone who has Drug Resistant TB
3. Those not responding to TB treatment
4. Those with Indeterminate Xpert results

** This may include IGRA in facilities where available # Use IMCI guidelines to classify severity of disease

Figure 28:1 Diagnostic algorithm for TB in children

Source: Kenya Basic Paediatric Protocols, 2022

28.8.1 PREVENTING TB IN CHILDREN

BCG Vaccination: Although not totally protective, BCG reduces the risk of severe/complicated TB.

Preventing Tuberculosis in Exposed Children

TB in children is always contracted from an adult in close contact with the child. All children in households where an adult has been diagnosed to have TB should be screened for TB and appropriately managed. In addition, all adults from households where a child has been diagnosed to have TB should be screened for TB and appropriately managed.

A healthy newborn with a mother who is still sputum positive should be started on isoniazid prophylaxis immediately and the prophylaxis continued for 3 months. If a repeat sputum evaluation for the mother is found to be negative for TB, isoniazid should be stopped and the baby given BCG. If the sputum is found to be still positive, isoniazid prophylaxis should be continued for 9 months. It should be ensured that the mother is taking the drugs.

If a parent on treatment for tuberculosis has a child under 5 years of age, the child should have a Mantoux test carried out on them. If the Mantoux is positive the child is infected and should receive full treatment for tuberculosis. If the Mantoux is negative, the child should be started on isoniazid prophylaxis at 10mg/kg body weight for 3 months. The Mantoux test should be repeated at 3 months. If the Mantoux test is more than 5mm, the child should receive prophylaxis for a further 3 months. If the test is negative, isoniazid prophylaxis should be stopped and the child given BCG vaccination after 3 days.

Management

The success of tuberculosis treatment depends on strict adherence to treatment. WHO's DOTS (directly observed treatment short-course) can be used if adherence is uncertain.

General Guidelines on TB Management

The following are the general guidelines for TB Management:

- ♦ Follow National Guidelines.
- ♦ Ensure adequate supply of drugs.
- ♦ Use correct regimens and dosages.
- ♦ Ensure regular patient attendance.
- ♦ Always supervise initial phase of treatment.
- ♦ Trace defaulters promptly.
- ♦ Maintain accurate patient information and clinic attendance records.

Management - Pharmacologic

In order to provide optimum treatment to patients with tuberculosis, such patients are classified into groups.

Classification of TB Patients

Patients are classified into the following groups for epidemiological and treatment purposes depending on the site, microbiology, severity of disease, and history of previous treatment. These classifications are also in the TB register for reporting.

- ◆ New (N): Patient who has never been treated before.
- ◆ Relapse (R): Patient who has received treatment and was declared cured but now has TB again.
- ◆ Transferred in (TI): Patient who was registered in another county/clinic initially and has now reported to continue treatment.
- ◆ Treatment resumed (TR): Patient who interrupted his/her treatment and was declared “out of control”, but is now resuming treatment.
- ◆ Other (O): Other types of patients e.g. failure cases put on re-treatment.

Short Course Chemotherapy (SCC)

SCC is given to all TB patients registered by the National Leprosy and Tuberculosis Programme (NLTP). Different SCC regimens are used for the different categories of tuberculosis patients. Treatment in the first 2 months (initial phase of treatment) should be administered under direct observation of either a health care provider in a health facility or a member of the household or community. Drugs and tools for registration and reporting should be available before treatment is started. Patient is admitted if very ill or DOTS cannot be ensured. The continuation phase (4–6 months duration) in principle is (or should be) available in all government and NGO health facilities. The patients should collect a supply of drugs enough for 4 weeks, for daily self-administration at home. The patient should return to the health facility for evaluation and supply of more drugs before the drugs run out, at 4-week intervals for self-administration at home.

Treatment Regimens and Drug Dosages

The drugs used for first line treatment of TB in children are:

- ◆ Rifampicin (R)
- ◆ Isoniazid (H) or (INH)
- ◆ Pyrazinamide (Z)
- ◆ Ethambutol (E)

Table 28.1 shows the recommended dosages

Table 28. 1: Dosage of individual anti-TB drugs according to body weight

Drug	Recommendations Average dose in mg/kg	Range in mg/kg	Maximum dose
Isoniazid	10	7-15	300mg
Rifampicin	15	10-20	600mg
Pyrazinamide	35	30-40	2.0mg
Ethambutol	20	15-25	1.0mg

The first 3 drugs have been combined into paediatric child-friendly fixed dose combinations which are dispersible in liquid, have a pleasant taste and are therefore easier for children to take.

The improved paediatric TB FDCs provide the correct dosing ratio of Rifampicin: Isoniazid: Pyrazinamide as follows: Rifampicin 75mg: isoniazid 50mg: pyrazinamide 150mg (RHZ 75:50:150) tablet Rifampicin 75mg: isoniazid 50mg (RH 75:50) tablet Ethambutol is available as a single drug paediatric tablet of 100mg (E 100)

Weight band (kg)	Number of tablets		
	Intensive phase		Continuation phase RHZ (75/50mg)
	RHZ (75/50/150mg)	E (100mg)	
< 2kg	¼	¼	¼
2.0 - 2.9kg	½	½	½
3.0 - 3.9kg	¾	¾	¾
4.0 - 7.9kg	1	1	1
8.0 - 11.9kg	2	2	2
12.0 - 15.9kg	3	3	3
16.0 - 24.9kg	4	4	4
> 25kg	Use adult dosage and preparation		

Pyridoxine (Give through the whole course of treatment)

Weight (kg)	Number of tablets of pyridoxine (50mg)
5-7	Quarter tablet daily
8-14	Half tablet daily
15 and above	One full tablet daily

Isoniazid Preventative Therapy (IPT): Refer to National TB Guidelines

Figure 28:2 TB drug doses

Source: Kenya Basic Paediatric Protocols, 2022

How to administer TB Treatment in children

Treatment is given in two phases as follows:

- ◆ The Intensive phase – this takes two months. During this period, 4 medicines are administered daily to rapidly kill the bacilli in the body (bactericidal).
- ◆ The Continuation phase –This varies depending on the type of TB being treated. In this phase, 2 drugs are given daily to kill dormant and slowly multiplying bacilli that may linger after the intensive phase. All forms of TB are treated for four months in the continuation phase except TB meningitis, TB of the spine, bone and joint that are treated for ten months.

Tuberculosis treatment



Treat for TB as follows:

- All children with **bacteriologically confirmed TB**
- All children with a **clinical diagnosis of TB**

NB : Children who do not have an Xpert result or their Xpert result is negative but they have clinical signs and symptoms suggestive of TB, should be treated for TB.

Regimens and dosing

TB disease category	Recommended regimen	
	Intensive phase	Continuation phase
All forms of TB except TB meningitis, bone and joint TB	2 months RHZE	4 months RH
TB meningitis Bone and joint TB	2 months RHZE	10 months RH
Drug-resistant TB	Refer to DR TB specialist	

Steroid therapy should be given for; TB meningitis and other forms of intracranial TB, PTB with respiratory distress, PTB with airway obstruction by hilar lymph nodes, severe miliary TB or pericardial effusion.

- Give **Prednisone at 2 mg/kg (max 60mg/day) once daily for 4 weeks.** Taper down over 2 weeks (1 mg/kg for 7 days, then 0.5 mg/kg for 7 days)

Figure 28:3 WHO recommended TB treatment regimen

Tuberculous Meningitis

Initial phase consists of 4 drugs that include streptomycin. Duration of treatment is 9 months.

Review of the patient should be done 2 weeks after initiation of therapy and at end of intensive phase. Thereafter, reviews should be carried out monthly. Each review evaluates symptoms, adherence, side effects, and weight gain. Refer to higher level for appropriate management if:

- ◆ Patient not responding to treatment.
- ◆ Patient has extra pulmonary tuberculosis

Levels 2–3—Primary Care

Treatment of TB in HIV/AIDS Patients

HIV increases a person's susceptibility to infection with *Mycobacterium tuberculosis*. In individuals infected with *M. tuberculosis*, HIV is a potent cause of progression of tuberculosis infection to disease.

In HIV infected children, dissemination of TB is common. TB meningitis, miliary tuberculosis and widespread tuberculous lymphadenopathy occur. Diagnosis of TB in HIV infected children can be very difficult as the clinical features of the two diseases are almost identical. There are several chest conditions that may mimic TB, and the tuberculin test may be negative despite TB infection. When in doubt treat for TB but non response may mean it was not TB in the first place. Do not keep the child on TB drugs indefinitely. Check that the drugs used for highly active antiretroviral therapy (HAART) are compatible with TB drugs.

Acquired Drug Resistant TB

Acquired drug resistance results from inappropriate use of one drug or poor adherence to treatment. This suppresses the growth of organisms susceptible to the drugs but encourages the multiplication of isolated strains with spontaneous drug resistance.

Multiple Drug Resistant TB (MDR-TB)

This is resistance to both rifampicin and isoniazid ± any other first line drug and occurs as a consequence of poor adherence to recommended treatment regimens by clinicians and patients. This resistance is further associated with increasing poverty and the HIV/AIDS epidemic. MDR-TB is confirmed on culture and sensitivity. MDR-TB can be prevented by:

- ◆ Strengthening TB programmes.
- ◆ Ensuring directly observed therapy whenever rifampicin is used.
- ◆ Using fixed dose combination tablets containing rifampicin.

~ Refer all drug-resistant TB patients to a TB specialist for confirmation and management

28.9 Rabies

Although not common, rabies is a devastating disease and is almost universally fatal once clinical features appear. It is therefore important to prevent onset of symptoms. The incubation period is 10 days to 1 year with an average of 1–2 months. This period is adequate to allow immunization.

Clinical Features

Initially, there is restlessness and paraesthesia at the site of the wound. Subsequently, the patient develops maniacal behaviour and may demonstrate violent behaviour; the patient also develops dysphagia and hydrophobia. Finally, repeated convulsions develop with hyperpyrexia and flaccid paralysis that ends in death in about 5 days from onset of symptoms.

Management

Rabies has no cure. The management is basically supportive and includes:

- ◆ Strict barrier nursing.
- ◆ Avoid bites from the patient.
- ◆ Sedation.
- ◆ Administration of fluids and feeding.
- ◆ Since even supportive care cannot be given on an outpatient basis, the patient should be referred for admission to provide such management.

28.10 HIV Infection in Children

HIV infection is now a common problem in children. The majority of children acquire the infection from the mother either during pregnancy, delivery or through breastfeeding (mother to child transmission), but a few are infected sexually through rape and still fewer through blood transfusion. The rate of progression of HIV children once infection has occurred is in two forms: one form progresses rapidly and the patients die within two years from birth (these termed rapid progressors) while the other form progress slowly over a few to several years before becoming symptomatic (these are termed slow progressors)

There are now several programmes in the country that address the HIV/AIDS disease. People should be encouraged to use voluntary counselling and testing (VCT) centres to know their status so that appropriate interventions can be instituted at an early stage for those who are infected so as to reduce morbidity and mortality.

28.10.1 PREVENTION OF MOTHER TO CHILD TRANSMISSION (PMTCT)

Without intervention, 20–45% of mothers infected with HIV transmit the infection to their babies. If intervention is carried out for these mothers, transmission can be reduced to 5% or even less.

Prevention of HIV/AIDS is centered around:

- ◆ Diagnosis of infection in the parents; routine testing of both parents is recommended.
- ◆ Good quality obstetric care:

- Pre-conception care – ensure viral load suppression for women known to be HIV positive (KPs), folic acid us, nutrition.
- Ensuring adequate maternal nutrition in pregnancy.
- ART should be initiated in all pregnant and breastfeeding women living with HIV regardless of WHO clinical staging.
- Avoiding prolonged rupture of membranes (>4 hours).
- Ensuring a clean, a traumatic delivery.
- Giving mother ARV during pregnancy, and/or labour and postnatally to the baby. The drugs currently in use are zidovudine and nevirapine. It is important to use the currently recommended ARVs.
- ◆ Counselling on feeding option for the baby. Counselling is best done antenatally to allow parents to choose the best option according to their socio- economic and other social factors.

28.10.1 FEEDING OPTIONS FOR HIV INFECTED WOMEN

Exclusive breast feeding for 6 months is the first option. In this method of feeding, the seropositive mothers breastfeed their babies exclusively for 6 months. Then the baby is tested for HIV infection using PCR, if it is possible. If the baby is not infected, advise the mother to wean the baby over several days. The baby then can get other types of milk with complementary feeding. If the baby is infected, then she can continue breastfeeding together with complementary foods. If a mother stops breastfeeding and cannot afford any other milk for her baby after 6 months it will be necessary to teach her how to heat treat her breast milk. Otherwise the baby will develop malnutrition.

Replacement feeding is the second option. This means not breastfeeding but using another type of milk exclusively for 6 months and introducing other feeds at 6 months while continuing the milk. The present WHO recommendation is that when replacement feeding is acceptable, feasible, affordable, sustainable, and safe (AFASS) then mothers should avoid breastfeeding. If this is not possible, mothers should be counselled on how to safely breastfeed.

Recent studies from Africa, however, indicate that replacement feeding is associated with increased morbidity and mortality even when formula milk is provided by the government. In light of findings from these studies, it appears that it is in the best interest of the child to breastfeed rather than use formula milk.

All mothers should be counselled to avoid mixed feeding, i.e., combining breast milk with other milks, liquids, or food unless they heat treat the breast milk.

28.10.2 CARE OF HIV EXPOSED INFANTS

Care of an infant exposed to HIV consists of the following:

- ◆ Initiate cotrimoxazole prophylaxis at 6 weeks
- ◆ Continue feeding counselling at all visits
- ◆ Ensure immunization according to KEPI schedule
- ◆ Give vitamin A according to national guideline
- ◆ Monitor growth: The growth curve should be evaluated: if the baby is not gaining weight appropriately despite nutrition counselling, the baby may be HIV infected and should be referred to a facility that can carry out the tests to confirm infection (PCR or CD4 counts).
- ◆ All HIV-exposed infants should have DNA PCR at 6 weeks and if negative repeat at 6 months and 12 months. An antibody test should be done at 18 months and then repeated every 6 months during breastfeeding. The final antibody test should be performed 6 weeks after complete cessation of breastfeeding.

28.10.3 CARE OF HIV INFECTED CHILDREN

Unfortunately, most parents do not know their HIV status in pregnancy and consequently the diagnosis of HIV in children tends to be made late. Early signs of HIV infection are also often missed by the primary health care provider. Many of the severe illnesses that occur as complications of HIV/AIDS disease are also the common in non-infected children. Consequently, healthy workers do not realize that they might be occurring as complications for HIV/AIDS.

Diagnosis

Diagnosis of HIV infection is made by an antibody test, in the form of a Rapid test or an Elisa test for all children aged above 18 months. Diagnosis can also be made by virological (antigen) test using the PCR; this is a confirmation test for infection in children below 18 months

Ideally, all children attending MCH should be tested for HIV to facilitate early intervention and appropriate management.

All children requiring admission should be tested to minimize missing of infected children and to facilitate optimum care.

HIV infection can be suspected in the presence of the following:

- ◆ Chronic otitis media
 - Persistent parotid enlargement
 - Slow growth or weight loss that fails to respond to adequate nutrition
 - Nonspecific skin rashes

Levels 2–3—Primary Care

- ◆ In more advanced disease, the following features are usually noted:
 - Recurrent serious infections, e.g., pneumonia
 - Persistent or recurrent fevers
 - Severe and recurrent oral thrush
 - Recurrent and persisted diarrhoea
 - Herpes zoster
 - Neurological dysfunction either delayed or regressed milestones
 - Failure to thrive

~ **It is advisable to encourage all adults with HIV and on treatment to bring their children for testing even if they think the children are not infected.**

Refer the patient if:

- ◆ HIV infection cannot be confirmed.
- ◆ Child diagnosed to have HIV, so that they can be taken care of in a comprehensive care centre, where also CD4 counts can be done.

HIV Staging in Children

Two approaches are taken to determining the phase or stage of HIV infection. The immunological approach, based on age specific CD4 counts, is summarized in Table 28.6. The second approach, by WHO, defines the following clinical staging:

Stage 1:

- ◆ Asymptomatic
- ◆ Persistent generalized lymphadenopathy

Stage 2:

- ◆ Skin eruptions that include recurrent/extensive lesions that may be infections due fungi or Molluscum contagiosum virus, or may be immunological like seborrheic dermatitis (eczema) and any non-specific dermatitis.
- ◆ Herpes zoster
- ◆ Recurrent or chronic upper respiratory and/or ear infections
- ◆ Parotid enlargement
- ◆ Recurrent oral infections
- ◆ Hepatosplenomegaly

Stage 3:

- ◆ Moderate malnutrition (-2SD or Z score) not responding to therapy
- ◆ Unexplained persistent diarrhoea
- ◆ Oral candidiasis (outside neonatal period)
- ◆ Unexplained persistent or recurrent fevers
- ◆ Severe recurrent pneumonias (>2 episodes in 12 months)
- ◆ HIV related chronic lung disease
- ◆ Symptomatic lymphoid interstitial pneumonitis

Levels 2–3—Primary Care

- ◆ Pulmonary or lymph node TB
- ◆ Systemic varicella infection
- ◆ Unexplained anaemia, neutropaenia, thrombocytopaenia

Stage 4:

- ◆ For a child <18 months of age: 2 or more of the following:
 - oral candidiasis,
 - severe pneumonia,
 - failure to thrive or sepsis
- ◆ For a child of any age:
 - Severe wasting, stunting, or malnutrition not responding to therapy
 - Pneumocystis jiroveci pneumonia(PCP)
 - Extra pulmonary TB
 - Candidiasis of oesophagus, trachea or lungs
 - HIV associated cardiomyopathy, or nephropathy, or encephalopathy
 - Kaposi's sarcoma or other lymphomas
 - Unusual bacterial, fungal or viral infection

Table 28.2: Immunological stages: Based on age specific CD4 counts

Stage	<12 months (%).	12–35 months (%)	36–59 months (%)	5 years & above
Not significant	>35	>30	>25	>500
Mild	30–35	25–30	20–25	350–499
Advanced	25–34	20–24	15–24.	200–349
Severe	<25	<20	<15	<200 or <15%

Management

Mother and child and any other infected family members should access care preferably in the same setting. If the clinic only caters for children then adult members must be referred to an appropriate clinic

Nutrition for Affected Children. Ensure adequate diet for age of the child. Energy needs are higher than non-HIV infected children. Many infected children have poor appetite needing the parent or care giver to vary and experiment on foods offered. Nutritional supplementation may be necessary especially micronutrients.

Levels 2–3—Primary Care

Prevent PCP with Daily Cotrimoxazole. Pneumocystis carinii pneumonia should be prevented in all HIV infected children by administering cotrimoxazole to them daily in the dosages indicated in Table 28.7.

Table 28. 3: Daily cotrimoxazole dosages to prevent Pneumocystis Carinii pneumonia

Weight (kg)	Syrup 240mg/5ml	Tablet 480mg	Tablet 960mg
1–4	2.5ml	¼ tab	-
5–8	5ml	2 tab	¼ tab
9–16	10ml	1 tab	2 tab
17–30	15ml	2 tabs	1 tab
>30	20ml	2 tabs	1 tab
Adolescent/Adult	2 tabs	1 tab	

Treat Inter-Current Conditions (Opportunistic Infections). Patients with any complications or coexisting disease should be treated for the condition using the recommended guidelines for the condition. Those more severely ill or with various complicating illnesses should be appropriately referred for appropriate management.

Pneumocystis Jirovecii Pneumonia (PCP). The following clinical features are shown by children with Pneumocystis carinii pneumonia, now called Pneumocystis jirovecii pneumonia:

- ◆ Low grade fever
- ◆ Severe respiratory distress
- ◆ Normal auscultatory findings
- ◆ Poor response to standard antibiotics
- ◆ Severe hypoxaemia

Toxoplasmosis. Children with this condition have features of encephalitis.

Antiretroviral Therapy (Comprehensive Care Centre). This is indicated when the child is in clinical stage 3 or 4 irrespective of immunological stage, or the child has severe immunosuppression irrespective of the clinical stage. Before a child is started on ARVs, adherence counselling is done to help the parent or guardian understand:

- ◆ The treatment that is required and the side effects of the treatment.
- ◆ Correct administration of the drugs and the need to give the drugs every day.
- ◆ That treatment is for life.

Before ARVs are started the following investigations need to be carried out:

- ◆ Full blood count
- ◆ Liver function tests (alanine transferase)
- ◆ Renal function (creatinine)
- ◆ CD4 count
- ◆ Viral load if possible

Levels 2–3—Primary Care

First Line ARV Therapy.

In order to optimize paediatric anti-retroviral therapy, children and adolescents living with HIV are to be transitioned to Dolutegravir based regimens as summarized in

Table 28.8,

Table 28. 4 Initiation of ART among children and Adolescents Newly diagnosed with HIV (Less than 15 years)

Age	Preferred Regimen
Birth – 4 weeks	AZT + 3TC + NVP
3 – 20 Kgs	ABC + 3TC + Ped DTG
20-29.9 Kg	ABC + 3TC + DTG
> 30Kgs	TDF + 3TC + DTG

NOTE: DTG will be double dose in children with Rifampicin based Anti-TB treatment

Table 28. 5: Transition of children and adolescents currently on 1st line ART who are virally suppressed (<1,000 copies/mL)

Current Regimen	Optimized ART Regimen		
	3(≥ 4 Weeks < 20 Kgs)	20-29 Kgs	≥ 30 Kg
AZT + 3TC + EFV/NVP	ABC + 3TC + DTG	ABC + 3TC + DTG	TDF + 3TC + DTG
ABC + 3TC + EFV/NVP	ABC + 3TC + DTG	ABC + 3TC + DTG	TDF + 3TC + DTG
AZT + 3TC + LPV/r or RAL	ABC + 3TC + DTG	ABC + 3TC + DTG	TDF + 3TC + DTG
ABC + 3TC + LPV/r or RAL	ABC + 3TC + DTG	ABC + 3TC + DTG	TDF + 3TC + DTG

Table 28. 6: Transition of children and adolescents < 20 Kgs currently on 1st Line ART who are not virally suppressed (>1,000 copies/mL)

Current Regimen	Optimized ART Regimen
Contains ABC	Switch to AZT/3TC + DTG
Contains AZT	Switch to ABC/3TC + DTG

Treatment Failure

Treatment failure can be considered only when a child has been on treatment for at least 6 months or 24 weeks.

The following features constitute treatment failure:

- ◆ **Clinical:** Poor growth or weight loss after gaining, recurrence of severe infections, neuro-developmental delay or regression.
- ◆ **Immunological:** Drop in CD4 count below level for age,>50% peak or below baseline.
- ◆ **Virological:** Failure to achieve significant suppression load or progressive increase in viral load after significant suppression.

A drug resistance testing (DRT) sample should be obtained from all children on 1st line on protease inhibitor based anti-retroviral therapy who have suspected treatment failure at the time of change of regimen to DTG based 2nd line. Results of DRT should not delay transition and a viral load test should be repeated within 3 months of transition.

Children who weigh < 20 Kgs and are one second line antiretroviral therapy and are virally suppressed should not be transitioned. For children on 2nd line anti-retroviral therapy and are not virally suppressed refer to current guidelines for 3rd line treatment considerations.

Discontinuation of ARVs. Sometimes it may be necessary to stop ARVs. This may occur in the following situations:

- ◆ When adherence is a problem despite repeated counselling.
- ◆ When there is drug toxicity.

Counselling and Psychosocial Support

This should be ongoing to address the parent and child's concerns. As the child gets older it is important to work towards disclosure. Children need to understand their condition and how to deal with problems such as stigma, especially in school.

As they approach adolescence, children need to be taught how to look after themselves and to assume responsibility for taking their own medicines. With adequate care perinatally, infected children are reaching adulthood. If they were attending a purely paediatric clinic they would graduate to an adult clinic just like any other children who have chronic diseases.

28.10.4 PREVENTION OF HIV TRANSMISSION IN HEALTH FACILITIES

HIV does not spread through casual contact, hence patients with HIV infection may be nursed in open wards. Eating utensils need not be handled in a special way. However, health workers who handle HIV-contaminated blood or certain body fluids are at risk

Precautions against transmission of HIV in the health facility include:

- ◆ Decontaminating surfaces which have been soiled by blood or other body fluids with sodium hypochlorite 0.25% (household bleach, e.g., Jik).
- ◆ Soaking instruments in glutaraldehyde solution.
- ◆ Washing hands and other contaminated parts of the body with soap and water
- ◆ Using gloves for all direct contact with blood and other body fluids.
- ◆ Soaking in bleach for 30 minutes, all soiled bed linen and clothing before general washing.

Wearing gloves and taking care in all situations involving direct exposure to blood and body fluids, e.g., wound dressings, surgery and other invasive procedures, collection of laboratory specimens.

Handling Accidental Exposure to Contaminated Blood or Needle Stick Injury

These include immediate measures, post-exposure care, and post-exposure prophylaxis. They consist of the following:

Immediate measures:

- ◆ If the exposure is to the skin:
 - Decontaminate skin by washing thoroughly with soap
 - Squeeze the wound and let blood flow freely
 - Apply iodine, methylated spirit, betadine, or other virucidal agents
- ◆ If exposure is to the eyes:
 - Rinse thoroughly with sterile saline, eye irrigant and clean watersplash
- ◆ If exposure is to the mouth/nose:
 - Flush with clean water, rinse
 - Use oral disinfectant

Post exposure care:

- ◆ Allay anxiety.
- ◆ Discuss safer sex/third party risks.
- ◆ Carry out HIV pre- and post-test counselling.
- ◆ Conduct serological testing:
 - Baseline HIV screening at injury
 - Repeat at 6 weeks, 3 months, and 6months
- ◆ Post-exposure prophylaxis: This is carried out as soon as possible. It consists of AZT 300mg or d4T (30mg if wt<60kg,40mg if>60kg)+3TC 150 mg twice a day for 28 days. For high risk exposure add LPV/r.

29. Nutrition, Growth, and Development

All children from conception require adequate nutrition for their growth, development, and normal function. Both under and over nutrition are undesirable and lead to disability. Currently, 31% of Kenya's children aged below 5 years are stunted. There is little information on the nutritional status of children aged 5–18 years, but it is known that poor nutrition leads to poor school performance.

Nutritional needs vary according to the rate of growth. Both the rate of growth and nutritional needs are highest in utero, followed by the first year and gradually reducing until the adolescent growth spurt.

Stunted children will become stunted adults. The damage that occurs in utero and early childhood cannot be reversed later in life.

29.1 Foetal Nutrition

Foetal nutrition depends on the nutrition of mothers, meaning that good nutrition of the mother contributes to the good nutrition of the foetus. It is preferable that a mother be well nourished before conception and that she continues to get adequate nutrition through pregnancy and lactation. Foetal under-nutrition predisposes to adulthood diseases such as diabetes and obesity, while micronutrient deficiency predisposes to congenital defects. It is therefore important to ensure adequate maternal nutrition. All programmes of maternal and reproductive health should have a component on maternal nutrition.

29.2 Infant and Young Child Feeding

This is centered on exclusive breastfeeding for 6 months and timely and adequate complementary feeding with continued breastfeeding up to 24 months. All infants should be breastfed unless there is medical contraindication. The national guidelines need to be followed to ensure prevention of malnutrition which is the main underlying cause of death in children aged below 5 years. Community support for appropriate breastfeeding is needed. Figures for 2003 indicated that only 2.6% of women at that time practiced exclusive breastfeeding for the recommended 6 months. Mother should be prepared and counselled for breastfeeding during the antenatal and postnatal periods.

Although the recommendations for feeding in this section are strictly for ages 0–2 years, they can be extended to older children up to 3 years. Compliance with the feeding recommendations for infants and young children can be

achieved with the help of support groups, which could have a number of additional activities on other aspects of health in the community.

Children aged 2–5 years are often on adult diets and this may not be sufficient for their needs. Consequently, families need the knowledge on how to feed them adequately (see Table 29.1). Some of these children may have started nursery school and may thus fit into the existing early childhood development (ECD).

Every facility providing maternal and child health (MCH) services should:

- ◆ Adhere to the National Infant Feeding Policy (Figure 29.1), which should be routinely communicated to all health staff and strategically displayed.
- ◆ Train all health care staff in skills necessary to implement this policy.
- ◆ Provide information to all pregnant and lactating mothers and their partners on the benefits and management of breastfeeding.
- ◆ Assist mothers to initiate breastfeeding within the first 30 minutes of birth.
- ◆ Give newborn infants no food or drink other than breast milk unless medically indicated (see specific guidelines on infants of HIV infected mothers – Table 29.2).
- ◆ Show mothers how to breastfeed and to maintain lactation even if they should be separated from their infants.
- ◆ Practice rooming-in, allow infants to remain with the mother 24 hours a day; Encourage breastfeeding on demand.
- ◆ Encourage and actively promote exclusive breastfeeding for infants up to 6 months.
- ◆ Provide information and demonstrate to mothers how to introduce and prepare appropriate nutritious complementary foods to their infants after 6 months of age
 - ◆ Encourage mothers to breastfeed for at least 24 months (see guidelines for HIV infected mothers).
- ◆ Foster the establishment of breastfeeding support groups and other support groups and refer mothers to them on discharge from hospital or clinic.
- ◆ **DO NOT:**
 - Accept any free samples and supplies of breastmilk substitutes.
 - Allow any publicity by the manufacturers or agents of breastmilk substitutes.
 - Give any feeds using bottles or teats.

29.3 Recommended Feeding For Young Children

Young children's feeding requirements generally go through 3 phases, as shown in the following:

Age	Type of feeding recommended
Birth to 6 months:	Exclusive breast milk. Breastfeed as often as the child wants day and night, at least 8 times in 24 hours. There should be no other food or milk, or fluid offered (including water) for healthy babies except medicines including ORS when indicated.
6 to 12 months:	Breastfeed on demand. If not breastfeeding, give 500ml of milk. Introduce enriched complementary foods like <i>uji</i> mixed with milk, sugar or oil. Mashed green vegetables, and proteins (plant or animal sources). Also give fresh fruit juice or mashed fruit. Feed 3 times a day if breastfed, and 5 times a day if not breastfed.
13 to 24 months:	Breastfeed on demand. Continue energy rich foods, giving at least 5 times a day.

29.3.1 NATIONAL POLICY ON INFANT AND YOUNG CHILD FEEDING PRACTICES: SUMMARY STATEMENT

Figure 29.1 presents a schematic diagram that summarizes the national infant and young child feeding policy. Then, Figure 29.2 illustrates the knowledge links between voluntary counselling and testing (VCT) for HIV and healthy child feeding practices.

29.4 Healthy Feeding through Childhood

Eating habits are established during the first 2 years. By this time the child is eating family foods. Encourage child to eat but respect the child's appetite. Do not force a child to eat. An adequate and balanced diet needs to be followed. Up to age 5 years, nutritious snacks are an essential part of the diet.

Organized feeding through the school years may help to prevent hunger, which affects the child's learning. In the low-cost school, parents may offer food or service for the children. In high-cost schools food and snacks sold in school shops/canteens should be healthy. Parents and teachers are responsible for this.

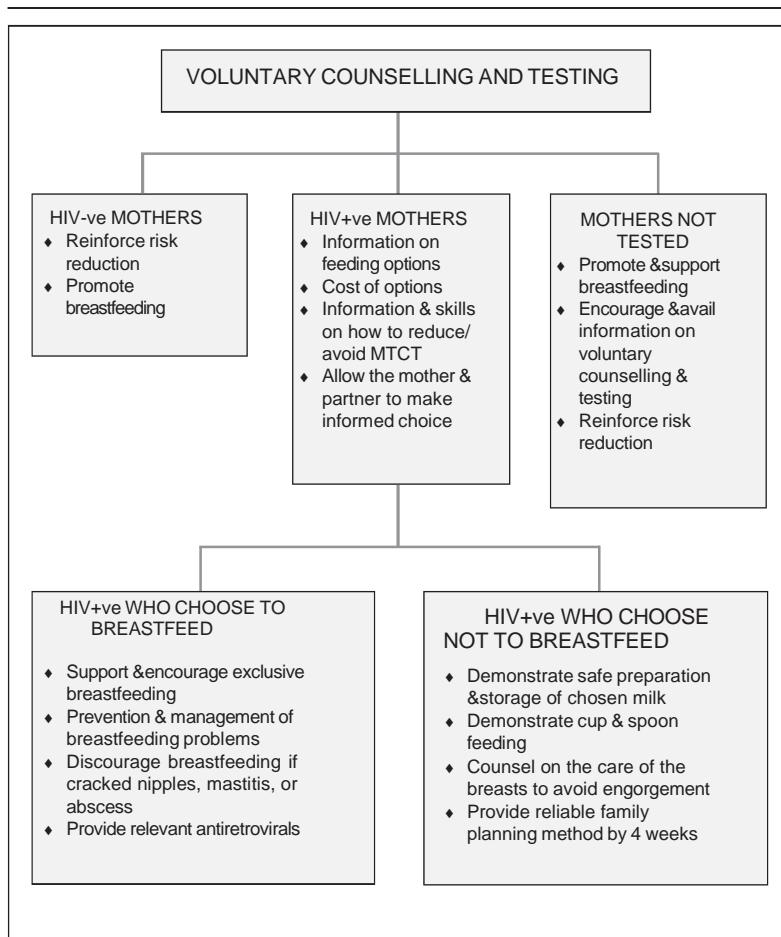


Figure 29:1 Summary of national infant and child feeding policy

Levels 2–3—Primary Care

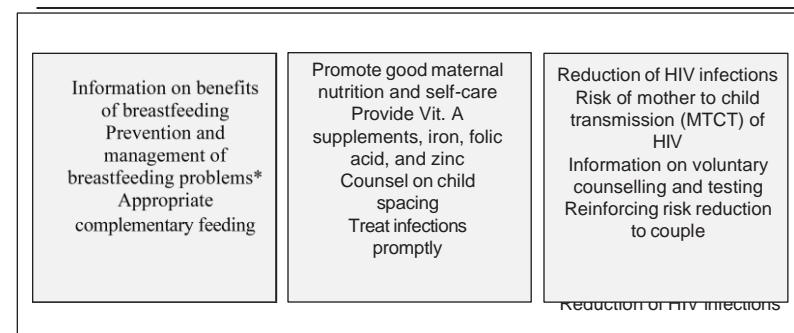


Figure 29:2 Information links between VCT and infant feeding

30. Growth Monitoring and Growth Promotion

Rate of growth is highest in the first year of life. It then gradually reduces until the child reaches puberty when there is another growth spurt that lasts 2–5 years.

Weight Gain

A term neonate aged 0–2 months gains 30g per day; an infant aged 2–6 months gains 20g per day. A child doubles birth weight at 5–6 months and triples birth weight at 12 months.

Increase in Height

Infants increase their height by about 25cm in the first year and 10cm in the second year.

Head Growth

Head growth is measured by head circumference. At birth head circumference ranges between 33cm and 37cm. Thereafter, it increases by 2cm per month for the first 0–3 months; by 1 cm per month from 3 to 6 months of age; and lastly by 0.5 cm per month from 6 to 12 months of age. These increments add to a total of 12cm by the end of the first year. Note that 80% of brain growth occurs in the first 2 years of life.

Head circumference below that expected for age is microcephaly, and above that expected is hydrocephaly or macrocephaly.

Growth Monitoring

Weight loss leads to wasting and is usually a sign of recent food shortage or illness. Inadequate gain in height or length leads to stunting and is a sign of chronic lack of food or illness. Use the following guide:

- ◆ Body mass index (BMI) = weight in kg x (height in meters)²
- ◆ Children with BMI above the 85th percentile are overweight, while those above the 95th percentile are obese.

Serial weight and height measurement and recording on the growth charts should be done as part of maternal and child health (MCH) programme. Each child has own growth curve, but if a child deviates from this curve the reason should be investigated.

Growth monitoring is important throughout childhood to detect not only failure to grow well but also features of over nutrition like obesity. Growth monitoring after 9 months is presently inadequate, however, as parents and health care providers have tended to associate clinic attendance with immunization. So after the measles vaccine at 9 months, few mothers see the need to come to clinic unless the child is unwell. Also, as the child grows bigger and maybe the mother has a new baby, the older child is no

longer priority. Growth monitoring at community level has been in existence for a long time in Kenya, but probably not widespread.

It is necessary to make growth monitoring an important community activity. Community health promoters (CHPs) can be trained and supported to carry out this activity. They together with the parents need to visualize the growth of children and seek help if the child is not growing appropriately (Table 30.1). All children up to age 5 years should be weighed regularly—preferably monthly.

Table 30. 1: When a child does not grow well: Assess nutritional status

Classification	Signs
Normal	No low weight for age and no other signs of malnutrition
Verylowweight	Very low weight for age Poor weight gain
Severemalnutrition	Visible severe wasting, “baggy pants”sign <u>Oedema of both feet</u>

Levels 2–3—Primary Care

To assess a child's growth, the CHWs need weighing scales and tools for length/height measurement. Currently, however, readily available charts are only for children up to 5 years. Poor growth is detected by the regular use of the growth chart. Action must be taken as soon as a slowing growth is detected. The advice given to a mother depends on the age of the child (Table 30.2). The advice must be practical, and the mother must be able to do what she is told.

When a child does not grow well:

- ◆ Assess the child's feeding.
- ◆ Ask what the child is fed.
- ◆ Ask how many times the child is fed in a day.
- ◆ Counsel the mother on feeding.

Table 30. 2: Feeding recommendations children with poor growth or lack of growth

Age	Growth chart shows	Recommendations
0–6 Months	Poor or no weight gain for 1 month	Breastfeed as many times as possible, day and night. Check that mother is breastfeeding properly and that her diet is adequate.
	Poor or no weight gain for 2 months	As above. In addition, the mother should be encouraged to eat and drink enough. Refer child for investigation. Child may have hidden illness.
7–12 months	Poor or no weight gain	Breastfeed as often as child wants. Give adequate servings of enriched complementary feed at least 3 times a day if breastfed and 5 times if not breastfed.
13–24 months	No/poor weight gain for 1 month	Continue breastfeeding. Check diet composition and how much child takes. Advise on how to enrich the food. Feed 3 main meals. Give snacks at least 2 times between meals.
	Poor or no weight gain for 2months	Continue feeding as above. Take history and refer.
>24 Months and over	Poor or no weight gain	Child should eat half as much food as the father. Child should be encouraged to eat with other children, but should have an adequate serving of food served separately. Take history and refer.

Follow up programme for child

- ◆ Review the progress of the child in 5 days.
- ◆ Reassess feeding.
- ◆ Counsel mother about any new or continuing feeding problems.
- ◆ If child is very low weight for age, ask the mother to return 14 days after the initial visit to monitor the child's weight.
- ◆ Encourage the mother to continue feeding until the child gains appropriate weight for age, if after 14 days the child is no longer very low weight for age.

Refer all children for further evaluation if:

- ◆ Weight has not increased in the last 2 months even though the advice on feeding practices has been followed by the mother/caregiver.
- ◆ Sick children are not gaining weight adequately. (Sick children may need to be referred immediately for other reasons.)
- ◆ Child continues to lose weight (consider TB, HIV infection among other problems).
- ◆ Child's weight is well below the bottom line on the chart.
- ◆ There is any sign of swelling of the child's feet and face(kwashiorkor) or indication of severe wasting(marasmus).

Advice to mothers should be:

- ◆ Well babies less than 6 months old need no other milk or food apart from breast milk.
- ◆ Adding oil or margarine or sugar, and milk, egg, or groundnuts makes *ujj* and other energy and protein rich foods and helps young children grow well.
- ◆ Feed often like 5 times a day; small children have small stomachs.
- ◆ Feed older children at least 5 times a day— 3 family meals and 2 nutritious snacks.
- ◆ Feed sick children at least one extra meal per day and continue for 1–2 weeks after they recover.
- ◆ Continue to take interest in what the child feeds on even in the school years. Mothers should know that the children are likely to have poor school performance if not fed well.
- ◆ Avoid over feeding and limit non-nutritious snacks especially if the child is overweight.

31. Development

Besides nutrition children need appropriate stimulation in order to reach their development potential. Both parents and health workers need to know the normal developmental milestones. The following table gives some of the major milestones.

Table 31.1: Developmental milestones

Milestones	Normal Limits
Social smile/follows a colourful object dangled before their eyes	0 - 2 months
Holds the head upright / follows the object or face with their eyes / turns the head or responds in any other way to sound / smiles when you speak	2 - 4 months
Rolls over / reaches for and grasps objects with hand / takes objects to her mouth / babbles (makes sounds)	4 - 6 months
Sits without support / moves object from one hand to the other/ repeats syllables (bababa, mamama)	6 - 9 months
Takes steps with support / picks up small object or string with 2 fingers / says 2-3 words / imitates simple gestures (claps hands, bye)	9 - 12 months
Walks without support / drinks from a cup / says 7-10 words / points to some body parts on request	12-18 months
Kicks a ball / builds tower with 3 blocks or small boxes / points at pictures on request / speaks in short sentences	18 - 24 months
Jumps/ undresses and dresses themselves / says name, tells short story/ interested in playing with other children	24 months and older

Note: Refer for further assessment if a milestone delays beyond the normal age limit indicated above.

Levels 2–3—Primary Care

Children need simple, culturally appropriate toys to play with. Parents can be taught how to make simple toys with materials available in the home. Encourage parents to spend time with their young children.

32. Nutritional Disorders

32.1 Micronutrient Deficiency

32.1.1 IRON DEFICIENCY

The commonest sign of iron deficiency is anaemia, which is discussed in a later section. Iron deficiency negatively affects cognitive function. A school going child may perform poorly at school long before iron deficiency anaemia manifests. Iron deficiency also increases risk of infection.

Prevention

Diet should consist of iron rich foods like dark green leafy vegetables (whose iron is poorly absorbed), meat, liver, and other animal sources (whose iron is easily absorbed).

32.1.2 IODINE DEFICIENCY

Iodine deficiency leads to deficiency of thyroxine because iodine is involved in the production of thyroxine. The thyroid gland may be enlarged in an effort to produce more thyroxine, leading to goitre.

Prevention

Consumption of iodized salt is adequate prevention against iodine deficiency

VITAMIN A DEFICIENCY

Vitamin A is a retinol ester that can be either ingested or synthesized within the body from plant carotene. It is important in maintenance of integrity of skin and membranes, immunity, and night vision. Deficiency of vitamin A results in increased rate of infection and increased mortality. In Kenya, about 75% of children aged below 5 years have vitamin A deficiency. Worldwide, vitamin A supplementation has been shown to result in a 23–34% reduction of all childhood mortality (6–59 months), 50% reduction in measles mortality, and 33% reduction in diarrhoeal disease mortality.

Vitamin A deficiency is a major cause of illness and blindness among poor communities worldwide.

Levels 2–3—Primary Care

Eye Manifestations of Vitamin A Deficiency

- ◆ Early signs include reversible dry cornea and night blindness.
- ◆ Later signs include irreversible damage of cornea rupture and scarring, Bitot's spots (white areas on lateral parts of the sclera). Blindness also develops as a consequence of vitamin A deficiency.

Prevention of Vitamin A Deficiency

- ◆ Encourage families to consume vitamin A rich foods, which include:
 - Animal products, for example liver, milk and kidneys.
 - Plant products, for example dark green leafy vegetables, yellow fruits and vegetables.
- ◆ Give vitamin A supplementation together with immunization.
- ◆ Give vitamin A supplementation routinely in the presence of the following conditions:
 - Malnutrition
 - Diarrhoea
 - Malaria
 - Tuberculosis
 - Pneumonia
 - Worm infestation
 - Fever
 - Measles

For children aged under 5 years it is important to ensure that they have not received Vitamin A in the last 1 month.

Treatment for Xerophthalmia

Affected children are given Vitamin A on day 1 and 2 and a third dose 1–4 weeks after the second dose. Children suffering from measles should be treated as if they have xerophthalmia.

32.1.3 VITAMIN D DEFICIENCY

Although there are no data from national surveys, vitamin D deficiency is commonly diagnosed in many parts of the country, usually during the second half of the first year. For children who were born premature, the deficiency is diagnosed much earlier.

Clinical Features

Children present with poor growth, delayed or regressed milestones, recurrent pneumonias, widening of the wrists, and prominence of costo-chondral junctions (rickety rosary).

Management

Refer all suspected vitamin D deficiency children to higher level for appropriate management.

Prevention

Children should be exposed to sunlight with minimal clothing for 30 minutes a day. For infants born preterm, supplementation with vitamin D at a dose of 400IU/day is recommended. In addition, the diet should provide adequate calcium and phosphate, which are usually inadequate from milk for the infant and young child.

32.2 Macronutrient Malnutrition

Macronutrient malnutrition presents as protein–energy malnutrition (PEM). PEM is a common disorder that covers a wide spectrum of deficiency in nutrition ranging from mild or underweight to severe forms like marasmus and kwashiorkor. The first sign of PEM is poor weight gain.

Clinical Features

The clinical features are itemized for the two severe forms of malnutrition, kwashiorkor, and marasmus, in Table 32.1. Each of these features varies from mild to severe. A child may have combination of features for both kwashiorkor and marasmus, and is then diagnosed to have marasmic kwashiorkor.

Table 32.1: Indications of severe malnutrition

Kwashiorkor	Marasmus
Pedal oedema	Very low weight for age
Low weight	Gross loss of subcutaneous fat
Apathy	"Wise old man look"
Poor appetite	Good appetite (if no complications)
Muscle wasting	Severe muscle
wasting "Flaky paint" dermatosis	
Hair changes (thin, sparse)	

Classification

"Weight for height" is now used for classifying malnutrition for the sake of deciding on management options rather than "weight for age" because weight is affected by stunting. It is known that children who are less than 60% for their "weight for age" may be so mainly because of stunting and such children do not need hospital treatment. Mid upper arm circumference (MUAC) can also add value. Consequently, the following classifications are available for children with macronutrient malnutrition:

Levels 2–3—Primary Care

- ◆ **Mild malnutrition:** Child <5 yrs who is failing to gain weight for 2 months.
- ◆ **Moderate malnutrition:** Weight for height Z score between -3SD and -2SD , MUAC $>11.0\text{cm}$ and $<12.5\text{cm}$.
- ◆ **Severe malnutrition:** Weight for height Z score $<-3\text{SD}$, MUAC $<11.0\text{cm}$ with or without oedema. If weight for height is not available, use “visible severe wasting”.

Children with macronutrient malnutrition may have the following additional features or complications in varying degrees and combinations:

- ◆ Anorexia
- ◆ Lower respiratory infections
- ◆ Fever
- ◆ Hypothermia
- ◆ Vomiting
- ◆ Diarrhoea with or without dehydration
- ◆ Altered consciousness
- ◆ Severe anaemia

Management

For mild malnutrition:

- Advise fortnightly attendance at the clinic for nutritional counselling and growth monitoring.
- Treat any intercurrent problem, e.g., diarrhoea, pneumonia, malaria.
- Check HIV status.

The child should be referred to higher level for appropriate management if:

- ◆ There is no change after 2 months.
- ◆ Child develops moderate to severe malnutrition.

For moderate malnutrition:

- ◆ Patients with this degree of malnutrition can be treated as an outpatient with food supplementation and nutrition counseling.

For severe malnutrition:

- ◆ Assess such children for the presence of complications such as dehydration, shock, severe anaemia, hypoglycaemia, hypothermia, malaria, pneumonia, septicaemia, and mouth ulcers.
- ◆ If the children do not have any of these complications or problems, and have good appetite and are alert, treat as outpatients with ready to eat therapeutic food.
- ◆ Review weekly until weight for height Z score is >-2 , MUAC is $>11.0\text{cm}$, and there is no oedema.

Levels 2–3—Primary Care

~ If children have the complications mentioned and/or have poor appetite and/or are not alert, they should be referred urgently for admission after stabilization.

Prevention

Preventive strategies for macronutrient malnutrition include the following:

- ◆ Provide appropriate nutritional advice in the MCH clinic (breastfeeding and complementary feeding). Advise mother on how to mix nutritious food from the 3 food groups.
- ◆ Show mothers how to provide sensory stimulation to their children.
- ◆ Use growth chart in the MCH clinic for all children aged below 5 years
- ◆ Provide health education to parents attending all health facilities and in the community on appropriate child rearing and feeding.
- ◆ Advocate for hygiene in food preparation.
- ◆ Advocate for environmental sanitation.

33. Children with Special Health Needs

33.1 Failure to Thrive

A child whose physical growth is significantly below that expected for age is said to have “failure to thrive”. Failure to thrive is placed in two categories: non- organic and organic failure to thrive.

Non-Organic Failure to Thrive

In this category, the child is usually less than 5 years with no underlying medical condition. The failure to thrive might be due to maternal emotional problems, child might have been unwanted, or there might be severe poverty. In some circumstances this form of failure to thrive could constitute child abuse.

Clinical features include the following: Besides the size, child is often unkempt, has delayed social motor and speech development, and there is poor parent– child interaction.

Organic Failure to Thrive

The child with this category of failure to thrive has an underlying medical condition that is usually a chronic illness, for example a chronic infection like TB or HIV kalaazar; a major congenital malformation; or an endocrine or metabolic disorder.

A complete history including nutritional, social and growth monitoring is essential. In non-organic FTT the mother's history may be inconsistent or show no concern for the child. A thorough physical examination for all forms of failure to thrive is essential.

~ Refer to higher level for appropriate management.

33.2 Child Abuse and Neglect

Child abuse is maltreatment of children or adolescents by parents, guardians, or other caregivers. Early recognition is very important for prompt intervention.

Most child abusers (90%) are related caregivers who tend to be lonely, unhappy, angry and under heavy stress, many of them having experienced abuse of one form of another during their own childhood.

Levels 2–3—Primary Care

Abused children may have certain provocative characteristics, such as negativity, difficult temperament, or offensive behaviour, or disability. Types of child abuse are in various forms, including:

- ◆ Physical abuse (non-accidental trauma): This is the commonest form of child abuse. It manifests as physical injuries that include bruises, burns, head injuries, and bone fractures. Their severity can range from minor bruises to fatal injuries.
- ◆ Emotional abuse: This type of abuse is characterized by intentional verbal acts, criticisms, and lack of nurturing. This type is very difficult to prove.
- ◆ Nutritional neglect or deliberate underfeeding is associated with failure to thrive.
- ◆ Sexual abuse usually occurs with family members and is the most overlooked (or under reported) form of abuse. Types of sexual abuse include molestation, sexual intercourse, and rape.
- ◆ Others: These may involve intentional drugging (or poisoning) or neglect of medical care.

Clinical Presentation

These may manifest as unexplained inconsistent injuries and delay in seeking medical help for the injuries. Sexual abuse may remain concealed for fear of reprisal from the perpetrator; often the victim (in this case the abused child) does not know what to do or where and how and to whom to report. Most victims report to a health facility due to acute stress or vaginal bleeding, STIs, UTI, enuresis, encopresis (faecal incontinence in absence of organic defect), or pregnancy. Children with nutritional neglect present with failure to thrive, poor hygiene, delayed immunizations, delayed development in speech, mental status and social interaction.

~ **Most abused children are shy, with expressionless faces, and tend to avoid eye contact.**

Investigations

For children who are suspected to be abused, the following are recommended:

- ◆ Thorough history and examination for all types of abuse, indicating who accompanies the child to the health facility. Precise documentation is important.
- ◆ In physical abuse, total skeletal survey is recommended (x-ray may find fractures at various healing stages).
- ◆ Sexual abuse: Examine for sperms, acid phosphatase, and infections, e.g., gonorrhoea. Rape cases may require examination under GA to determine the type and extent of genital injury.
- ◆ Nutritional neglect: Must rule out all other causes of failure to thrive.

Levels 2–3—Primary Care

Management

~ **Refer all children considered to be victims of child abuse to higher level for appropriate management.**

Reasons why a child suspected to be abused should be admitted include the following:

- ◆ The diagnosis might be unclear, and admission may be important for the child because of consideration for immediate safety, or the state of the child may require medical or surgical intervention.
- ◆ The need to remove the child from the source of the abuse in order to protect the child until the evaluation of the family with respect to the safety of the child is completed.
- ◆ The needs of the perpetrator for psychiatric evaluation and care.
- ◆ The need to involve the police and the social worker for more effective management of such a child.

For children who experience rape or sodomy, the following need to be done:

- ◆ Refer urgently for evaluation and prophylaxis for HIV/AIDS.
- ◆ Do not remove clothes or wash the child.
- ◆ Report to police, social worker, and children's officer.

Prevention

Health workers should have a high index of suspicion on likelihood of abuse. Older children should be encouraged not to keep "secrets" and to refuse any enticement to have what could be sexual abuse. Children who are in high-risk situations should be removed from that environment and not left there.

~ **Referral for these children is necessary for long-term psychological and psychiatric care.**

34. Gastrointestinal Conditions Other than Diarrhoea

34.1 Infestation with Worms

This is a common condition in children. Various types of infestations and their investigation are summarized in Table 34.1; drug treatments are shown in Table 34.2.

~ **HOOKWORM** – Anaemia develops if iron intake is slow, and infection is significant. If patient fails to respond to therapy consider other cause, e.g., blood loss, poor compliance.

De-worm children above 2 years at least every 6 months – with albendazole 400mg STAT.

Prevention

Appropriate prevention depends on the particular worm. In general, the following measures should be instituted:

- ◆ Providing safe water
- ◆ Washing hands and trimming fingernails
- ◆ Changing innerwear and bed sheets frequently
- ◆ Using latrines.
- ◆ Wearing shoes/sandals

Table 34. 1: Specific worm infestations, their clinical features, and investigations required for diagnosis

Worms	Clinical features	Investigations
Ascaris lumbricoides (roundworms): Large round, cream-coloured worms that live in the small intestines	<ul style="list-style-type: none"> ● Infection by swallowed embryonated eggs ● Loeffler's syndrome ● Mild bouts of recurrent colic ● The mother has seen the worm in stool or vomitus ● Complications such as obstruction, vomiting may occur 	Stool for ova
Hookworms	<ul style="list-style-type: none"> ● "Ground itch" ● Features of anaemia (iron deficiency) 	Stool for ova Haemogram
Trichuris trichiura (whipworms)	<ul style="list-style-type: none"> ● Diarrhoea with blood ● Rectal prolapse ● Anaemia ● Wasting 	Stool for ova Worms may be seen adhering to rectal mucosa
Strongyloides stercoralis	<p>Most infections are asymptomatic, but the following may occur:</p> <ul style="list-style-type: none"> ● Larva currens(buttocks) ● Soiling of innerwear with stool ● Hyperinfection syndrome ● Diarrhoea ● Gram-negative septicaemia ● Bacterial peritonitis ● Encephalitis 	Direct stool microscopy (motile larvae, adult worms)
Enterobius vermicularis oxyuriasis (pin worm) Synonyms: Threadworm, pinworm, seatworm. The worm is 4mm long and is just visible to the human eye	<p><i>Mode of spread</i> <i>Auto-infection:</i></p> <ul style="list-style-type: none"> ● Direct anal to mouth transfer via the fingernails ● Retro-infection; eggs may hatch into larvae at the anal-rectal area. Then larvae move retrogradely to the caecum. <p><i>Cross infection:</i></p> <ul style="list-style-type: none"> ● Contamination of fingers by clothing, objects, toilet seats, etc. ● By inhaling and swallowing eggs in the dust <p><i>Main presentation:</i> Perianal and perineal itching. Migrating larvae may cause:</p> <ul style="list-style-type: none"> ● Vaginitis, vulvitis, salpingitis, and peritonitis ● Irritation, insomnia may occur 	Stool for ova Ova can be obtained from the perianal region by use of adhesive tape
Taenia saginata (beef tapeworm)	<ul style="list-style-type: none"> ● Non-specific symptoms, irritability ● Segment may be passed with stools ● Egg in stools 	Stool for ova (motile proglottides)

Table 34. 2: Drugs and their dosages for common worm infestations

Worms	Adults	Children
Ascaris lumbricoides (Roundworm)	Levamisole 2.5mg/kg as a single dose OR Albendazole 400mg STAT	Levamisole 2.5mg/kg as a single dose OR Albendazole 200mg STAT for children under 2 years
Hookworm	Levamisole 2.5mg/kg as a single dose OR Albendazole 400mg STAT	Levamisole 2.5mg/kg as a single dose Albendazole 200mg STAT for children under 2 years + ferrous sulphate
Trichuris trichiura (whipworm)	Albendazole 400mg STAT	Albendazole 200mg STAT for children under 2 years
Strongyloides stercoralis	Albendazole 400mg BD x 3 days OR Thiabendazole 25mg/kg x 3 days	Albendazole 200mg BD x 3 days OR Thiabendazole 25mg/kg x 3 days
Enterobius vermicularis (pinworm)	Albendazole 200mg STAT for children 12 months up to 24 months and 400mg STAT for children above 2 yrs	Albendazole 200mg STAT for children 12 months up to 24 months and 400mg STAT for children above 2 years
Taenia saginata (beef tapeworm)	Niclosamide 2g; 1g before breakfast, 1g 1 hour after breakfast	>6 years 1g before & 1g after breakfast 2–6 years 500mg before and 500mg after breakfast < 2 years 250mg before and 250mg after breakfast

34.2 Amoebiasis

This is an infection usually of the colon by *Entamoeba histolytica*. Most of the people infected by *E. histolytica* are asymptomatic cyst carriers. Two diseases caused by *E. histolytica* are amoebic dysentery and amoebic liver abscess.

Clinical Features

- ◆ **Amoebic dysentery:** This presents as bloody diarrhoea and depending on the severity of infection there may be varying degrees of dehydration.
- ◆ **Amoebic liver abscess:** This presents as intermittent fevers, night sweats and tenderness in the right hypochondrium and with difficulty in breathing for some of the patients. The abscess may rupture into the chest causing empyema or into the abdomen, causing peritonitis.

Management

Refer patients to higher level for appropriate management

34.3 Schistosomiasis

This is infection with blood flukes of the genus *Schistosoma*, which may cause chronic disease of intestines, liver, and genitourinary tract. Adult flukes are white worm-like creatures that inhabit parts of the venous system of humans.

All the worms need a molluscan (snail) intermediate host. Important species of schistosomiasis in Kenya are *Schistosoma haematobium* and *Schistosoma mansoni*. Adult worms live and copulate within the veins of the mesentery.

The sexually mature worms are mainly found in the intestinal veins for *Schistosoma mansoni* while those of *Schistosoma haematobium* are mainly located in the venous plexus of the genitourinary tract. Eggs that are laid penetrate the intestinal or bladder mucosa, pass into the lumina, and are passed in faeces or urine. Once passed, the eggs hatch in fresh water liberating cercariae that multiply in snails (intermediate host) and produce thousands of cercariae. These penetrate human skin within a few minutes after exposure and transform into schistosomiasis which develop into sexually active adult worms in the intestinal veins or venous plexus of genitourinary tract depending on the species. An adult worm's lifespan ranges from 3–37 years. *Schistosoma haematobium* is common along the coastline, especially along Tana River, Kwale, and Lamu. *Schistosoma mansoni*, on the other hand, is widespread, and occurs particularly in Machakos, the rice schemes, parts of Nyanza, and even Nairobi.

Clinical Features

Acute dermatitis and fever after exposure are rare presentations. Occasionally transverse myelitis and convulsions may occur. Chronic schistosomiasis is the main presentation in *Schistosoma mansoni*, manifesting with portal hypertension, splenomegaly, anaemia and oesophageal varices. On the other hand, *Schistosoma haematobium* may present with terminal haematuria, dysuria and may progress to obstructive uropathy; bladder cancer has been noted as a late complication in some these patients.

Metastatic eggs can be found in other organs such as the spinal cord and brain. It has also been noted that *Salmonella* infections, presenting as recurrent pyrexia, are difficult to eradicate until schistosomiasis has been treated.

Investigations

- ◆ *S.mansoni*: Take stool and examine for ova, using concentration or Kato technique
- ◆ *S. haematobium*: Examine urine for RBC and for ova of *Schistosoma haematobium*

Management

Schistosomiasis should be treated with praziquantel 20mg/kg BD for one day (effective against all types). Patients should be examined for living eggs and if positive to be given another course of treatment.

Refer to higher level for appropriate management if:

- ◆ There are features of obstructive uropathy.
- ◆ There are feature of portal hypertension.

Prevention

Preventive strategies against schistosomiasis should include the following:

- ◆ Avoid contact with contaminated water.
- ◆ Give mass chemoprophylaxis to school age children in endemic areas.
- ◆ Improve environmental hygiene, advocating use of toilets by communities.
- ◆ Eradicate snails, which are the intermediate hosts.

34.4 Gastrointestinal Bleeding

Clinical Features

Gastrointestinal bleeding may present as blood in vomitus or in stool. In either case, there may be frank red blood or altered blood that looks like coffee grounds or there might be black stool. Bleeding may occur from the upper or lower gastrointestinal tract. The amount of bleeding varies depending on the cause of bleeding. Massive bleeding can present with features of shock.

The common causes of upper gastrointestinal bleeding include the following:

◆ ***The newborn:***

- Swallowed maternal blood: In this situation the baby looks well.
- Stress ulcers often following birth asphyxia.
- Coagulopathy: DIC associates with asphyxia, sepsis, vitamin K deficiency.
- Necrotizing enterocolitis (NEC): More common in sick preterm infants.

◆ ***Infants and children:***

- Swallowed blood following epistaxis (history of epistaxis)
- Gastritis
- Oesophageal varices
- Gastric/duodenal ulcers

At all ages the common causes of lower gastrointestinal bleeding include the following:

- ◆ Anal fissure.
- ◆ Infectious diarrhoea (including NEC in neonates, shigella, campylobacter, salmonella, amoebiasis and schistosomiasis).
- ◆ Coagulopathy due to bleeding disorders that include liver disease and DIC.
- ◆ Intussusception, which is more common in infants and young children.

Levels 2–3—Primary Care

Management

If there is shock, initiate treatment for shock according to the guidelines given under Emergencies. Otherwise, urgently refer to higher level for appropriate management all sick neonates and children with gastrointestinal bleeding.

34.5 Vomiting

Clinical Features

Vomiting in children may be due to a systemic infection or may accompany diarrhoea, as it often happens. Vomiting may also be due to upper gastro- intestinal tract; vomiting may be the primary presentation for this condition.

~ It should be noted that many normal babies regurgitate milk regularly and are clinically normal with normal growth. ***These are not considered to be having a vomiting problem.***

The common causes of gastrointestinal obstruction include the following:

- ◆ Early infancy
 - Gastro-oesophageal reflux disease (GORD), which initially presents as painless and persistent vomiting.
 - Pyloric stenosis, which presents as projectile vomiting and with a mass palpable in the right upper abdominal quadrant in the affected children.
 - Congenital upper gastrointestinal obstruction.
- ◆ Later infancy/early childhood
 - Intussusception that presents with intermittent acute pains and blood in the stool. A mass may be palpable in the abdomen

Management

- ◆ Avoid antiemetics.
- ◆ Treat non obstructive causes appropriately and refer all that do not respond well after 24 hours of therapy.
- ◆ Initiate rehydration according to degree of dehydration, using normal saline in the acute phase.
- ◆ Refer urgently to higher level for appropriate management all patients with obstructive features and those with gastroesophageal reflux disease.

34.6 Peptic Ulcer Disease

This refers to ulceration of gastric or duodenal mucosa that has a tendency to being chronic and/or recurrent.

Clinical Features

Duodenal ulcer has the following features:

- ◆ Presents with epigastric pain that is typically nocturnal and also when the patient is hungry.
- ◆ May present for the first time with complications(described below).
- ◆ There is wide individual variation in presenting symptoms and in the food that gives pain or discomfort when eaten.
- ◆ 95% of duodenal ulcers are caused by Helicobacter pylori (H.pylori).

Gastric ulcer presents with epigastric pain that is worse after eating food. Other symptoms are similar to those for duodenal ulcers.

Complications

Chronic blood loss may lead to iron deficiency anaemia, and acute bleeding results in haematemesis or melaena stool.

Management

Avoid any foods that in the patient's experience, give pain. Avoid obviously acidic foods for example cola drinks. Avoid gastric irritating drugs (NSAIDs). Give magnesium-based antacids or combined magnesium-aluminium compounds, liquid preferred. Adjust dose to limit pain.

~ Refer to higher level for appropriate management

34.2 Constipation and Encopresis

Clinical Features

- ◆ Constipation is failure to open bowels regularly and is often accompanied by painful passage of hard stool. It may be associated with soiling of pants
- ◆ Encopresis is intermittent leakage of soft/watery stool in a child with chronic constipation.

Constipation may be caused by obstructive lesions (these include congenital or acquired defects) or by neurological or endocrine abnormalities (hypothyroidism), or they may be functional.

~ Note: Exclusively breastfed infants may take several days without passing a stool. But when they do the stool is soft. This should not be confused with constipation.

Management

Children with perceived constipation are often treated at home with herbs and even enemas. However, this mode of treatment may make it difficult to diagnose this condition and may lead to some complications. The inclusion of bananas or pawpaw in the diet may be beneficial, especially in increasing fibre intake. For disimpaction, use glycerine suppositories for all ages. Refer all children with suspected nonfunctional lesions and any child that fails to respond to disimpaction of stool.

35. Disorders of the Liver and Spleen

35.1 Hepatosplenomegaly

Liver enlargement is said to have occurred when the liver measures more than 3cm below the costal margin or has a liver span greater than normal for age. Enlargement of the spleen, on the other hand, is said to have occurred if the spleen is “just palpable”. Refer to Table 35.1 for a summary of the causes of these conditions. **Refer to higher level for appropriate management**

35.2 Jaundice after the Neonatal Period

Definition: Yellow discolouration of skin and mucous membranes due to excess bilirubin. It is also referred to as hyperbilirubinaemia, usually with serum bilirubin at that time of $>2\text{mg\%}$ ($35.2\mu\text{mol/L}$). Jaundice is a clinical feature and not a diagnosis. Any patient with jaundice should be appropriately evaluated to determine the cause of the jaundice so as to institute appropriate management. Hyperbilirubinaemia is categorized according to the site of the abnormality in the metabolism and excretion of bilirubin: pre-hepatic, hepatic or post-hepatic. Thus:

Table 35. 1: Causes of hepatosplenomegaly

Category of causes	The specific causes associated with hepatomegaly	The specific causes associated with splenomegaly
Infections	Malaria kala azar	Malaria/tropical splenomegaly
	Schistosomiasis	HIV
	Infectious hepatitis	Kala azar (leishmaniasis)
	Amoebic hepatitis/abscess	Schistosomiasis
	Brucellosis	Infectious hepatitis Brucellosis Other infections, like SBE, typhoid fever, infectious mononucleosis
Blood	Haemolytic anaemia	Haemolytic anaemia, e.g., sickle cell anaemia in child <3 years auto-immune haemolytic anaemia
	Leukaemia	Leukaemia
Nutrition	Kwashiorkor	Iron deficiency
Congestion	Cardiac failure	Portal vein thrombosis
Metabolic disorders	Gaucher's disease	Gaucher's disease
Other	Liver tumours	Liver cirrhosis (portal hypertension)

Levels 2–3—Primary Displaced rather than enlarged liver Juvenile rheumatoid arthritis, SLE

Levels 2–3—Primary Care

Pre-hepatic: This is due to excess intravascular release of bilirubin, often by haemolysis)

◆ **Hepatic:** This is due to hepatocyte dysfunction with faulty uptake, metabolism, or excretion of bilirubin.

◆ **Post-hepatic:** This is due to blockage of bile and its constituents so that they do not exit from the biliary system (this may result from common bile duct obstruction or intrahepatic cholestasis).

The common causes of Hyperbilirubinaemia include viral hepatitis, haemolytic anaemia (e.g., sickle cell, malaria), cirrhosis, biliary obstruction, hepatoma, and drug induced reactions.

Clinical Features

Meticulous history and physical examination are important before ordering investigations. The history should include exposure to hepatotoxic drugs, known history of haematological disorder, history suggestive of viral hepatitis (anorexia, nausea, and aversion fatty foods), and history suggestive of obstructive jaundice (of dark urine, pale stool and pruritus). Physical examination should look for features suggestive of cirrhosis (spider naevi, gynaecomastia, loss of axillary hair, parotid gland enlargement and ascites) or features suggestive of parenchymal liver disease or haemolytic jaundice (splenomegaly).

Management

Patients with history and physical findings suggestive of viral hepatitis could be managed as outpatients requiring advice on bed rest, and should be given multivitamins. However, refer all patients to higher level for appropriate management. Consider hepatic encephalopathy in any patient who has jaundice and mental complaints. Early treatment of hepatic encephalopathy may reduce mortality.

35.3 Obstructive Jaundice beyond Neonatal Period

This refers to jaundice caused by obstruction of bile in the biliary tree. It can be due to intrahepatic or extrahepatic causes.

Clinical Features

These include the following features:

- ◆ Jaundice and pruritus, which can be severe, with steady increase in jaundice.
- ◆ Distended gall bladder.
- ◆ Anorexia.
- ◆ Troublesome diarrhoea with foul smelling and pale stool.
- ◆ Dark urine with a history of flatulence.

Levels 2–3—Primary Care

The causes of obstructive jaundice include the following:

- ◆ Those that are intraluminal include gallstones that can dislodge from the gall bladder and get impacted in the common bile duct (CBD) and helminthiasis especially ascaris and liver flukes.
- ◆ Those within the wall or mural include primary sclerosing cholangitis.
- ◆ Those acting outside the wall or extramural include enlarged lymph nodes of any cause, and neoplasms.
- ◆ Other causes include iatrogenic trauma to the ducts during surgery (especially cholecystectomy).

~ Refer to higher level for appropriate management.

36. Haematologic Conditions

36.1 Anaemia

Patients with anaemia have a reduction in total red blood cell mass, decreased concentration of red blood cells (RBC), and reduced haemoglobin (Hb) in the peripheral blood, resulting in a corresponding decrease in the oxygen carrying capacity of the blood.

The average normal haemoglobin levels for the various ages in childhood are shown in Table 36.1:

Table 36. 1 Normal childhood haemoglobin levels

Age category in childhood	Average haemoglobin level
Newborns	14g/dl
Children aged under 5 years	10g/dl
Children aged 5–9 years	11g/dl
Children aged 9 years and above	12g/dl

Anaemia except in the newborn may therefore be classified as follows as follows:

- ◆ Severe anaemia: Haemoglobin below 5g/dl.
- ◆ Moderate anaemia: Haemoglobin of 5–8g/dl.
- ◆ Mild anaemia: Haemoglobin above 8g/dl but below normal for age category.

The common causes of anaemia in Kenya are the following:

- ◆ Haemolysis of red blood cells caused by infections like malaria or congenital abnormalities like haemoglobinopathies exemplified by sickle cell disease.
- ◆ Iron deficiency due to chronic blood loss from bleeding, following parasitic infestation like hookworm, or nutritional deficiency of iron,
- ◆ Reduced production of red blood cells by the bone marrow due to depression of its function by chronic illness, infection, infiltration or just failure to produce blood cells (aplasia)

Clinical Features

Meticulous history and examination are essential in order to identify the cause of the anaemia. Pallor of the palms is a useful indicator of anaemia and is classified into two categories: “some pallor” for mild to moderate anaemia and “severe pallor”. Other features of severe anaemia include irritability, listlessness, anorexia, easy fatigability, heart failure, and shock. Additional; clinical features depend on the underlying cause of the anaemia.

Management

- ◆ For anaemia due to malaria, manage the malaria as according to the guidelines given under the malaria section in this chapter. In addition, give folic acid to all patients who have malaria and anaemia:
 - Below 2 years of age: 2.5mg daily for 3 months
 - Above 2 years of age: 5mg daily for 3 months
 - Continue with the doses once weekly as for malaria prophylaxis above
- ◆ For anaemia due to iron deficiency, the following needs to be done:
 - If severely anaemic, refer urgently to hospital.
 - If the anaemia is mild or moderate and the patient is not severely malnourished, give iron and folate orally.

~ **Review the child every 2 weeks.**

- ◆ For anaemia due to worm infestation, deworm using albendazole or mebendazole: Iron therapy should be continued until normal haemoglobin is achieved, usually after 3 months of treatment (1 month's treatment corrects the anaemia while the other 2 months treatment is needed to build up iron stores). The dose of iron is usually 6mg/kg/day of elemental iron (or 30mg of ferrous sulphate which contains 6mg of elemental iron) to a maximum of 200mg 3 times a day.
- ~ **Iron should not be given in the presence of sickle cell disease, so as to avoid excessive iron load in the body that might result in toxicity.**
- ◆ Refer all patients with severe anaemia or who fail to respond to treatment to higher level for appropriate treatment.
- ◆ Advise mothers to give a balanced and adequate diet to all children. Iron and folate containing foods include meat, fish, liver, eggs, dark green leafy vegetables, and yellow fruits.

36.2 Sickle Cell Anaemia (Disease)

This is a chronic haemolytic anaemia found mainly in Nyanza, Western, and Coast regions. It is characterized by sickle-shaped red blood cells as a result of homozygous inheritance of Haemoglobin S. Because sickled red blood cells are fragile and cannot withstand the trauma of being squeezed through capillaries during circulation, haemolysis occurs in the small blood vessels.

These abnormal red blood cells are also destroyed within the spleen.

Clinical Features (Presentation)

Symptoms of sickle cell disease or anaemia usually start around the age of 6 months and include the following:

- ◆ Pain and swelling of the hands and feet (hand and foot syndrome)
- ◆ Anaemia and mild jaundice
- ◆ Impaired growth and development

Levels 2–3—Primary Care

- ◆ Susceptibility to infections (including malaria, Haemophilus influenza, Streptococcus pneumoniae)
- ◆ Hepatosplenomegaly
- ◆ Acute splenic sequestration blood with resultant cardiovascular collapse

As the child grows pain predominates, being experienced as:

- ◆ Bone pain, involving the long bones, the back, and the head.
- ◆ Severe abdominal pain with vomiting.
- ◆ Acute chest syndromes (sudden onset of fever, chest pain leucocytosis, and pulmonary infiltrates on x-ray) that may be fatal.

Other features of sickle cell disease include:

- ◆ Aplastic crisis
- ◆ Priapism (painful erection of the penis)
- ◆ Hyperhaemolytic crisis
- ◆ Impaired renal function
- ◆ Avascular necrosis of the femoral head is common
- ◆ Occlusion of major intracranial vessels that may lead to hemiplegia, cranial nerve palsies and other neurological deficits
- ◆ Bossing of the skull that might be “tower shaped” skull.

Management

Management options for sickle cell disease include:

- ◆ Adequate diet to prevent growth failure due to malnutrition
- ◆ Adequate hydration, therefore avoiding dehydration by encouraging the child to drink as much as possible
- ◆ Allowing activity according to tolerance
- ◆ Avoiding exposure of the child to precipitating conditions, e.g., exposure to cold
- ◆ Seeking medical care early
- ◆ Giving prophylaxis for malaria
- ◆ Give supplementary folic acid but avoiding administration of iron
- ◆ Ensuring adequate immunization including that of pneumococcal vaccine if possible.

~ Refer all new patients for appropriate diagnosis and initiation of proper management.

Management of Sickle Cell Crises

For all patients with sickle cell crisis the following should be done:

- ◆ Giving prophylaxis for malaria
- ◆ Intravenous or oral fluids should be given, and their intake monitored carefully
- ◆ Infections should be treated vigorously and promptly

Levels 2–3—Primary Care

- ◆ For patients with thrombotic (vaso-occlusive, painful, or infarctive) crisis the following should be done:
 - Assess severity of pain carefully and give appropriate analgesia at all times.
 - For mild pain give paracetamol, diclofenac, or ibuprofen.
 - For moderate pain use give dihydrocodeine, codeine phosphate.
 - For severe pain give strong analgesia e.g morphine and refer/consult appropriately.

~Refer all patients with aplastic, sequestration, and haemolytic crises to higher level for appropriate management.

37. Neoplasms in Childhood

Neoplasms can occur in any age group. In general, most neoplasms require referral to hospital facilities and skill for treatment. All suspected malignancies or those whose diagnosis is unclear should be referred early to higher level for appropriate management. Early treatment of malignancies carries the best prognosis. See Table 37.1 for a summary of the features, investigations, and management of various tumours.

Table 37. 1: Common childhood malignancies, their clinical features,

Tumor	Clinical features	Investigations	Management
Leukaemias	Anaemia bone pains, haemorrhagic tendencies, epistaxis and gum bleeding Repeated infections	Haemogram Bone marrow Cytochemistry Flowcytometry	Refer to haematologist/oncologist for specialized care for chemotherapy
Burkitt's lymphoma	Usually, a jaw tumour May also present as an abdominal mass or central nervous system tumour	Biopsy of the mass; haemogram, bone marrow, x-ray, ultrasound scan CT scan, PET scan Lumbar puncture	Refer for specialized care
Hodgkin's disease	Lymph node enlargement, usually cervical Splenomegaly abdominal masses	Haemogram Chest x-ray Lymph node biopsy for histology and immunohistology-chemistry Bone marrow	Refer for specialized care for chemotherapy with or without radiotherapy
Nephroblastoma (Wilms' tumour)	Average age 2 years: Embryonal tumour Early childhood Painless loin mass (abdominal mass) Fast growing	Full haemogram U/E in normal IVU (intravenous urography) shows displaced calices FNAC shows malignant embryonal tumour cells CXR for metastasis	Refer to specialized care Chemotherapy Surgery – nephrectomy with post-surgical chemotherapy has good prognosis
Neuroblastoma	Embryonal tumour Abdominal mass in loin region Markedly elevated blood pressure Fast growing often crossing midline Child is sick looking	Full haemogram IVU shows caudally displaced normal kidney FNAC – malignant embryonal cells Ultrasound shows supra renal tumour with normal kidney CXR – look for metastasis, 24 hr urine – VMA grossly elevated	Refer to specialist centre Chemotherapy Surgery NB: Challenging anaesthesia, has poor prognosis
Dysgerminoma	Commonest midline tumour in neonatal period Commonest in ovary, testis, thymus, sacrococcygeal (most dramatic – teratoma) Presents with pressure symptoms May ulcerate especially when malignant	Plain x-ray may show calcification U/S – defines extent/site of tumour Foetoprotein tumour marker	Surgical excision; if benign, leave alone; if malignant, chemotherapy Good prognosis

38. Cardiovascular Diseases in Children

Most cardiac diseases in young children are congenital, while those in older children may be acquired or congenital. The heart may also be affected by systemic disorders like pneumonia, anaemia, electrolyte imbalances and malnutrition.

Clinical Features

The clinical features depend on the severity of the lesion or defect in the heart. Minimal lesion or defect may only be discovered on routine examination. Major ones may lead to functional disability. Easy fatigability and difficulty in breathing are prominent features of cardiac dysfunction; frequent interruptions of breastfeeding accompanied by sweating may be the manifestation in infants.

Other features include poor weight gain and poor growth. The affected children have stature and nutrition that is usually below the average for the age and also have frequent respiratory infections.

A physical examination that consists of evaluation of pulses in all limbs and of blood pressure, apex beat and heart sounds, and inspection of the precordium is likely to detect the specific cardiac lesion. The presence of a murmur indicates presence of a defect but does not indicate its size. Cyanosis and digital clubbing are often noted in children with cyanotic heart diseases.

Parents can usually notice that the affected child has a problem although they may not be able to localize the problem. A young baby who gets tired quickly or who has to pause many times while breastfeeding, or looks breathless or is not growing well, or has a darkish bluish tinge on the lips and tongue should be suspected to have a heart problem and should be taken to a health facility for examination.

~ Innocent murmurs occur at any age but are commonest among neonates.

38.1 Heart Failure (Congestive Cardiac Failure)

Heart failure occurs when the heart is unable to supply output that is sufficient for the metabolic needs of the tissues in the face of adequate venous return. Any severe cardiac condition, severe pneumonia, or anaemia can lead to heart failure.

Signs of Cardiac Failure

- ◆ Among infants and young children cardiac failure manifests as feeding difficulties and excessive sweating, rapid weight gain, tachycardia, gallop rhythm, respiratory distress, and tender hepatomegaly.

- ◆ Among older children cardiac failure manifests in addition with raised jugular venous pressure, dependent oedema, orthopnoea, fatigue, exercise intolerance, and basal crepitations.

Management

Refer all children with diagnosed or suspected cardiac disease to higher level for appropriate management.

38.2 Pulmonary Oedema

Pulmonary oedema is accumulation of fluid in the alveoli due to an increase in pulmonary capillary venous pressure resulting from acute left ventricular failure.

~ This is an acute emergency.

Clinical Features

Breathlessness, sweating, cyanosis, frothy blood-tinged sputum, respiratory distress, rhonchi and crepitations.

Management

Give a dose of IV frusemide 0.5–2mg/kg/dose and refer urgently to higher level for appropriate management.

38.3 Congenital Heart Disease with Cyanosis

The congenital cardiac abnormalities that are associated with cyanosis are associated with shunting of blood from the right side of the heart to the left side. These include the following cardiac abnormalities:

- ◆ Tetralogy of Fallot
- ◆ Pulmonary atresia with ventricular septal defect (VSD)
- ◆ Transposition of the great vessels
- ◆ Truncus arteriosus (associated VSD is always present)
- ◆ Eisenmenger syndrome
- ◆ Hypoplastic left heart syndrome

~These abnormalities manifesting in the neonatal period have a poor prognosis

38.3.1 TETRALOGY OF FALLOT

This is the commonest of the cyanotic group because of a slightly better prognosis in infancy, allowing more of them to survive longer. Classically, tetralogy of Fallot consists of pulmonary stenosis, ventricular septal defect, dextroposition of the aorta, and right ventricular hypertrophy.

Specific Clinical Features

Cyanosis is a major feature, but it may not be present at birth, but developing later during first year. Other features include dyspnoea on exertion, to which the affected child responds by assuming a squatting position for a few minutes after such an exercise. The affected children tend also to have paroxysmal hypercyanotic attacks often referred to as “blue” spells. The pulse may be normal, but a systolic thrill is felt along the left sternal border in 50% of cases. Clubbing of fingers and toes occurs after a longtime.

The following complications are associated with Tetralogy of Fallot:

- ◆ Cerebral thrombosis due to polycythaemia,
- ◆ Brain abscess (usually after 2 years of age) presenting with headache, fever, nausea and vomiting with or without seizures,
- ◆ Bacterial endocarditis, and
- ◆ Congestive heart failure.

Management

- ◆ For children with “blue” spells, administer oxygen; child should be in knee-chest position.
- ◆ Avoid dehydration in these children at all times.
- ◆ Refer children with this condition to higher level for appropriate management.

38.4.1 PATENT DUCTUS ARTERIOSUS (PDA)

The pulmonary arterial blood is shunted through the ductus arteriosus into the aorta during foetal life. Functional closure occurs soon after birth when pulmonary pressure falls. Gradually anatomical closure takes place over several days. This process is slower in the preterm infant. Patent ductus arteriosus is when ductus fails to close and the blood continues to shunt through it to the aorta.

Clinical Features

On auscultation one frequently hears a systolic or machinery murmur over the entire precordium, axilla and back. The patient also has bounding peripheral pulses. The

Levels 2–3—Primary Care

affected child may also be in congestive cardiac failure with its typical clinical manifestations.

Types of Patent Ductus Arteriosus

- ◆ Anatomical defect: This type is the typical ductus that occurs in term and preterm babies; treatment is surgical management.

38.4 Congenital Heart Disease without Cyanosis

The commonest in this group of conditions are ventricular septal defect, patent ductus arteriosus, and atrial septal defect.

38.4.1 VENTRICULAR SEPTAL DEFECT(VSD)

This is the most common cardiac malformation, accounting for 25% of congenital heart diseases. The magnitude of the left to right shunt is determined by the size of the defect and the degree of the pulmonary vascular resistance.

Clinical Features

Small defects with minimal left to right shunts are the most common. Patients are often asymptomatic. The patients may have a loud, harsh, or blowing left parasternal pansystolic murmur, heard best over the lower left sternal border on auscultation. Large defects with excessive pulmonary blood flow and pulmonary hypertension are characterized by dyspnoea, feeding difficulties, profuse perspiration, recurrent pulmonary infections, and poor growth. Physical examination reveals prominence of the left precordium, cardiomegaly, a palpable parasternal lift, and a systolic thrill, besides a systolic murmur.

Prognosis and Complications

Spontaneous closure of small defects occurs in 30–50% of cases. A large number remains asymptomatic and a significant number with large defects get repeated infections and congestive cardiac failure. Infective endocarditis is a complication in VSD, while pulmonary hypertension may develop as a result of high pulmonary blood flow.

Management

Refer the affected child to higher level for appropriate management.

- ◆ PDA of prematurity: This is basically a “functional” problem; the ductus remains open when there is tissue hypoxia, e.g., in respiratory distress or anaemia and is contributed to by fluid overload. The ductus normally closes spontaneously or by use of drugs and sometimes surgery may be required.

Levels 2–3—Primary Care

- ◆ PDA accompanying other abnormalities: This accompanies other congenital cardiac abnormalities and may be the only communication between the right and left side of the heart. In such cases closure of the patent ductus may lead to death unless the accompanying defects are also corrected.

Management

Refer all children with patent ductus arteriosus to higher level for appropriate management.

38.5 General Management of Congenital Heart Disease

The following general principles guide the management of congenital heart disease:

- ◆ Parents should be counselled on what can and what cannot be done depending on the heart lesion.
- ◆ Evaluation and close follow up of affected children is vital for appropriate and effective management.
- ◆ The majority of patients having mild CHD require no treatment. Such patients are expected to live normal lives and should not have any exercise restriction. The parents of the child should be made aware of this.
- ◆ Good nutrition should be maintained with adequate immunization and avoiding anaemia.
- ◆ Children with severe disease will tend to limit their own exercise but if dyspnoea, headache and fatigability in cyanotic patients occur, their exercise and other activities should be limited.
- ◆ Bacterial infections should be treated vigorously.
- ◆ Prophylaxis against bacterial endocarditis should be given before dental procedures, urinary tract instrumentation, and lower GIT manipulation.
- ◆ Observe for polycythaemia in cyanotic patients and avoid dehydration.
- ◆ Venesection with volume replacement should be carried out for polycaethsemic when haematocrit goes above >65%; and maintain it between 55–65%.

38.6 Acquired Heart Disease

38.6.1 ACUTE RHEUMATIC FEVER

This is an acute, systemic connective tissue disease related to an immune reaction to untreated group A beta haemolytic streptococcus infection of the upper respiratory tract in children. The significance of this disease is the rheumatic heart disease complication that may result from it and which may result in severe heart valve damage. Rheumatic heart disease is the commonest form of heart disease in Kenyan children. The initial attack of acute rheumatic fever occurs in most cases between the ages of 3 and 15 years.

For the sake of diagnosis, clinical features related to rheumatic heart disease are categorized into major and minor criteria:

- ◆ Major criteria include migrating polyarthritis, carditis (manifested by signs of cardiac failure, persistent tachycardia, pericardial rub or heart murmurs) Sydenham's chorea, erythema marginatum, and subcutaneous nodules.
- ◆ Minor criteria include past history of rheumatic fever, raised ESR, fever, and arthralgia.

Diagnosis of rheumatic fever occurs when in the presence of 2 major criteria and 1 minor criterion, or 1 major criterion and 2 minor criteria.

Complications

The main complication of rheumatic fever is rheumatic heart disease.

Management

Give aspirin and the patient to higher level for management.

Prevention

- ◆ Reduction of overcrowding among populations as much as possible.
- ◆ Early treatment of streptococcal sore throat with appropriate antibiotics (benzathinepenicillin 25,000–50,000units/kg/dose STAT; maximum 1.2 mega units dose **OR** phenoxymethylpenicillin 25–50mg/kg/24 hour TDS for 10 days).

Long-Term Prophylaxis

Parents should be made aware of the necessity for long-term prophylaxis:

- ◆ Children with previous acute rheumatic fever **without** carditis should be given benzathine penicillin 1.2 mega units monthly for 5 or up to the age of 18 whichever is longer. Patients allergic to penicillin should be given erythromycin 125–250mg BD for 5years.
- ◆ Children with previous acute rheumatic fever **with** carditis should be given benzathinepenicillin1.2megaunits**OR**erythromycin125–250mg/dose BD for those sensitive to penicillin for life.

38.7 Rheumatic Heart Disease

Rheumatic heart disease is inflammatory damage of the heart valves as a complication of acute rheumatic fever. The mitral valve is the most commonly involved valve, although any valve may be affected. The inflammatory damage involved in rheumatic heart disease results in stenosis or incompetence of the valves, either singly or in combination with other valves. Rheumatic heart disease may be asymptomatic, and the lesion is only discovered during routine examination. Some patients may present with congestive cardiac failure.

Heart murmurs are over the precordium on auscultation, but the murmurs depend on the nature of the damage (whether incompetence or stenosis) and on the specific valves involved.

Complications

The complications for rheumatic heart disease include congestive cardiac failure, pulmonary oedema, and bacterial endocarditis

Management

Refer all patients with rheumatic heart disease to higher level for appropriate management.

Long-Term Prophylaxis

- ◆ Rheumatic fever: Advise that all patients with a history of rheumatic fever must be given prophylaxis for life (see Section 38.6.1)
- ◆ Endocarditis prophylaxis: In addition to rheumatic fever prophylaxis, do the following:
 - Dental procedures: Amoxicillin 50mg/kg PO 2 hrs before procedure and 25mg/kg PO 6 hours after the initial dose. If penicillin allergy-erythromycin 1g PO 2 hrs before procedure then half the dose 6 hours after the initial dose
 - Lower gastrointestinal and genitourinary procedures :Amoxicillin50mg/kgIM 30 minutes before procedure and 6 hours after the initial dose + gentamicin 1.5mg/kg IM 30 minutes before procedure and 8 hours after the initial dose.

Patient Education

The need for follow up should be strongly emphasized.

38.8 Infective Endocarditis

The most common pathogens are bacterial, but they can also be fungal. Any child with a heart condition can get endocarditis but it can occasionally affect normal valves.

Clinical Features

The clinical features include fever, splenomegaly, petechiae, and new murmurs.

Management

Refer all suspected patients with infective endocarditis to higher level for appropriate management.

38.9 Pericardial Disease

Diseases of the pericardium are difficult to detect unless one has a high index of suspicion. Clinical features may be vague or very dramatic, as the situation when one has cardiac tamponade. A review of some of the diseases affecting the pericardium is given below.

38.9.1 ACUTE PERICARDITIS

This is usually caused by bacterial infections but it can also be due to viral pathogens. Patients may present with fever, chest pain and dyspnoea and may have pericardial friction rub on auscultation.

38.9.2 PERICARDIAL EFFUSION

Pericardial effusion may be due bacterial infection resulting in collection of pus in the pericardium (exudates) or to some non-infective inflammation with collection of serous fluid in the pericardium (transudate), for example in rheumatoid arthritis.

Clinical features

This may be asymptomatic if it is due to non-infective cause, and it is a small effusion. Otherwise, there may be acute chest pain or a dull ache depending to the cause of effusion. On examination, the apex beat may be difficult to palpate, and the heart sounds may be distant if the amount of fluid in pericardium is large.

38.9.3 CARDIAC TAMPOONADE

Cardiac tamponade occurs when cardiac filling is severely limited by the presence of a large amount of pericardial fluid.

Clinical Features

The affected patient presents with severe dyspnoea, cold extremities with decreased capillary refill, raised JVP, tachycardia, pulsus paradoxus, and inaudible heart sounds.

Management

This is an extreme emergency that requires urgent decompression of the pericardium. Refer the patient urgently to higher level for appropriate management.

38.9.4 CONSTRICTIVE PERICARDITIS

This tends to be chronic and is often due to tuberculosis. The pericardium becomes thick and inelastic leading to poor filling of the heart.

Clinical Features

The patient presents with cough and dyspnoea, small volume pulse, ascites, hepatomegaly and raised jugular venous pressure (JVP).

Management

Refer the patients suspected of having constrictive pericarditis to higher level for appropriate management.

38.10 Hypertension in Children

This is defined as elevation of systemic blood pressure beyond the 95th blood pressure centile for age (or above the upper limit of normal). The blood pressure varies with age, gender, and stature; these values are found in nomograms for blood pressure for children. A simplified version of a nomogram that considers only age is shown in Table 38.1.

In order to record blood pressure accurately, a correct size cuff for the child is needed; such a cuff is expected to cover about two thirds of the arm.

Table 38. 1 Upper limits of normal blood pressure values for both sexes at different ages (in mmHg)

Average age	12 hours	8years	9years	10 years	12 years	14years
Systolic blood pressure	80	120	125	130	135	140
Diastolic blood pressure	50	82	84	86	88	90

The following are the common causes of hypertension at different ages:

- ◆ For neonates and infants: Renal artery thrombosis or stenosis and coarctation of the aorta.
- ◆ From 1 year to 10 years: Renal parenchyma disease and coarctation of the aorta.
- ◆ From 11 years to 18 years: Renal parenchyma disease, essential hypertension.

Clinical Features

Levels 2–3—Primary Care

Essential hypertension may initially be asymptomatic. Coarctation of aorta in neonate may present with sudden collapse or features suggesting sepsis. Others will present with clinical features of underlying diseases or target organ system
– hypertensive encephalopathy, pulmonary oedema.

Management

Refer all children with hypertension to higher level for appropriate management.

Hypertensive Crisis

Defined as systolic or diastolic pressure above the 95th percentile by 50%, or when signs of hypertensive encephalopathy or pulmonary oedema occur.

- ~ **Untreated or inadequately treated hypertensive crisis result in congestive heart failure and stroke.**
- ~ **Refer affected patients urgently to higher level for appropriate management.**

39. Urinary Tract and Renal Conditions

39.1 Features of Renal Disease

Clinical Features

The following are the common causes of hypertension at different ages:

- ◆ For neonates and infants: Renal artery thrombosis or stenosis and coarctation of the aorta.
- ◆ From 1 year to 10 years: Renal parenchyma disease and coarctation of the aorta.
- ◆ From 11 years to 18 years: Renal parenchyma disease, essential hypertension.

Clinical Features

Essential hypertension may initially be asymptomatic. Coarctation of aorta in neonate may present with sudden collapse or features suggesting sepsis. Others will present with clinical features of underlying diseases or target organ system
– hypertensive encephalopathy, pulmonary oedema.

Management

Refer all children with hypertension to higher level for appropriate management.

The clinical features of renal disease include the following:

- ◆ Changes in urine output that include reduced urinary output (oliguria, anuria), increased urinary output (polyuria), increased frequency without increased volume.
- ◆ Oedema of the body, usually facial initially, but later involving legs and generalized.
- ◆ Haematuria that ranges from microscopic to gross. Haematuria is a serious sign of disease and should be aggressively investigated. Causes include infections (urinary tract infection, tuberculosis, schistosomiasis), acute glomerulonephritis, trauma,

meatal ulcers, blood disorders (bleeding disorders, leukaemia, purpura, sickle cell disease), tumours, scurvy, congenital abnormalities.

- ◆ The blood pressure may be raised in some conditions, or it may be a terminal manifestation in some conditions.
- ◆ Renal masses may be palpable, for example if the patient has nephroblastoma, polycystic kidneys, horse-shoe kidneys, neuroblastoma, or hydronephrosis.

Laboratory Findings

The following laboratory findings may be found renal disease:

- ◆ Pyuria of >10 cells/cubic mm in uncentrifuged urine specimen.
- ◆ Casts of renal tubules formed by red blood cells (RBC), white blood cells (WBC), epithelial cells. The casts may be granular or hyaline.

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- ◆ Proteinuria that may vary from minimal to gross.
- ◆ High blood urea or blood urea nitrogen (Azotaemia, BUN) that accompany renal failure.
- ◆ Raised blood creatinine levels that accompany renal failure.
- ◆ Hyperkalaemia. Usually, there are no clinical consequences until the levels rise to 6mmol/L and above. Clinical features of hyperkalaemia include muscular weakness, abdominal distension, tingling of the face of the muscles on the hands and feet, and irregular pulse.

39.2 Urinary Tract Infections (UTI)

Urinary tract infection is commonly caused by the following bacterial organisms: Escherichia coli (75%), Klebsiella and Proteus vulgaris, less commonly by Streptococcus faecalis and some Pseudomonas species, and rarely by a Staphylococcus species.

Clinical Features

In children it is not easy to differentiate upper from lower urinary tract infections, but loin (lumbar) pain and tenderness suggest upper urinary tract infection.

- ◆ In neonates and early infancy, boys are affected more often than girls because of the higher incidence of congenital urinary tract malformation in boys than girls that are noted at that age. Affected children present with fever, failure to thrive, irritability, poor feeding, and vomiting.
- ◆ In older infants and children, girls are affected more often than boys because of their anatomically shorter urethra. Affected children present with anorexia, vomiting, fever, abdominal pain, frequency, enuresis in a previously dry child and dysuria. For the younger child, the mother may report that the child cries when passing urine.

- ◆ For all male children, ask about the nature of the stream of urine when they are passing it. In those with urinary tract obstruction, the urinary stream is poor. Recurrences of urinary tract infection are common.

Investigations

The following investigations are recommended for a child with urinary tract infection:

- ◆ Full blood count.
- ◆ Urinalysis where urinary tract infection is contemplated when urinary WBC >10 WBC/cubic mm in uncentrifuged urine midstream or catheter specimen.

For the best results, the urine specimen for investigation of urinary tract infection should reach the laboratory within 2 hours of voiding or be refrigerated.

The following are the common causes of hypertension at different ages:

- ◆For neonates and infants: Renal artery thrombosis or stenosis and coarctation of the aorta.
- ◆From 1 year to 10 years: Renal parenchyma disease and coarctation of the aorta.
- ◆From 11 years to 18 years: Renal parenchyma disease, essential hypertension.

Clinical Features

Essential hypertension may initially be asymptomatic. Coarctation of aorta in neonate may present with sudden collapse or features suggesting sepsis. Others will present with clinical features of underlying diseases or target organ system – hypertensive encephalopathy, pulmonary oedema.

Management

Refer all children with hypertension to higher level for appropriate management. Test at 4°C for a period not exceeding 24 hours

When associated with haematuria or proteinuria, pyuria is suggestive of parenchymal renal disease such as glomerulonephritis or interstitial nephritis. Sterile pyuria is often due to infection with tuberculosis. Consequently, carry out cultures for tuberculosis.

Management

Refer all patients suspected of having urinary tract infection to higher level for appropriate management.

39.3 Glomerular Disorders

39.3.1 ACUTE GLOMERULONEPHRITIS (AGN)

This is an inflammatory renal disease commonly following streptococcal infection of skin and tonsils.

The following are the common causes of hypertension at different ages:

- ◆For neonates and infants: Renal artery thrombosis or stenosis and coarctation of the aorta.
- ◆From 1 year to 10 years: Renal parenchyma disease and coarctation of the aorta.
- ◆From 11 years to 18 years: Renal parenchyma disease, essential hypertension.

Clinical Features

Essential hypertension may initially be asymptomatic. Coarctation of aorta in neonate may present with sudden collapse or features suggesting sepsis. Others will present with clinical features of underlying diseases or target organ system – hypertensive encephalopathy, pulmonary oedema.

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Management

Refer all children with hypertension to higher level for appropriate management.

Clinical Features

The patient presents with smoky or tea coloured urine as a result of haematuria, with oedema that manifests as puffiness of the eyes more noticeable in the morning. The oedema is seldom severe or generalized. The affected children also experience back pain, hypertension commonly presenting as headaches, visual disturbance, and vomiting.

Occasionally the patients may present with pulmonary oedema with dyspnoea or convulsions and coma due to hypertensive encephalopathy. There may be evidence of primary streptococcus infection, most often as an acute follicular tonsillitis with cervical adenitis and less often as skin sepsis. In the initial stages of the illness there is oliguria that is followed by diuresis (oliguric and diuretic phases).

Investigations

Urinary examination is likely to show red blood cells in urine, RBC casts, WBC casts, granular and hyaline casts.

Refer all patients with acute glomerulonephritis to higher level for appropriate management.

39.4 Nephrotic Syndrome

Causes of nephritic syndrome include the following:

- ◆ Idiopathic or unknown for the majority of children with nephritic syndrome.
- ◆ Congenital nephritic syndrome, which may be to congenital syphilis.
- ◆ Secondary nephritic syndrome that is due to post-acute glomerulonephritis, plasmodium malaria, other infection and infestations, allergy following bee stings, heavy metal poisoning (e.g., mercury and lead), urinary tract infection.

Clinical Features

The clinical features of nephritic syndrome include the following:

- ◆ Oedema that is marked to massive and may be accompanied by ascites and/or pleural effusion may occur.
- ◆ Marked proteinuria.
- ◆ Hypoproteinaemia, mainly low serum albumin in blood.
- ◆ Hyperlipidaemia.

Children with nephritic syndrome who have haematuria with hypertension are categorized as nephritic nephrosis.

Management

Refer all patients with nephritic syndrome to higher levels for appropriate management.

39.5 Tubular Disorders

Tubular disorders can be congenital or be the result of shock or toxins. Congenital variety tends to be associated with acidosis (renal tubular acidosis -RTA) and renal rickets.

Management

Refer suspected patients with renal tubular disorders to higher level for appropriate management.

39.6 Acute Renal Failure

Acute renal failure is acute or sub-acute decline in the glomerular filtration rate and/or tubular function characterized by rapid accumulation of nitrogenous waste products, for example urea and creatinine, in the blood.

Aetiologies of Acute Renal Failure

The causes of acute renal failure into pre-renal, renal and postrenal groupings:

- ◆ Pre-renal acute renal failure: This group of diseases include the following:
 - Diarrhoea and vomiting with severe dehydration, burns, inappropriate diuretic treatment, peritonitis, pancreatitis, heart failure and liver disease with ascites.
 - Diseases of the renal arteries and veins that include direct trauma to renal vessels, dissecting aortic aneurysm
- ◆ Intrinsic renal problems:
 - Glomerulonephritis, acute interstitial nephritis, acute tubular necrosis, intratubular obstruction.
 - Post-infectious glomerulonephritis; renal damage related to drugs, for example methicillin, ibuprofen and gentamicin
 - Following volume depletion and also as a result of toxins
 - Rhabdomyolysis and uric acid nephropathy
- ◆ Obstruction of the collecting system:
 - Bladder outlet obstruction, bilateral ureteral obstruction, ureteral obstruction and a single kidney.

Management

Refer all suspected cases of renal failure to higher level for appropriate management.

39.7 Chronic Renal Failure

Chronic renal failure describes the situation when there is the existence of advanced, irreversible, and usually progressive renal failure. Chronic renal failure is commonly caused by chronic glomerulopathies, hypertension, chronic interstitial nephritis, and diabetes mellitus.

The following are important manifestations of chronic renal failure:

- ◆ At biochemical level in the blood, there is acidosis, hyperkalaemia, elevated blood urea and elevated serum creatinine.
- ◆ At cardiovascular level there is pulmonary oedema, hypertension, pericarditis and cardiac tamponade and heart failure.
- ◆ At skeletal level, there is bone pain and bone fractures(rare).

- ◆ At nervous system level, there is encephalopathy (confusion, convulsions) and peripheral neuropathy.
- ◆ At haematological system level there is anaemia, excessive bleeding., from gums, skin, nose.
- ◆ At the skin level, there is scratching(pruritus)and darkening of skin.

Chronic renal failure should be suspected in the presence of the following:

- ◆ Previous history of renal disease, e.g., acute nephritis, nephrotic syndrome is present
- ◆ History of hypertension
- ◆ History of diabetes mellitus
- ◆ High blood urea and serum creatinine
- ◆ Some of the systemic manifestation listed under “manifestations of chronic renal failure”.

Refer all patients with suspected chronic renal failure to higher level for appropriate management.

39.8 Hypokalaemia

Hypokalaemia is said to have occurred when serum potassium levels are persistently below 3.5mmol/L. Causes of hypokalaemia include inadequate dietary intake (rare), gastrointestinal fluid loss (vomiting, diarrhoea, fistulae), renal loss (diuretics, uncontrolled diabetes mellitus), systemic metabolic alkalosis, and dialysis.

Clinical Features

Clinical features for hypokalaemia include the following:

- ◆ Muscular weakness
- ◆ Tetany
- ◆ Fatigability
- ◆ Thirst
- ◆ Polyuria
- ◆ Paralytic ileus
- ◆ Cardiac arrhythmias
- ◆ Low serum potassium
- ◆ Elevated serum bicarbonate
- ◆ Low serum chloride
- ◆ ST segment depression and appearance of V waves on ECG.

Management

Refer all patients suspected of having chronic renal failure to higher level for appropriate management.

39.1 Genito-Urinary Anomalies

The genito-urinary anomalies include undescended testes, hypospadias, ectopia vesicae, patent urachus, urachal cyst, and recto urethral fistula in males with imperforate anus.

Management of these conditions is complex, and the patients need to be referred to higher level for appropriate management.

40. Central Nervous System

40.1 Seizure Disorders

A seizure is defined as a paroxysmal involuntary disturbance of brain function that may result in loss of consciousness and abnormalities in movement, behaviour, or sensation. Seizures can result from organic lesions such as acute or chronic infections, tumours, and developmental defect, but more commonly the cause is unknown.

Epilepsy is defined as recurrent seizures.

40.1.1 TYPES OF SEIZURES

The clinical features depend on the type of seizure. The various forms of seizures are itemized below:

◆ **Partial seizures, which include:**

- Simple partial seizures; can be motor, sensory, and sensory motor (consciousness not impaired).
- Complex partial seizures: starting with an aura (later impairment of consciousness) and often accompanied by automatic behaviour.
- Partial seizures becoming progressive (Jacksonian seizures) or generalized.

◆ **Generalized seizures, which include:**

- Absences, which are brief lapses of awareness lasting for about 30 seconds and are uncommon below 5 years of age.
- Tonic seizures, which manifest with sustained muscle contractions.
- Myoclonic seizures, which are repetitive symmetrical muscle contractions whose distinctive forms are:
 - Benign myoclonus of infancy disappears by age 2 years
 - Early childhood type, whose onset starts at about 2 years and has a relatively good prognosis.
 - Complex type, whose onset is in the first year of life commonly following birth asphyxia (a common cause), with a poor prognosis.
 - The juvenile form that begins at age 12–16 years, among children that are neurologically normal and has a good response to treatment.
- Clonic seizures, characterized by rhythmic jerking.

- Tonic-clonic seizures characterized commonly by an aura with loss of sphincter control and postictal deep sleep.
- Atonic seizures, characterized by sudden loss of muscle tone.
- Infantile spasm, characterized by their initiation at age 4–8 months with sudden symmetrical contraction of all parts of body. Prognosis is poor if there is identifiable underlying pathology, but good if there is no identifiable underlying pathology

Meticulous history from parents and reliable witness is critical in diagnosing a seizure disorder. It is important to find the details of the prodromal phase, aura and the type, duration, frequency, and the age of onset of seizures. Details about the postictal phase are important. It is also important to determine the underlying pathology, for example birth asphyxia, neonatal jaundice, or infection of the central nervous system.

A careful and thorough physical examination is necessary to detect associated neurological dysfunction or abnormality. Evaluation of blood pressure, head circumference in those aged less than 2 years, and fundoscopy are important in the examination of such children.

40.1.2 MANAGEMENT DURING AN EPILEPTIC ATTACK

During an epileptic attack, the following should be observed:

- ◆ The patient should be placed on the left lateral position with the head turned to the same side.
- ◆ Tight fitting clothing around the neck should be loosened or removed.
- ◆ No attempt should be made to insert any instrument into the mouth to avoid tongue biting, as this may have already happened.
- ◆ The patient should not be surrounded by too many eager observers.
- ◆ Seizures should be allowed to complete its course without physically attempting to hold down the patient. However, the patient should be removed from danger like fire.

General Management

- ◆ A child with seizure should first be treated for any underlying undiagnosed condition.
- ◆ Most patients with epilepsy can be started on therapy as outpatients.
- ◆ Treatment is usually lifelong. Therapy may be discontinued after a seizure free period of at least two years if the patient has no risk factors. Reduce dose gradually over many months. Sudden discontinuation of drugs may precipitate status epilepticus. Complex partial seizures will require lifelong drugs.

Pharmacological Management

Start long-term therapy if patient has had two or more seizures within one year Start therapy with one drug, usually phenobarbital. Increase at regular intervals until

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seizures are controlled or side effects appear. Refer to Tables 40.1 and 40.2 for drugs of choice and dosages for paediatric seizure disorders.

Refer patient to higher level for appropriate management if:

- ◆ Seizures are not controlled with maximum drug dose.
- ◆ Child develops side effects.
- ◆ Raised intracranial pressure is suspected.
- ◆ Space occupying lesion is suspected.

Parent and Patient Education

The following are important for the education of the patient and the parent:

- ◆ Medication should be taken regularly, and it should not be assumed that the child is healed when the seizures are controlled. Treatment in most cases is lifelong.
- ◆ Ensure normal activity for the age of the child including school.
- ◆ Child should avoid dangerous activities like climbing trees.
- ◆ Protect child from falling into fires.
- ◆ The patient should never swim alone, and all precautions should be taken when swimming.
- ◆ The parent should not be overprotective of the child.

Table 40. 1 Drugs of choice for common seizures

Main classification of convulsive disorder	Sub classification of the main convulsive grouping	Preferred drug of choice for treatment	Other drugs that can be used For treatment
Partial seizures	With awareness	Carbamazepine Carbamazepine	Valproic acid Lamotrigine, Sodium valproate
	Without awareness		
	Secondarily generalized	Sodium valproate	Phenytoin
Generalized seizures	Absence	Sodium valproate Ethosuximide	Sodium valproate,
	Clonazepam Tonic-clonic, clonic. tonic, atonic	Sodium valproate Phenobarbitone	Carbamazepine
Nitrazepam, Valproic acid		Myoclonic	Clonazepam.
			Acid, Phenobarbitone

Table 40. 2 Paediatric dosages of common drugs for convulsive disorders

Drug	Dosage	Frequency	Remarks
Phenobarbitone	3–8mg/kg	Once daily	May cause hyperactivity in some children.
Phenytoin	4–7mg/kg	Once daily	Causes gum hypertrophy
Carbamazepine	10–30mg/kg/day	2-3 divided doses	
Sodium valproate	20–40mg/kg/day	2- 3 divided doses	May precipitate, absence status if given with clonazepam. Also causes transient alopecia
Ethosuximide	20–40mg/kg/day	2–3 divided doses	
Clonazepam	0.01–0.02mg/kg/day	Once daily	May precipitate absence status if given with sodium valproate

NB: Sodium valproate is the most broad-spectrum anticonvulsant, but it is very costly and is better used as a second line drug. If seizures are not controlled, drugs used at maximum recommended dose should be withdrawn gradually as another one is introduced.

If seizures are not controlled, gradually withdraw drugs used at maximum recommended dose as another one is introduced.

40.2 Status Epilepticus

Clinical Features

A succession of seizures without regaining consciousness between attacks or one prolonged convolution lasting 30 minutes or more. Status epilepticus can occur with partial, complex partial, absence, tonic-clonic, or clonic seizures and may result in respiratory embarrassment with cyanosis and hypoglycaemia.

Management

The following is recommended in stabilizing the child with status epilepticus:

- ◆ For the airway and breathing:
 - Establish the airway
 - Give oxygen
 - Provide ventilation
- ◆ With regard to circulation and disability:
 - Establish intravenous access
 - Give 10% dextrose 5ml/kg.
 - Give diazepam intravenously or rectally.

~ Transfer patient with status epilepticus urgently to higher level for appropriate management.

40.3 Febrile Convulsions

These are generalized tonic-clonic seizures seen in childhood with the following characteristics:

- ◆ Occurs in children aged between 6 months and 5 years.
- ◆ There is fever at the time of the attack (usually greater than 38°C).
- ◆ They are of brief duration (always less than 15 minutes).
- ◆ They occur in the absence of central nervous system infection, and
- ◆ There is absence of neurological abnormalities in the inter-ictal period.

Management

Emergency care:

- ◆ Give paracetamol to reduce the temperature.
- ◆ Given diazepam rectally if child is convulsing at the time of presentation.
- ◆ Reduce clothing should be to a minimum to facilitate lowering of temperature.

~ Refer the child to higher level for appropriate management.

Subsequent care:

- ◆ Educate parents that recurrences are common but that they can be reduced by administration of antipyretics as soon as child becomes febrile. Diazepam may be used occasionally.
- ◆ Use anticonvulsants regularly after these conditions or third attack of the febrile convulsions or if the convolution is atypical.

Seizures in the neonate are covered under neonatal care, Section 26.6.

40.4 Cerebral Palsy

Cerebral palsy (CP) is defined as a non-progressive disorder that consists of motor and other neurological problems resulting from a defect or lesion of the developing brain.

The aetiological factors associated with cerebral palsy are:

- ◆ Those occurring in the prenatal period, including rubella, syphilis, toxoplasmosis.
- ◆ Birth asphyxia, the main factor in the perinatal period, being responsible for about 50% of cerebral palsy cases.
- ◆ Those occurring with bilirubin encephalopathy, meningitis, encephalitis, intracranial haemorrhage, hydrocephalus.

Clinical Features

Spastic paralysis is the commonest variety. It involves one or more limbs and also the trunk. Posture is that of hyperextension with tendency to contractures. Deep tendon reflexes are increased. The choreoathetoid type of cerebral palsy is less common and is characterized by involuntary movements and abnormal posture. Cerebral palsy may also present as ataxia with low muscle tone and lack of balance. Abnormalities associated with cerebral palsy include deafness, visual defects, speech difficulties, mental retardation, convulsions, and growth retardation. If the problem dates from birth, neonatal reflexes may persist.

Malnutrition can result from neglect of the child or from difficulties associated with feeding the child.

All children should, if possible, be seen by a doctor with some experience of cerebral palsy children for correct diagnosis. The nature of the motor dysfunction, its distribution, and all related abnormalities should be noted and a decision made on what could be offered to the child.

Symptomatic Therapy

Physical therapy is the mainstay of management of these children. Such therapy should be started as early as possible. The main aim is to prevent contractures and abnormal movement patterns and to train other movements and

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coordination. Depending on the degree of disability the child can be trained by experienced therapist to attain some degree of independence. Home training programme for the parents is the most important part. Anal sphincter control may be assisted by administration of stool softeners and enemas where necessary.

Anticonvulsive drugs should be given if there are convulsions, and any accompanying problem should be appropriately dealt with. A multidisciplinary approach is recommended for management of children with cerebral palsy.

Support of Family

Parents are encouraged to bring their children early for care and not hide them from the public. The diagnosis should be discussed with the parents in an open and honest manner, explaining that there is no cure for the condition but that physical therapy contributes significantly to the well-being of the affected child.

40.1 Intellectual disability

Children whose neuromotor and cognitive development is delayed are considered to have mental retardation. The degree of impairment can range from mild to very severe. Intellectual performance is below average, as expected, and the severely retarded is not able to adapt to daily demands and thus may not be able to lead an independent life. Mental retardation may also be part of a syndrome like Downs syndrome

Management

Refer all children with mental retardation to higher level for appropriate management.

40.2 Hydrocephalus

Hydrocephalus is excessive enlargement of the head because of accumulation of cerebral spinal fluid in the cerebral ventricles as a result of the blockage of its flow. Hydrocephalus can be congenital or acquired.

- ◆ Congenital isolated hydrocephaly occurs due to blockage of flow of CSF.
- ◆ Commonest area is the Aqueduct of Sylvius. It may also be part of neuro-tube defect.
- ◆ Acquired is usually due to complication of meningitis or it may be due to a tumour. In both situations, the flow of the cerebral spinal fluid is blocked.

Clinical Features

For those aged 0 to 2 years there is enlargement of the head, bulging fontanel, sunset eyes, and large veins on the head. Depending on the cause and the severity there may be neurological signs as well.

For those over 2 years there is headache, vomiting and papilloedema. There may also be focal neurological signs.

Management

Refer all patients with hydrocephalus to higher level for appropriate management.

41. Skin Diseases

41.1 Eczema

41.1.1 ATOPIC ECZEMA

Atopic eczema has a genetic predisposition with a strong personal or family history of asthma and allergic rhinitis. It usually begins in the first 2 to 3 months of life.

Clinical Features

Pruritus is the cardinal feature of eczema. There is tendency to chronicity or relapses. Acute changes include erythema, papules, or vesicles, crusting, and secondary infection. Subsequently, there is scaling, hypopigmentation, or hyperpigmentation. Distribution of the lesions varies with age. In infants it tends to be on the scalp, face, and extensor surfaces, while in older children it tends to be in flexures and skin creases.

Management

The management of atopic eczema consists of the following:

- ◆ Educate parents on the disease and its natural history and advise to avoid any precipitating factors, e.g.:
 - Synthetic clothing.
 - Any food substance that seriously aggravates the eczema.
 - Letting the skin to dry excessively, e.g., by using harsh soaps like bar soaps, Sunlight, Ushindi etc. One should use the normal toilet soaps. No need to use medicated soaps.
 - Any of the petroleum jelly products for those who react against them (Vaseline, Ballet, Valon, Ideal, etc.).
- ◆ Keep the skin moist by using emulsifying ointment.
- ◆ Use antihistamines like chlorpheniramine maleate to alleviate the itch.
- ◆ Apply topical steroids. These are recommended for severe cases, but generally for not more than 7 days. Note that infants can absorb steroids through the skin easily.
- ◆ Treat any intercurrent infection (bacterial or fungal).

Refer to higher level for appropriate management if the body surface area involved is large (e.g., 50% and over) or the disease is severe.

41.1.2 CONTACT DERMATITIS

Acute or chronic inflammation produced by substances contacting the skin and causing toxic (irritant) or allergic reactions.

Primary irritants include acids, alkalis, soaps, detergents, and acetone. Allergic contact dermatitis may be caused by topical drugs, plants, shoes, clothing, metal compounds, dyes, and cosmetics.

The lesions in contact dermatitis may be acute vesicles or may consist of weeping subacute erythema or dry scaly papules. Chronic lesions may be lichenified (thickened), excoriated, and hyper pigmented.

The distribution of the lesions may take the shape of offending item or area of its contact, for example shoes, watch, and gloves, or may be asymmetric or have other forms.

The following management is recommended for children with contact dermatitis:

- ◆ Identify and remove the causative agent.
- ◆ Drain large blisters, but do not remove their tops (roofs).
- ◆ Apply gauze or thin cloths dipped in water or normal saline
- ◆ Apply topical 1% hydrocortisone ointment to dry lesions and cream for wet ones.

41.1.1 SEBORRHOEIC DERMATITIS

This is an inflammatory scaling disease of the scalp, face, and occasionally other areas with high density of oil glands (axilla, upper chest, anogenital areas).

Clinical Features

Symptoms develop gradually as:

- ◆ Dry or greasy diffuse scaling of scalp (dandruff) with pruritus.
- ◆ Yellow-red scaling papules, in severe cases found along the hairline, external auditory canal, the eyebrows, conjunctivitae, and naso-labial folds. The lesions are not accompanied by hair loss.
- ◆ Cradle cap (thick yellow crusted scalp) in newborns.
- ◆ Severe seborrhoeic dermatitis, found in neurological disorders (Parkinson's disease) and HIV infection.

Management

- ◆ Refer children with seborrhoeic dermatitis to higher level for appropriate management
- ◆ Remove dandruff by applying shampoos containing selenium sulphide, sulphur, and salicylic acid, or tar daily (more recently ketoconazole shampoo is excellent).
- ◆ Apply topical steroids, using mild lotions.

- ◆ Treat superimposed bacterial, fungal, or viral infections, which are especially prevalent in patients with HIV.

41.2 Bacterial Infections

41.2.1 IMPETIGO CONTAGIOSUM

This is a contagious intradermal infection caused by streptococcal or staphylococcal organisms. This condition is commonly associated with poor hygiene, crowded living conditions, and neglected minor trauma. The condition frequently complicates scabies, purpura urticaria and insect bites. Impetigo contagiosum may presents as bullous lesions that rupture and crust on the face, arms, legs, and buttocks.

The recommended management of this condition comprises the following:

- ◆ Local treatment for minor lesions consisting of cleaning the lesion with normal saline
- ◆ Systemic treatment for extensive lesions consisting of administration of systemic antibiotics (amoxicillin/cloxacillin or erythromycin).

41.2.2 BULLOUS IMPETIGO

This condition is common in neonates (pemphigus neonatorum) although any age can be affected. It is caused by a staphylococcal bacterium, involving mainly the axilla and the groin.

The skin lesions are usually large bullae containing pus and clear serum and may rupture easily leaving raw areas. Crust do not form in this condition. Refer patient with bullous impetigo if patient is toxic or is suspected to have septicemia or if the lesions are extensive especially in the neonate.

Patient Education

The patients and their guardians need to know the following about bullous impetigo:

- ◆ It can spread easily, especially in schools
- ◆ Affected children should be isolated and treated
- ◆ Towels and bath facilities for those affected should be separated.

41.3 Fungal Infections

The fungal infections of the skin include dermatophyte (genus microsporum, trichophyton and epidermophyton) infections, which thrive on non-viable keratinized tissue of the skin (stratum, corneum, hair and nails). Sources of infection include other persons, animals such as puppies or kittens, and more rarely the soil. The nomenclature for the infection is “tinea” followed by the Latin name of the appropriate body part: for example, Tinea pedis for athlete’s foot, which is manifested by scaling or maceration between toes particularly the fourth interspace. This is caused by Tinea rubrum and/or Tinea interdigitaliae.

Predisposing factors include hot humid weather and occlusive footwear. Tinea cruris is an erythematous and scaly rash with distinct margin extending from groin to upper thighs or scrotum. Itching may be severe and is common in males.

Tinea corporis (body ringworm) forms characteristically annular plaques with raised edges and central clearing and scaling with variable degrees of itching. Tinea capitis (scalp ringworm) is mainly a disease of children; those infected experience spontaneous recovery at puberty. It manifests commonly with scaling, itching, and loss of hair, often referred to as "Mashillingi" in Kiswahili. Scarring and alopecia may result from the infection. Tinea anguum involves the nails and presents with nail discolouration and subungual hyperkeratosis (friable debris).

The management of fungal skin infections consists of the following:

- ◆ Administer ketoconazole 3–6mg/kg/day or fluconazole 6mg/kg/day.
- ◆ Apply clotrimazole cream.
- ◆ Administer ketoconazole shampoo twice weekly until lesions clear.

41.4 Parasitic Infestations

41.4.1 SCABIES

Scabies is caused by the human itch mite, Sarcoptes scabiei, and spreads through intimate personal contact, facilitated by overcrowding and poor hygiene.

Transmission via bedding or clothing is infrequent, partly because the mites do not survive for a day without host contact.

Clinical Features

The clinical features of scabies include the following.

- Intense itching, worse at night or after hot shower.
 - Skin papular rashes associated with burrows that occur predominantly on the finger webs, the wrists flexor surfaces, elbows, and axillary folds, and around the areola of the breasts in females, the genitals especially male, along the belt line, and on the buttocks. In young children rash may be generalized and may affect the face.
 - Secondary infection causes rashes that manifest themselves as urticarial papules, crusts and pustules.
- ~ The burrow is a fine, wavy scaly line, 0.5–1cm long, with a small papule/ vesicle at the end.

Diagnosis

Diagnosis is made by demonstration of typical burrows on the skin; these may be difficult to demonstrate.

Management

The following are recommended for the management of scabies:

- ◆ Application to the entire skin (from the neck down) of 25% benzyl benzoate emulsion (use 12.5% in children) on days 1 and 2 without bathing. On day 3 bathe and apply again.
- ◆ Application of 5–10% sulphur ointment.

The nonspecific measures against scabies include the following:

- ◆ Maintaining good personal hygiene.
- ◆ Use of antihistamines for pruritus.
- ◆ Treatment of the whole family and personal contacts.
- ◆ Putting the clothing used by the affected individually, including beddings, mattresses, in the sun.
- ◆ Treatment of secondary bacterial infections using cloxacillin in severe cases.
- ◆ Treatment of the whole family for scabies at the same time.

41.4.2 JIGGERS/TUNGA PENETRANS

Diagnosis of jiggers is not a problem but education to the community on treatment is mandatory. The following is recommended:

- ◆ Wash affected area with soap and dry thoroughly.
- ◆ Extract the jiggers with clean pin.
- ◆ Suffocate the jiggers by soaking the affected feet in Lysol or kerosene if not extensive.
- ◆ Give tetanus toxoid.

The following preventive measures are recommended:

- ◆ Smoothening the walls and floors with mud or cow dung.
- ◆ Dusting of the earthen floors with insecticide powders. (Ensure that any compound used is not harmful to humans.)
- ◆ Personal hygiene should be maintained for affected populations.

41.5 Pellagra (Niacin Deficiency)

Pellagra is a dietary deficiency that may occur in starvation, isoniazid therapy, diarrhoea, and liver cirrhosis.

Clinical Features

This condition presents with characteristic dermatitis, diarrhoea and dementia and may result in death if appropriate treatment is not given.

Weight loss, anorexia, fatigue, malaise, pruritus with burning sensation, dysphagia, nausea, diarrhoea, vomiting, impaired memory, confusion and paranoid psychosis may occur. Skin lesions are limited to areas exposed to the sun, namely the face, neck, hands and feet. Mucous membranes may be involved, manifesting as scarlet stomatitis and scarlet red tongue.

Management

Refer to level 4.

41.6 Dermatological Emergencies

41.6.1 STAPHYLOCOCCAL SYNDROME(SSSS) OR RITTER'S DISEASE

SCALDED

SKIN

This is a toxin-mediated epidermolytic condition leading to detachment of the superficial epidermal layers to resemble scalding. Affected children may look like they have been immersed in a basin of hot water and sustained burns.

This condition mainly occurs in children under 2 years of age, varying in severity and distribution from a localized form (bullous impetigo) to a generalized form of epidermolysis. The condition is also found in immuno-compromised patients and in those with renal failure.

Clinical Features

The clinical features in this condition comprise the following.

- ◆ Flaccid vesicles that shear off, leaving raw areas, when gentle lateral pressure is applied to them.
- ◆ Focus of infection may be found in the nose, umbilical stump, purulent conjunctivitis, otitis media or nasopharyngeal infection

Management

Refer patients with this condition to higher level for appropriate management.

41.6.2 ERYTHEMA MULTIFORME SYNDROME

This condition is now a common problem as a result of the increased prevalence of HIV/AIDS. It is characterized by an infiltration by mono-nuclear cells into the dermo-epidemial junction, leading to the formation of vesicles generally found on the extremities, palms, and soles in the mild form of disease. In severe forms of the disease, widespread mucosal involvement occurs with typical features of Steven's-Johnson syndrome and may last 1–2 months, being accompanied by a high mortality.

The following is known about its aetiology:

- ◆ About 50% are idiopathic, with no known cause.
- ◆ Administration of drugs like sulphanamides, phenytoin, barbiturates, penicillins, and thiacetazone have been known to lead to its occurrence.
- ◆ Viral infections like Herpes simplex and bacterial infections like streptococcal and infections with mycoplasma have been associated with the development of the condition.
- ◆ Underlying malignancies have been known to be associated with this condition.

Clinical Features

The clinical features of this condition include the following: In severe form the mucous membranes are always involved, with extensive bullae formation and systemic symptoms of fever and prostration. There may be cheilitis and stomatitis that interfere with feeding, with vulvitis in females and balanitis in males, leading to difficulties in micturition. There may be conjunctivitis that leads to keratitis, and there may be epidermal necrolysis, that may be life threatening.

Management

The following emergency care should be provided:

- ◆ Stop the offending factor immediately.
- ◆ Apply 1% tetracycline eye ointment to the eyes that are affected.
- ◆ Keep the patient warm.
- ◆ Provide IV fluids if the patient is dehydrated or in shock.

41.6.3 EXFOLIATIVE DERMATITIS

Also known as exfoliative erythroderma syndrome or erythroderma, this is a serious, life-threatening skin disease characterized by generalized and confluent redness with scaling of the skin, associated with systemic toxicity, generalized lymphadenopathy, and fever. The disease manifests as an acute illness and may also manifest as a chronic illness. More than 50% of patients with this condition have a history of pre-existing dermatosis, commonly eczematous dermatitis (atopic, contact).

Levels 2–3—Primary Care

It is also associated with psoriasis, drug reaction, leukaemia, and lymphoma. In 10–20% of cases no possible cause can be identified.

Constitutional symptoms of this condition include fatigue, weakness, anorexia, weight loss, malaise and feeling cold (shivering). Skin appears red and is thickened and scaly, and commonly without any recognizable borders for the lesions. Oedema of lower legs and ankles may occur. The palms and soles may be involved with resultant thickening and fissuring. There may be alopecia (although this is not a constant finding), with shedding of the nails.

Erythroderma may be purely secondary to HIV infection.

Prognosis

This is a very serious disease with many complications in a number of body systems. The highest level of skill and facility are necessary for its management. The prognosis is however guarded.

Management

Refer to higher level for appropriate management

42. Endocrine System Conditions

42.1 Diabetes Mellitus

Diabetes mellitus is recognized by persistent elevation of concentration of glucose in the blood (hyperglycaemia).

42.1.1 GENERAL INFORMATION

Clinical Features

The clinical features for diabetes mellitus include polyuria, polydipsia, and polyphagia. The affected child also has weight loss and experiences recurrent infections. In severe uncontrolled diabetes with keto-acidosis, there may be altered consciousness and coma.

Classification

Diabetes mellitus is classified as type 1 or type 2:

- ◆ Type 1, insulin dependent diabetes mellitus: Usually occurs in children and young adults and in the absence of appropriate therapy is associated with ketoacidosis. These patients require insulin to sustain life.
- ◆ Type 2, non-insulin dependent diabetes mellitus: Usually afflicts adults, although it is increasingly being seen in obese children.

Investigations

The following investigations are recommended:

- ◆ Evaluation of plasma glucose: fasting venous plasma glucose of more than 7.8 mmol/L on more than one occasion or random plasma glucose of more than 11.1 mmol/L in symptomatic patients is indicative of diabetes mellitus.
- ◆ Urinalysis for protein, sugar, and ketones is useful for making a diagnosis.

Management

Management of this condition includes the following:

- ◆ Aim at abolition of symptoms of diabetes
- ◆ Aim at correction of hyperglycaemia, and glycosuria
- ◆ Aim at prevention and management of complications.

For children with diabetes mellitus, the following is also important:

- ◆ Maintaining normal weight, growth, and development.
- ◆ Improving quality of life.
- ◆ Keeping the urine free of ketones.

General Management

Dietary modification is important in both types 1 and 2 diabetes mellitus. The hospital nutritionist should be consulted so as to appropriately carry out dietary modification that is preferably individualized.

The following food composition is recommended.

- ◆ Carbohydrate: 50–60% in complex form; should be based on the staple for the family and refined products should be avoided.
- ◆ Protein: 10–20%; should include vegetable protein sources like soya beans, lentils, and beans. Animal products should be included if possible.
- ◆ Fat: 25–30% of energy intake; should be preferably polyunsaturated types.
- ◆ There should be adequate fibre in the diet, because fibre can prolong absorption of sugar. Fibre containing foods include most unrefined staple foods, beans, legumes, bran, fruits, and vegetables.

~ Strict adherence to meal schedules should be maintained.

42.1.1 TYPE 1 DIABETES MELLITUS

This form of diabetes usually presents with diabetic keto-acidosis (DKA). Patients with type 2 DM can also present with DKA especially in situations of stress such as infection or neglect of therapy.

Clinical features

The clinical features include intense polydipsia, polyuria, and polyphagia. In young children it may present with enuresis in a previously dry child. The child may also present with abdominal pain, vomiting, dehydration, acidotic breathing, and altered consciousness or coma. The child loses weight in spite of having a good appetite.

Management

Management of diabetic ketoacidosis is a medical emergency. Some patients with DKA present without coma.

Rehydration of the child if dehydrated using normal saline in line with management guidelines is recommended. After the initial resuscitative rehydration, the child should be transferred to higher level for appropriate management.

Fluid Replacement in a Child with Diabetic Ketoacidosis

Working assumption is that the child has lost 10% of weight due to dehydration. Intravenous infusion of normal saline is initiated. Total fluid to be given should be 100ml/kg/24 hours, with additional fluid for maintenance. The child should receive 20ml/kg of fluid in the first hour and the rest of the rehydration over 24 hours.

Levels 2–3—Primary Care

Cerebral oedema may occur during the rehydration phase.

Maintenance Fluid Volume per 24 Hours for Age

- ◆ <24months: 100ml/kg
- ◆ 2–4years: 85ml/kg
- ◆ 5–10years: 70ml/kg
- ◆ >10years: 20–30ml/kg

Parent/Patient Education

The parent of, or a child with, diabetes mellitus should receive the following information to enhance management of the condition:

- ◆ The parent or child (if old enough) should be taught how to give insulin at home and how to look after the insulin.
- ◆ Child with any infection should always be taken to the health facility for immediate treatment.
- ◆ Such a child should seek medical advice for any injury, however minor.
- ◆ Patients with diabetes should take their meals regularly, even at school.
- ◆ Teachers should be made aware of child's diabetic status.
- ◆ Patients should carry sweets or glucose and chew them if they experience any symptoms of hypoglycaemia.
- ◆ Patients should always carry a "Diabetic Alert" card with them and inform all health workers when they present to clinic with any problem.
- ◆ Patients and parents should join support groups for diabetes mellitus.

42.1.2 TYPE 2 DIABETES MELLITUS

This form of diabetes occurs in obese children usually over age of 10 years and can also present ketoacidosis. Children whose BMI is >85% for age should be screened for this condition, especially if there is a family history of diabetes.

Management

The primary management of Type 2 diabetes mellitus is based on manipulation of the diet and use of exercise. The following is recommended:

- ◆ Manage as outpatient preferably in the hospital's diabetic or specialist paediatric clinic if there is such a clinic.
- ◆ Consult hospital nutritionist for dietary modification.

Pharmacological Management

Oral hypoglycaemic drugs should be used only if diet and exercise fails and should be strictly under guidance of specialist.

Refer all children with complications after stabilization to higher level for appropriate management.

Complications

- ◆ Hypoglycaemia: This occurs when blood glucose falls lower than 4 mmol/L.
 - Non-pharmacological management: Give sugar-containing soft drinks, snacks, or sweets. These can be given at home if patient or caregiver notices signs of hypoglycaemia.
 - Monitor blood sugar every 15 minutes until blood glucose is 6–8mmol/L.

- Pharmacological management: Give IV 10% dextrose bolus 5ml/kg (do not use 50% dextrose in children). Give 5 or 10% dextrose fluid as a continuous infusion until normal blood glucose is achieved then change to oral feeding.
- ◆ Infections, including:
 - Nephropathy: This is rare in children, but all children over 12 years should be screened for microalbuminuria.
 - Neuropathy: This is very rare in children.

42.2 Thyroid Diseases

42.2.1 GOITRE

This is the enlargement of thyroid gland usually caused by lack of iodine or defects in synthesis of thyroxine hormone. Children may demonstrate features of hyperthyroidism or hypothyroidism.

42.2.2 HYPERTHYROIDISM

This condition is due to excessive levels of the thyroid hormone.

Causes

In the neonatal period it is a manifestation of the effect of Graves disease in the mother. In older children it may be a manifestation of Graves disease in the child or subacute thyroiditis.

Clinical Features

The clinical features for this condition include tachycardia, cardiac failure, arrhythmias, tremors/jitteriness, lid lag, exophthalmos, sweating, and failure to thrive. If the child has a goitre, there may be pressure symptoms on the trachea like stridor and difficulty in swallowing.

Management

Refer to higher level for appropriate management.

42.2.3 HYPOTHYROIDISM

This condition is due to deficiency of the thyroid hormone.

Classification

Hypothyroidism can be classified into the following 5 categories:

- ◆ Congenital failure of thyroid development (complete or partial).
- ◆ Endemic cretinism due to iodine deficiency.
- ◆ Iatrogenic (after thyroidectomy, radio-iodine therapy, pituitary ablation, drug induced).
- ◆ Auto-immune thyroiditis.
- ◆ Pituitary gland damage, e.g., cranial pharyngeoma.

Clinical Features

The deficiency ranges from mild with minimal or unrecognized clinical manifestation to severe mental retardation (cretinism).

In congenital hypothyroidism most neonates appear normal at birth. Prolonged neonatal jaundice, feeding difficulty, lethargy and somnolence, apnoeic attacks, constipation, large abdomen, umbilical hernia, macroglossia, failure to thrive, delayed physical and mental development, slow pulse rate, dry skin, sparse dry hair, and hoarse voice are some of the clinical features of such children. Ideally diagnosis should be based on neonatal screening tests and not abnormal physical signs. Since such tests are not routinely carried out in the health services, however, the clinical features listed and a high index of suspicion continue to play an important role in picking up such children, who can then undergo appropriate laboratory investigations to confirm the diagnosis.

Management

Refer all children with suspected thyroid disease to higher level for appropriate management.

Prevention of endemic hypothyroidism

Iodination of salt has helped reduce incidence of endemic goitre in our country.

42.3 Adrenal Disorders

42.3.1 ADRENAL INSUFFICIENCY

Causes

The following situations have been associated with adrenal insufficiency:

- ◆ Congenital adrenal hyperplasia
- ◆ Long-term use of steroids
- ◆ Addison's disease
- ◆ Pituitary hypofunction

Clinical Features

Congenital deficiency may be associated with ambiguous genitalia and precocious puberty. Other manifestations of deficiency include hypoglycaemia, hyponatraemia, hyperkalaemia, and hypotension.

Management

Refer to higher level for appropriate management.

43. Musculoskeletal Conditions

43.1 Arthralgia (Non-Specific)

This is joint pain without features of inflammation.

Clinical Features

The clinical features include general malaise, joint pains without affecting joint mobility, and without features of inflammation (redness, warm, tenderness) although the joint might be slightly tender. The arthralgia is usually a feature of another illness and careful systemic examination is likely to reveal the responsible disease.

Investigations

There is not specific investigation besides that to identify the responsible disease

Management

Paracetamol should be administered at 40mg/kg/day given four times a day.

43.2 Juvenile Idiopathic Arthritis (JIA)

This condition is an arthritis beginning at or before the age of 16 years and tends to affect large and small joints and may interfere with growth and development.

Stiffness worse in the morning and the child may be reluctant to use affected limb.

Classification

Juvenile rheumatoid arthritis (JRA) is classified into three grouping, namely, systemic (Still's disease), pauciarticular types I and II and polyarticular varieties. Presentation is shown in Table 43.1.

Table 43.1 Presentation of juvenile idiopathic arthritis, by type

Type	Systemic disease	Pauciarticular (JRA)	Polyarticular (JRA)
Frequency of occurrence as a percentage	20%	40%	40%
Rheumatoid factor test	-ve	-ve	+/-ve/-ve
Antinuclear factor test	-ve	75% +ve	
HLA B27 antigen test		+/-ve/-ve	-ve
Presentation	High fever, rash, splenomegaly, generalized lymphadenopathy, serositis, striking leucocytosis and thrombocytosis	Type I: mainly male Type II: mainly female	As for adult rheumatoid arthritis

Prognosis

Overall prognosis for juvenile rheumatoid arthritis is better than that for adult rheumatoid arthritis. Complete remission occurs in 50–75% of patients. Those with polyarticular form of the disease and are RhF positive have a less favourable prognosis.

Management

Refer to higher level for appropriate management.

44. Mental Disorders

Childhood mental dysfunction is not uncommon but is often overlooked, especially in busy clinics with a lot of children very sick with somatic illnesses. Mental illnesses depend on recognition by the parents and, to some degree, teachers for the children who go to school. Assessment of such children requires a friendly, non-threatening environment. Depending on the age of the child, it is important to observe how the child plays and relates to the parent and the environment as well as to the clinician. The older child with mental illness is able to relate and talk to the clinician.

Early recognition of children with mental illness and their referral to a mental specialist is important.

44.1 Vegetative Disorders

These include eating (pica, bulimia and anorexia nervosa) and elimination (enuresis and encopresis) disorders. Encopresis has already been dealt

44.1.1 ENURESIS (BED WETTING)

Most children will be dry at night by age of 5 years. Enuresis is more common in boys. It may be a feature of diseases like renal diseases, cardiac diseases, diabetes mellitus and seizure disorders. Enuresis is categorized as primary when a child has never been dry, or secondary when a child has been dry for at least 1 year before starting bed-wetting again. Secondary enuresis is usually due to some stressful events in a child's life. However, it is important to rule out other diseases that have been mentioned earlier.

The general management of enuresis involves the following:

- ◆ Getting the cooperation of the child and parent.
- ◆ Avoiding punishment and humiliation of the child.
- ◆ Limiting evening and night fluid intake.

Refer those that do not respond to the general management to higher level for appropriate management.

44.2 Anxiety Disorders

These are the commonest psychiatric disorders in children and adolescents. It may be difficult to distinguish between an anxiety disorder and normal anxiety, although it is very important to make such a distinction.

The three types of anxiety disorders are:

- Separation anxiety in which the affected child shows excessive distress when separated from home and may refuse to go to school or sleep away from home.
- Phobia whereby there is persistent fear of social situations, school, and animals.
- Post-traumatic stress disorder that is related to a traumatic or a life-threatening event. Child may re-enact the event or have nightmares.

Refer affected child to higher level for appropriate management.

44.3 Mood Disorders: Depression

Clinical Features

The clinical features depend on the age of the child, as illustrated below

- ◆ In infants, there is panic behaviour and irritability initially looking for a parent/ care giver. This is followed by the child losing interest in every body. Child becomes inactive, apathetic with sad facies.
- ◆ Affected child has a sad face, is withdrawn, has poor feeding and poor sleeping, with poor school performance.
- ◆ In adolescence, there is fatigue for no apparent reason, lack of interest in normal activities, poor school performance, and suicidal tendencies.

Management

Refer to higher level for appropriate management.

44.4 Conversion Syndromes (Hysteria)

These are mental disorders in which there is a psychogenic disturbance of either motor or sensory function in some parts of the body.

Clinical Features

Patients with this condition could present as paralysis of a part of the body, tremors, blindness, deafness, seizures, or aphonia. The severity of disability fluctuates, and the patient fails to exhibit the seriousness the disability accords.

Management

Refer to higher level for appropriate management.

44.5 Disruptive Behaviour Disorders

44.5.1 ATTENTION DEFICIT/HYPERACTIVITY DISORDER

Clinical Features

The onset of this condition is usually before age of 7 years and the child is permanently on the move during the waking period leading to poor sustained attention and as a result the child finds it difficult to complete tasks and is inattentive. Very often the child is labelled as being stubborn by the parents and has poor school performance

Management

Refer to higher level for appropriate management.

44.5.2 CONDUCT DISORDERS

These are defined as repetitive and persistent behaviour that violate societal norms. Children present with truancy, drug abuse, defiance of authority, stealing, excessive lying, running away from home, aggressiveness, and involvement in criminal activities. Such children often have a background of family disharmony.

Refer to higher level for appropriate management.

44.5.3 PERVERSIVE DEVELOPMENT DISORDERS – AUTISM

The conditions appear early in life and affects the child's social, cognitive and language development. Besides autistic disorder, these disorders include Asperger's disorder and Rett's disorder

In autistic disorder (autism), the child has marked impairment of social and emotional interaction with people. The onset is in the first year of life. There is lack of language development, the child is inflexible and may have ritualistic behaviour. It is important to exclude medical conditions like cerebral palsy and hearing impairment. Refer to higher level for appropriate management.

44.5.4 CHILDHOOD PSYCHOSES

Childhood schizophrenia, bipolar mood illness, and depression may present with psychotic features in the same way as they do in adults. The age of onset is usually after 12 years, rarely before. Those with very early onset may be difficult to diagnose and are often mistaken for having some conduct disorder and have poor school performance.

Refer to higher level for appropriate management.

44.5.5 SUBSTANCE ABUSE RELATED DISORDERS

These are syndromes arising out of repeated maladaptive use of substances (substance is defined as any chemical with brain altering properties). They are characterized by significant impairment of psychological, social, and occupational functioning as observed over a 12-month period. Commonly abused substances in Kenya include tobacco, Cannabis sativa, khat (miraa), opioids (heroin), cocaine, and solvents (glue, petrol, wood varnish). Substance related syndromes include intoxication, dependence, withdrawal, psychosis, mood disorders, anxiety, sleep disorders and sexual disorders.

Those at high risk include children aged 12–20 years and patients with primary mental disorders.

Substance abusing adolescents usually present with self-neglect, slovenliness, deteriorating school performance, excessive sleeping, rough appearance, increasing and unexplained demand for money from caregivers, involvement in petty crime (pilfering), and running away from home, in addition to substance-related disorders.

Refer such patients to higher level for appropriate management.

44.5.6 SUICIDE ATTEMPTS

This is an unsuccessful attempt by one to end their own life. This is more common in adolescents following severe social problems or stress. Suicide attempt is used as a desperate attempt on conflict resolution. But it may also be due to depression, schizophrenia, or influence of alcohol/drugs

Refer to higher level for appropriate management, which would include admission.

The following are general principles to observe for such patients:

- ◆ Avoid accusing the patient.
- ◆ Treat the patient with understanding and respect.
- ◆ Every suicide attempt should be regarded as serious. Do not regard an attempt as just attention seeking. A successful attempt may follow.

45. Child Health

It is the responsibility of all health care providers to ensure that the children in their catchment area are kept as healthy as possible. Many child health programmes are covered in the care of children in the community. Individual sections also include advice on prevention. Those that are not are discussed in detail in this section.

Programmes that help to keep children healthy include:

- ◆ Adequate nutrition for all children and their parents
- ◆ Growth monitoring
- ◆ Ensuring proper childcare and stimulation to enhance adequate development
- ◆ Immunization of all children
- ◆ Screening for disabilities and adequate referral in all cases
- ◆ Continued support for all children with chronic illnesses
- ◆ School health programmes
- ◆ Environmental sanitation and food hygiene

45.1 Immunization

The basic principle of immunization is to administer to a healthy person a vaccine that will prevent that person from getting a certain disease.

Ideally, all children should complete their primary immunization by the age of one year. This may involve community activities to ensure each child has a card and that immunization is up to date. If by any chance a child's immunization is incomplete, the parent is requested to take the child to an immunization centre at the earliest opportunity.

Vaccines maybe made with live attenuated vaccines (e.g., rubella, OPV, measles, BCG), inactivated or killed vaccines (e.g. Hib, IPV), or micro-organisms and detoxified toxins (e.g., tetanus).

Generally, several vaccines can be given at the same time. This is important since it reduces the number of injections as well as visits to a health facility. BCG, OPV, DPT-HepB-Hib, and measles vaccines can be given simultaneously if the child is of the appropriate age and has not received the immunizations. A critically ill child needing hospital admission must be given the appropriate vaccines upon recovery.

45.1.1 IMMUNIZATION GUIDELINES

All parents are encouraged to take their children for immunization starting soon after birth. Presentation of the child health card at every visit to a health facility helps to detect those who missed previous vaccinations. In the community, health workers can also check on these cards.

It is necessary that informed consent be obtained from either the parent or the patient, before any vaccination is given.

45.1.2 VACCINE ADMINISTRATION

The following is important for vaccine administration:

- ◆ The vaccine dose should always be checked from instruction on the vaccine, but nearly all paediatric doses are 0.5ml.
- ◆ Site for vaccine administration (refer to Table 45.1 for individual vaccines)
- ◆ Simultaneous administration of uncombined live vaccines must be given at different sites.
- ◆ Minimum interval between vaccine doses should be 4 week.

45.1.3 AGE AT VACCINATION

Vaccines are given at specific ages, in accordance with the national immunization schedule, shown below. The list includes vaccines not currently on the national vaccination schedule but indicates when such vaccines could be given.

- ◆ Vaccination of the preterm baby follows the chronological age rather than weight.
- ◆ Pre-term infants and low birth weight infants (<2500g) should receive the BCG vaccine at the time of discharge from hospital irrespective of the weight at discharge.
- ◆ Vaccines currently given as part of the routine national immunization schedule are listed in table 45.1 below.
- ◆ Refer to table 45.1 for the full immunization schedule which includes other vaccine antigens that are available in the country but are not yet part of the routine national immunization schedule.

45.1.4 SPECIFIC INSTRUCTIONS

The following are general instructions with respect to immunization:

- ◆ A slight fever and/or other minor illness should not prevent you from immunizing a child.
- ◆ Children should be vaccinated during recovery from a serious illness if they had missed the vaccine.
- ◆ Mothers/child-caregivers should be informed about possible side effects of each of the given vaccines.
- ◆ All vaccinations should be recorded on tally sheets and on the Child Health Immunization cards and mothers should be instructed to always bring the cards along with them when taking children to a health facility.

- ♦ Mothers should be instructed to return the child for the next immunization on the date indicated on the card.
- ♦ The disposal of used sharp syringes should be handled appropriately to prevent injury and spread of diseases like HIV.
- ♦ To ensure appropriate cold storage of the vaccines, follow the recommended cold-chain instructions for each of the vaccines carefully. All the vaccines and diluents must be kept cold. DPT, HB, and TT vaccines are damaged if kept below 0°C and therefore should never be frozen. Always check the Vaccine Vial Monitor (VVM). The cold chain should be maintained because vaccines are easily destroyed by heat and rendered ineffective.
- ♦ Hands should be washed before and after handling vaccines.

Contraindications

- Anaphylaxis after previous dose or severe allergy to vaccine component is a contraindication to further doses of the same vaccine.
- In pregnancy, live vaccines including OPV, Measles-Rubella, Yellow Fever and HPV vaccines.
- Severely immunocompromised; Live vaccines including BCG, OPV, Measles-Rubella and Yellow Fever.

<https://vaccine-safety-training.org/contraindications.html>

45.1.5 IMMUNIZATION IN SPECIAL SITUATIONS

Immunization in Immunocompromised Host

- ♦ HIV/AIDS infection:
 - HIV exposed and asymptomatic children infected with HIV should receive all standard Kenya Expanded Programme on Immunization (KEPI) vaccines.
 - BCG vaccination should not be repeated if there is no scar formation.
 - live and live attenuated vaccines are to be avoided in symptomatic HIV infected children, as well as in children with unknown HIV status but who are symptomatic for HIV infection.
 - The National Vaccines and Immunization Program does not recommend testing for HIV before giving vaccinations.
 - The immunization program recommends a supplemental Measles vaccine dose at age 6 months for asymptomatic HIV infected children and all children from age 6 months during measles outbreak response.
- ♦ Oncology patients, patients on immunosuppressive therapy and primary immunodeficiencies:
 - Live vaccines are generally contraindicated in severely immunocompromised individuals.

Levels 2–3—Primary Care

- Severely immunocompromised patients include patients on Immunosuppressive therapy including high dose Corticosteroid therapy (more than 0.5mg/kg/day or >10mg per day of prednisolone equivalent):
- For those on immunosuppressive therapy, Live vaccines may be given after cessation of immunosuppressive therapy.
- ♦ Children with Immune Mediated Inflammatory Disorders (IMIDs)
 - Immune mediated inflammatory disorders include Juvenile idiopathic arthritis, Systemic Lupus Erythematosus, Diabetes mellitus, inflammatory bowel disease, psoriasis and other auto-immune and autoinflammatory diseases.
 - It is recommended that children with IMIDs follow the normal routine immunization schedule.
 - Live vaccines are generally to be avoided in children with IMIDs and should be given before start of or after stopping treatment with immunosuppressive drugs.
 - The non-live vaccines can be given safely at any time to age-appropriate children before, after or during immunosuppressive treatment.
 - All children with IMID should receive a single booster (4th) dose of pneumococcal (PCV) vaccine at the age of 2 years or later and varicella vaccine (if not previously given and no history of having contracted chicken pox provided the child is not on immunosuppressive treatment).
- ♦ Pregnancy:
 - Generally live vaccines are contraindicated during pregnancy unless the risk of disease outweighs the risk of vaccine, e.g. during yellow fever epidemic.

Side Effects and Adverse Reactions to Vaccinations

The side effects range from mild to severe for various vaccines.

- ♦ BCG vaccine: These include injection abscess, regional or widespread lymphadenitis, osteomyelitis, and disseminated BCG infection. These should be treated with anti-tuberculosis drugs.
- ♦ Oral polio vaccine: Adverse reactions rarely occur.
- ♦ Measles vaccine: Adverse reactions include fever, mild rash, and rarely convulsions and encephalitis.
- ♦ DPT-HepB-Hib (Pentavalent): Most adverse reactions are attributed to the pertussis component. Minor reactions include pain at the injection site and fever. Major reactions are persistent crying, high pitched cry, excessive somnolence, convulsions, encephalopathy, and coma.
- ♦ Recombinant DNA Hepatitis B vaccine: Side effects include pain, fever, and swelling at the site of injection.

45.1.6 IMMUNIZATION TYPES AND SCHEDULE IN KENYA (KEPI)

Kenya's national immunization schedule specifies both the schedule of vaccines (Table 45.1), and the dosage and mode of administration (Table 45.1).

Levels 2–3—Primary Care

Table 45. 1 Kenya Childhood Immunization Schedule

	Age of child	Vaccine Antigen	Dosage	Route
1.	At birth or at first contact	BCG	0.05 ml (<1 year) 0.1 ml (> 1 year)	Intradermal, Upper outer aspect of the left forearm
2.	At birth or at first contact (within the first 2 weeks of life)	OPV birth dose (bivalent)	2 drops	Oral
3.	At 6 weeks or 1st contact after 6 weeks	OPV I	2 Drops	Oral
		DPT-HepB+Hib 1	0.5 ml	Intramuscular into the upper outer aspect of left thigh
		PCV10- I	0.5 ml	Intramuscular into the upper outer aspect of Right thigh
		Rotavirus-1	1.5 ml	Oral
4.	At 10 weeks or 4 weeks after OPV I	OPV 2	2 Drops	Oral
	At 10 weeks or 4 weeks DPT-HepB-Hib 1	DPT-HepB+Hib 2	0.5 ml	Intramuscular into the upper outer aspect of left thigh
	At 10 weeks or 4 weeks PCV10 - 1	PCV10- 2	0.5 ml	Intramuscular into the upper outer aspect of Right thigh
	At 10 weeks or 4 weeks Rota-1	Rotavirus-2	1.5 ml	Oral
5.	At 14 weeks or 4 weeks after OPV 2	OPV 3	2 Drops	Oral
		IPV	0.5 ml	Intramuscular into the upper outer aspect of right thigh, 2.5cm from PCV -3 site
		DPT-HepB+Hib 3	0.5 ml	Intramuscular into the upper outer aspect of left thigh
		PCV10- 3	0.5 ml	Intramuscular into the upper outer aspect of Right thigh
6.	At 6 months	Vitamin A	100,000 iu	Oral
	At 12, 18, 24, 36 months	Vitamin A	200,000 iu	Oral
7.	At 6 Months	Measles-Rubella (MR)	0.5 ml	subcutaneous right upper arm (deltoid muscle) during measles-rubella outbreak or HIV infected infants without severe immunosuppression
8.	At 9 months or first contact after 9 months	Yellow fever (High Risk counties)	0.5 ml	Subcutaneous into the Left upper arm (deltoid muscle)
		Measles-Rubella (MR1)	0.5 ml	Subcutaneous into the right upper arm (deltoid muscle)
9.	At 18 months or first contact after 18 months	Measles-Rubella (MR2)	0.5 ml	Subcutaneous into the right upper arm (deltoid muscle)
10.	At 10 years (girls),	HPV-1 vaccine	0.5 ml	Intramuscular left deltoid muscle
	At 10 years 6 months or 6 months after HPV1.	HPV-2 vaccine		

45.1.7 VACCINES AVAILABLE BUT NOT YET IN KEPI PROGRAMME

The following are beneficial, though not yet mandated.

- ◆ Hepatitis B monovalent vaccine: Given as soon as possible at birth; and also recommended in health workers and other high-risk groups in three doses at 0, 2 and 6 months.
- ◆ MMR (measles, mumps, rubella): Given at 12–15 months.
- ◆ Influenza vaccine: Inactivated seasonal influenza vaccine. Given in 2 doses for children aged 6 months or older and subsequently, annually.
- ◆ Meningococcal vaccine: Polysaccharide type for age >2 years is often used to control epidemics.
- ◆ Hepatitis A: Given at the age of 12 months. Improving socioeconomic status is shifting the infection age to older children who are at a higher risk of severe Hepatitis A including fulminant hepatitis. • Routine childhood vaccination should be considered. • Travellers from low endemic areas should be considered for vaccination.
- ◆ Rabies vaccine (see national immunization guidelines and policy).
- ◆ Varicella vaccine (live attenuated): Can be given simultaneously with MR Can be given either routinely to all children, or post exposure to high risk groups—immunocompromised patients without history of having had varicella infection. For cancer patients it is best given during remission.
- ◆ Malaria vaccine: protein based recombinant vaccine recommended at age 6,7, 9 and 24 months.
- ◆ Typhoid polysaccharide vaccine: recommended at age 2 years and booster every 3 years. Prioritization of vaccination to those at highest risk of contracting or transmitting the disease. (Food handlers, especially those employed in institutions and hotel as well as laboratory staff and employees of sewerage and treatment works).
- ◆ Cholera: Inactivated oral cholera vaccine is available in the country and is recommended for people aged 2 years or older. Pre-emptive vaccination with oral cholera vaccines should be undertaken in epidemic prone regions of the country once the risk of cholera becomes significant due to events such as flooding and emergency displacement of communities.

45.1.1 IMMUNIZATION SCHEDULE FOR ALL WOMEN AND PREGNANT MOTHERS WITH TETANUS DIPHTHERIA TOXOID (TD2+)

1st dose at first contact.

2nd dose – 4 weeks after first dose

3rd dose – 6 months after 2nd dose

4th dose – at least 1 year after the third dose

5th dose – at least 1 year after the fourth dose

A total of 5 doses is recommended during a woman's reproductive age.

For pregnant women who have not received the 5 doses, give the 1st and 2nd during the first pregnancy (or first contact). The 3rd, 4th, and 5th doses can be given in subsequent pregnancies. Immunizing a pregnant mother ensures protection of her newborn baby against tetanus.

45.1.2 VITAMIN A SUPPLEMENTS

Vitamin A supplementation is recommended for all children at age 6 months and every 6 months subsequently thereafter.

45.1.3 IMMUNOGLOBULINS (PASSIVE IMMUNIZATION)

These may be nonspecific or specific and are given either IM or IV.

- ◆ Nonspecific immunoglobulins: Can be used as replacement in individuals with antibody deficiency disorders
- ◆ Specific immunoglobulins: Prepared from donors known to have high antibody to specific antigens or specific sources. Very useful in post exposure prophylaxis Examples include rabies, varicella, RhO (D) immune globulin (antiD)

45.1.4 RABIES

Any mammalian animal may carry rabies. Saliva from a rabid animal contains large numbers of the rabies virus, which is inoculated through a bite or any laceration or break in the skin. For more details refer to Chapter 1 in Part I of these guidelines.

Pre-exposure prophylaxis vaccine is recommended for anyone above 1 year of age at increased risk e.g Veterinarians, wildlife officers and visitors to high rabies-enzootic areas. The vaccine is given intramuscularly on days 0 and 7.

Post exposure prophylaxis (PEP): This is given following suspected rabid bites. For individuals who are not previously vaccinated, the vaccine is given on days 1,3,7,14 & 28. For previously vaccinated individuals, give post exposure Booster on Days 0 and 3.

Management

Emergency care for a suspected rabid bite includes the following:

- ◆ Thorough irrigation of bite with copious amounts of saline solution
- ◆ Cleansing the bite with a soap solution
- ◆ Debridement of the bite area
- ◆ Administration of antibiotic
- ◆ Administration of tetanus toxoid
- ◆ Delayed suture or skin grafting
- ◆ Infiltration of the wound with rabies immunoglobulin

Indications for rabies vaccine are the following:

- ◆ Bites from wild animals
 - ◆ Bites from UNPROVOKED domestic animal
 - ◆ Bites from a sick looking domestic animal, whether immunized or not
 - ◆ Laboratory findings of Negri bodies in the brain of the involved animal
 - ◆ Persons at high risk of exposure
- ~ Always refer as soon as possible to a centre that can vaccinate (with the vaccine and immunoglobulin as necessary).

45.1.5 SNAKE BITES AND ENVENOMATION

- ◆ All snake bites are to be treated as poisonous and patients administered the highest valency anti-snake venom available.
- ◆ The dose of anti-snake venom is the same for children and adults.

PART III: Surgery and Related Disciplines

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46. Acute Trauma and Selected Emergencies

46.1 Abdominal Trauma

Summary

Abdominal injuries (to spleen, liver, bladder, gut) are not an uncommon cause of preventable death and their proper clinical assessment is vital. The spleen, liver, retroperitoneum, small bowel, kidneys, bladder, colorectum, diaphragm, and pancreas tend to be the most commonly injured organs.

Signs and symptoms of blunt injuries can be masked by injuries elsewhere e.g., fractured limbs, fractured ribs or spinal cord, and head injuries and may also develop slowly. If a patient has multiple injuries assume the abdomen is involved until this is ruled out. Organomegaly makes the involved organs more vulnerable to abdominal trauma so be cautious with children with pre trauma splenomegaly.

Unexplained shock in a trauma patient should point towards an intra-abdominal bleed.

Clinical Features

- ◆ Vitals signs (pulse rate, blood pressure, respiratory rate, temperature, SPO₂).
- ◆ Obvious bruises
- ◆ Abdominal wall wounds
- ◆ Pain
- ◆ Localized tenderness
- ◆ Rigidity of the abdominal wall (indicates the most likely site of injury)
- ◆ Abdominal distension can be due either to gas leaking from a ruptured viscous or to blood from injured solid organ(s) or torn blood vessels. This is a serious sign
- ◆ Haematuria (occurs in bladder injuries)
- ◆ Haematochezia (rectal injuries)

Note: The absence of bowel sounds or sustained shock despite resuscitation mandates urgent surgical intervention.

Investigations

- ◆ X-rays of the abdomen and chest x-rays may show existing fractures, foreign bodies, gas under the diaphragm, gas under the anterior abdominal wall, or bowel loops in the chest.
- ◆ Ultrasound or CT scans of the abdominal wall (where applicable).

- ◆ Total blood counts are useful for serial assessments.
- ◆ Blood group and cross-match blood if intra-abdominal bleed is suspected

Note:

- ◆ Bloody nasogastric aspirate may indicate upper gastrointestinal tract injuries.
- ◆ Peritoneal lavage is indicated in the following patients:
 - Patients with spinal cord injury.
 - Those with multiple injuries and unexplained shock.
 - Confused patients with a possible abdominal injury.
 - Intoxicated patients in whom abdominal injury is suggested.

Management

- ◆ Maintain airway and breathing.
- ◆ Circulation - Is your patient in shock? (Has low BP, high pulse rate, cold clammy extremities).
- ◆ Secure a wide bore (Gauge 18 in adults) intravenous cannula.
- ◆ Take blood sample for grouping and cross matching.
- ◆ Start intravenous fluid appropriately.
- ◆ Catheterize the patient appropriately.
- ◆ Clean, stitch, and dress small superficial wounds, but do not let this adversely delay referral. (Management at level 2 and 3 is limited mainly to patient resuscitation in order to stabilize)
- ◆ Give tetanus toxoid 0.5ml intramuscular STAT as per expanded program of immunization (EPI) schedule.
- ◆ Start antibiotics appropriately.
- ◆ Keep patient warm and comfortable.
- ◆ Closely monitor BP, pulse rate, respiratory rate, temperature, and urine input and output.
- ◆ Measure abdominal girth, as this may prove useful in follow up of patients' progress.

NOTE

- ◆ If not sure of wound depth, explore the wound directly under local anaesthesia.
- ◆ Explore penetrating wounds early.
- ◆ In blunt trauma, manage according to clinical findings and how they evolve overtime. Mild symptoms are managed conservatively, while deterioration is managed by abdominal exploration.
 - Indications for laparotomy in blunt trauma include:
 - Persistent abdominal tenderness and guarding.
 - Persistent unexplained shock
 - Paralytic ileus
 - Positive peritoneal lavage or positive ultrasound findings pneumo-
 - Manage specific organ injuries at laparotomy.

- ◆ Inform receiving facility prior to referral as trauma needs urgent attention on arrival.
- ◆ At discharge, provide adequate documentation to be sent back to referring facility.

46.2 Animal and Snake Bites

These include bites by humans, dogs, and other domestic and wild animals, as well as wild animal bites.

Management

This will depend on the extent of tissue loss and the site of injury and the type of animal. Most bites consist of cuts and simple lacerations. Other animals (hippopotamus and crocodiles) inflict major tissue destruction (lacerations, avulsions, and amputations).

Immediate Care

If not already acted upon at lower health facilities, stop all bleeders by pressure and ligature while preparing for thorough debriding. Administer a pain reliever.

Local Care

- ◆ Clean cuts and lacerations thoroughly with normal saline (hydrogen peroxide is indicated for septic wounds only).
- ◆ Dress with povidine solution appropriately.
- ◆ Give tetanus toxoid 0.5ml IM STAT as per expanded programme (EPI).
- ◆ Give analgesia as appropriate.
- ◆ Give antibiotics appropriately.
- ◆ Give rabies vaccine where indicated (Section 1.4.2, on rabies management.)
- ◆ Give antivenom for snake bites in appropriate cases.

NOTE

- ◆ Consider urgent referral if rabies vaccine or anti-snake venom is not available in facility within 24 hours. Ensure adequate documentation and availability of resuscitation equipment during the actual referral phase.
- ◆ For large bites, carry out surgical debridement under anaesthesia.
- ◆ DAILY dressing is advised and later skin grafting or flap repair is performed.
- ◆ Open chest injuries will require closure and underwater seal drainage.
- ◆ Open abdominal wounds will necessitate an exploratory laparotomy.
- ◆ In the case of amputated extremities, carry out debridement and stump refashioning where necessary followed by appropriate rehabilitation and appropriate assistive device.
- ◆ Should the patient be in shock, treat aggressively with saline infusions, blood transfusions, and vasopressor agents.
- ◆ In major tissue destruction, administer appropriate antibiotics.

46.3 Burns

The majority of burns are caused by heat, which may be open flame, contact heat, or hot liquids(scalds). Others are chemical, electric, friction, sunburns, and irradiation. Extreme cold can cause tissue injuries (i.e. frost bite).

Interventions in burns patient should aim to prevent the following complications:

- ◆ Airway obstruction
- ◆ Fluid and electrolyte imbalance
- ◆ Acid based balance
- ◆ Infections
- ◆ Hypothermia
- ◆ Joint stiffness/contractures
- ◆ Anaemia
- ◆ Muscle protein catabolism
- ◆ Compartment syndrome etc

46.4 Initial Management of Burn Cases

46.4.1 FIRST AID MEASURES

If not acted on at lower level, initiate the following management plan:

- ◆ Airway: Ensure patient has a clear airway.
- ◆ Breathing: Ensure patient is breathing and receiving oxygen by mask if need be.
- ◆ Circulation:
 - Ensure adequate intravenous access and availability of intravenous crystalloids;
 - Assess peripheral circulation and look out for compartment syndrome
 - Group and cross match blood.
- ◆ Give tetanus toxoid and analgesics.

46.4.2 QUICK ASSESSMENT OF THE EXTENT OF BURNS

- ◆ Degree of burn:
 - First degree: Epidermis only involved.
 - Second degree: Epidermis and portions of dermis involved.
 - Third degree: All skin layers, including the subcutaneous tissue are involved.
- ◆ Special sites of injury (note facial, perineal, hands, and feet).
- ◆ Look out for circumferential burns on extremities.
- ◆ Look out for other injuries (for example: fractures, head injuries, chest injuries, abdomen, etc)
- ◆ The Wallace Rule of Nines (see Figure 48.1) is used to estimate the extent of burns
- ◆ Admit if meets admission criteria.

-Initiate fluid management schedule.

46.4.3 CRITERIA FOR ADMISSION

- ♦ Extent of burns: Are >10% body surface area. If the extent is >25% of body surface area, transfer to special burns unit.
- ♦ Degree of burns:
 - Hands and feet
 - Face and neck
 - Perineum
 - Circumferential
 - Joints and other associated injuries
- ♦ Inhalational burns.
- ♦ Chemical and electric burns.
- ♦ In the presence of other known pre-existing diseases, e.g., diabetes mellitus.
- ♦ Other burns requiring hospitalization: full thickness burn, circumferential burns.

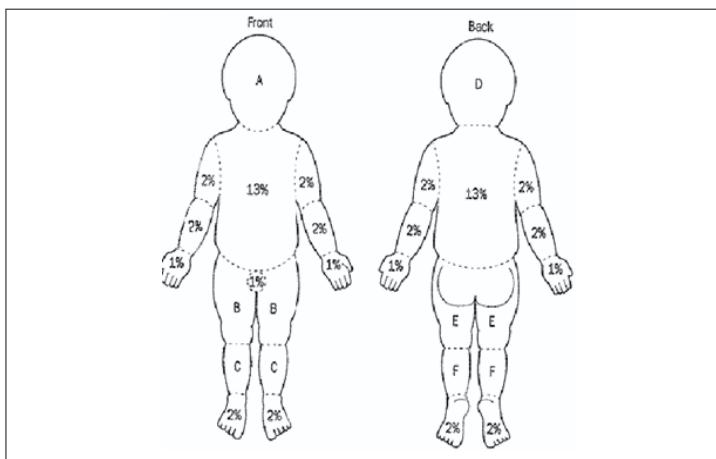


Figure 46:1 Body surface estimation in children

It is safer to overestimate body surface area than to underestimate it. A useful rough guide is to estimate the palm of the hand excluding the fingers as being approximately 1%. The total body area is critical to the fluid management of the burn patient.

Table 46.1: Change in body surface area with growth

Body area	< 1 yr (%)	1 yr (%)	5 yr (%)	10yr(%)	15 yr (%)
Head (A/D)	10	7	7	6	5
Thigh (B/E)	3	3	4	5	5
Leg (C/F)	2	3	3	3	3

46.4.4 AMOUNT OF FLUIDS TO BE ADMINISTERED

Calculation Using the Parklands Formula

- ♦ $4 \times \text{Total body surface area burnt} \times \text{weight in Kg} = \text{ml of fluids to be administered within the first 24 hours from the time of the burns.}$
- ♦ The total fluids calculated should be administered as indicated below:
 - First 8 hours from the time of burns=1/2 total calculated fluid
 - Next 8 hours = 1/4 total calculated fluid
 - Next 8 hours = 1/4 total calculated fluid
- ♦ As an example, for a 80kg man with 20% burns, total fluid ($80\text{kg} \times 20\% \times 4$) ml = 6400 ml. Administer as follows:
 - 3,200 ml within the first 8 hours
 - 1,600 ml next 8 hours
 - 1,600 ml over the next 8 hours

Other Fluid Management Considerations

For management of a person with burns, the following is necessary:

- ♦ Types of fluids to use these should either be normal saline or Hartman's solution
- ♦ Monitoring should be carried out for vital signs, urine output (maintain at least 1–2ml/kg/hr) and packed cell volume.
- ♦ Care of the burn surface includes the following:
 - Cleaning with normal saline , antiseptics or normal saline
 - Applying antiseptic cream like silver sulphadiazine when nursing wounds.
 - Cover using a cradle.
 - Using a moist plastic bag for burns of the hands and feet after antiseptic cream application.
 - Early surgical debriding of dead, burned tissue and skin grafting for extensive burns.
- ♦ Pregnant mothers are more prone to the effects of burns than non-pregnant females. For pregnant women with burns observe the following:
 - Prompt and aggressive fluid management is essential.
 - Pregnancy is associated with a 50% increase in intravascular volume as well as a 43% increase in cardiac output.
- These factors in addition to others make ***pregnant women more prone to fluid loss associated with burns.*** As a result, a pregnant woman will not likely conform to the Parklands fluid replacement formula and may need up to twice this volume. In fluid resuscitation for these patients' variables like urine output, heart rate, central venous pressure, and mean arterial pressure are more reliable indicators of successful resuscitation
- ♦ Types of fluids used for treating burns include the following:
 - Crystalloids
 - Normal saline

- Ringer's lactate solution (use with caution in patients who have associated metabolic acidosis following burns)
- ♦ The type of monitoring required for patients with burns includes the following:
 - Vital signs
 - Urine output (maintain at least 1–2ml/kg/hr)
 - Urea and electrolytes
 - Packed cell volume
 - Blood gas analysis for severe burns.

46.5 Special Burns

48.2.1 TYPES OF BURNS

- ♦ Circumferential burns: Do an early escharotomy to prevent compartment syndrome.
- ♦ Elevate the affected limb and apply crepe bandage appropriately to reduce oedema
- ♦ Inhalational burns: Should be suspected if there are burned lips and/or burned nostrils, especially in cases of open fires and smoke. Give humidified air and oxygen, bronchodilators, and appropriate antibiotics. Intubation may be necessary.
- ♦ **For pregnant females with burns**, early intubation and mechanical ventilatory support is strongly recommended if inhalation burn injury is suspected due to risk of tracheal oedema. Both the functional residual capacity and the residual volume are decreased by 20% in pregnancy, making ventilatory support particularly important.
- ♦ Electrical burns: These are deep burns and require specialized care.
- ♦ Chemical burns: To manage these types of burns, irrigate with plenty of water and soap.

48.2.2 MANAGEMENT OF ELECTRICAL BURNS

Low voltage electrical injury tends to be associated with electrocution (cardiac arrest), while high voltage burns are associated with extensive tissue destruction rather than electrocution. The body tissues most vulnerable to electrical injury are peripheral nerves and skeletal muscles.

- ♦ Injury from electrical burns occurs through two main avenues:
 - Electric shock resulting in cardiac arrhythmias and muscle spasm.
 - Thermal injury resulting in muscle destruction.
- ♦ Diagnosis of electrical burn can be made on the basis of:
 - History of contact.
 - Presence of 2 contact injury points on skin.
 - Presence of cardiac arrhythmias and respiratory disturbances.
 - Presence of skeletal fractures secondary to muscle spasms.
- ♦ Management at levels 4 to 5:
 - Resuscitate as appropriate.
 - Maintain a fluid balance and urine output.
 - Initiate or continue analgesia. For severe burns, give morphine 10mg IV 6 hourly.

- If more specialized treatment is needed refer to burns unit.
- ♦ At level 6 (burns unit):
 - Cardiovert if needed. Cardioversion may be electrical or chemical.
 - Maintain adequate urine output, more than 50ml/kg/hr, but raise to more than 2ml/kg/hr to avoid renal failure secondary to myoglobinuria.
 - Give anti arrhythmic drugs if needed.
 - Administer tetanus toxoid as in all burns.
 - Look out for compartment syndrome.
- ♦ The rest of the treatment plan will follow in a similar fashion to other burns.
- ♦ Skin grafting shortens the duration of hospital stay and should be performed early when necessary.
- ♦ Start physiotherapy and occupational therapy early.

46.6 Mortality Risk From Burns

Improvements in wound care and the use of antibiotics have had an influence on the survival following burns. However, the risk of mortality is directly related to surface area that is burned. Other relevant independent factors influencing mortality are the immune status of the patient and the presence of respiratory burns.

47. The Multiply Injured Patient

A patient injured in more than two body systems is defined as multiply injured. This situation commonly occurs in road traffic accidents, falls from a height, blast injuries among others. The approach to a patient with multiple injuries has to be systematic in order to identify all the injuries and prioritize their sequence of attention.

47.1 Resuscitation Required and Its Order

- ◆ Airway: Position the head and with finger or suction, clear blood, mucus, and foreign bodies. Take care to avoid causing cervical injury and apply cervical collar or use the jaw lift manoeuvre. Use log rolling procedure if it is necessary to reposition the patient in anyway.
- ◆ Breathing: Check respiratory rate and air entry into the chest. If need be use an ambu bag to maintain air flow.
- ◆ Circulation: Stop active bleeding and monitor pulse rate and blood pressure. Fix a large intravenous cannula (gauge 18) preferably in the antecubital area.
- ◆ Dysfunction of CNS: Assess neurological status, consciousness level and spinal cord.
- ◆ Drugs, including fluids: Use these to correct acid base and volume imbalance.
- ◆ Exposure for reexamination: Disrobe the patient entirely and carry out a complete physical examination. Look for:
 - Chest injuries: For example, haemopneumothorax from whatever cause takes priority.
 - Head injuries: Require setting of baseline observations.
 - A patient in shock from non-obvious causes: This points towards the abdomen, suggesting visceral injury. It may be very unapparent and can be fatal.
 - Peripheral bone fracture: This may need stabilization initially and proper attention later.
- ◆ After resuscitation and stabilization: Carry out frequent and more thorough examinations.
- ◆ Give attention to:
 - Continued bleeding. Arrest the bleeding and transfuse appropriately; haemopneumothorax may need underwater seal drainage.
 - Persistent shock from unexplained source. May necessitate an exploratory laparotomy.
 - Fractured limb will need splinting. Spine fractures need bed rest with fracture boards. X-rays of a patient with multiple injuries should be taken after adequate resuscitation. Exceptions are in the chest and cervical spine, which should be taken after initial resuscitation.
 - Acute gastric distension. Managed by nasogastric tube and suction of the same; the patient will require feeding to counter the catabolism associated with multiple injuries.

- ◆ Some of the injuries may require referral for more specialized care. This referral is executed **after** adequate resuscitation.

47.2 CHEST INJURY

47.2.1 PENETRATING INJURY

Common objects causing injury are knives, arrows, spears, and bullets. The objective of management is to restore normal anatomy and/or physiology resulting from the stab injury.

Investigations

- ◆ CXR: for the majority of cases, chest radiograph alone is adequate.
- ◆ Specialized investigations are ordered where more detail is required e.g. CT scan.

Management

- ◆ Clean wounds and apply clean dressing to wounds.
- ◆ Give tetanus toxoid 0.5ml STAT.
- ◆ Give analgesics and start antibiotics treatment.
- ◆ NOTE: Make sure resuscitation measures continue during transportation.
- ◆ If the instrument used during stabbing is still in situ, DO NOT remove. It is advisable to remove only in a controlled setting like in theatre. For referral, stabilize this by surrounding with heavy dressing or other cloth like material.
- ◆ If available, insert chest tube with under water seal drainage system.
- ◆ Drain pleural collection using chest tube, which will suffice for most injuries.
- ◆ Conduct surgical intervention to stop bleeding that continues, or correct significant anatomical or physiological anomalies.(This is applicable for only about 5% of cases.)

47.2.2 SIMPLE RIB FRACTURES

This is a break in the continuity of a rib(s). Could be traumatic or pathological. Types of fractures can be crack fracture(s), single or multiple fractures with fragment displacement, and segmental fracture(s).

Clinical Features

- ◆ There is history of trauma
- ◆ Pain on breathing or movement.
- ◆ Evidence of chest trauma.
- ◆ Crepitus at the fracture site or tenderness. May have signs of associated with haemo-pneumothorax, subcutaneous emphysema.
- ◆ **Caution:** The chest injury may be associated with splenic or liver injury, especially with higher and lower rib fractures.

Investigations

- ◆ Chest radiograph; Antero-Posterior oblique views are necessary

Management

- ◆ **Oxygen:** Supplement if signs of respiratory distress are present.
- ◆ **Analgesia:** Administer intramuscular diclofenac and 2% lidocaine 2–5 ml direct into fracture site; repeat once daily or after 3 days
- ◆ **Chest drainage:** Insert tube as indicated. Admit patient for observation if fractures of the first rib and those of the 8th rib and below are present.
- ◆ **Antibiotics:** Give antibiotics appropriately. Antibiotics given because of the associated atelectasis.
- ◆ **Mucolytic drugs:** to aid in expectorations of chest secretions e.g., carbocisteine 750 mg TDS for adults; children 2–5 years 62.5–125 mg QID, while 6–12 years 250mg TDS.
- ◆ Manage associated conditions.
- ◆ Initiate chest physiotherapy.

47.2.3 FLAIL CHEST

This occurs when multiple fractures are sustained with more than one site per rib. The main danger is that the patient may lapse into respiratory failure.

Clinical Features

The features include the following:

- ◆ Chest pain
- ◆ Paradoxical chest movement
- ◆ Dyspnoea may be present
- ◆ Evidence of fractured ribs
- ◆ Haemothorax or pneumothorax or both

Investigations

- ◆ Chest radiograph

Management

- ◆ Splint the flail segment using kinesiology tape.
- ◆ Administer analgesia. Make sure no neurological deficit is present.
- ◆ Restrict fluids to avoid development of adult respiratory distress syndrome.
- ◆ If there is no respiratory failure continue conservative management. If it develops transfer patient to ICU for intubation and positive airway breathing. If no respiratory failure results, continue with conservative management in general wards.
- ◆ At referral centre if referred to ICU: Carry out intubation with positive end expiratory pressure (PEEP) applied.
- ◆ Best managed at facilities where ICU is available

47.2.4 PNEUMOTHORAX

This occurs when air enters the pleural space, causing lung collapse on the affected side. Causes include spontaneous development following staphylococcal pneumonia due to chronic obstructive pulmonary disease. Pneumothorax may also be caused by blunt trauma with rib fractures and or lung contusion, penetrating injuries, stab wounds, and missiles.

Note: Tension pneumothorax is a clinical diagnosis and not a radiological diagnosis. Ordering a chest radiograph may result in patient death before active treatment can be implemented.

Clinical Features

- ◆ Shortness of breath
- ◆ Tightness of the affected chest
- ◆ Chest pain
- ◆ Tachypnoea and tachycardia
- ◆ Sweating
- ◆ Cyanosis
- ◆ Reduced air entry on auscultation
- ◆ Hyperresonant chest is noted on percussion
- ◆ Reduced chest expansion

Investigation

Chest radiograph: Shows various degrees of lung collapse.

Management

- ◆ If more than 5% pneumothorax, institute tube thoracostomy drainage (under water seal drainage); ***maintain absolute sterility while performing the procedure.***
- ◆ Chest tube may be removed when the lung is fully expanded and remains fully expanded after test clamping the chest tube for a number of hours.
- ◆ Tension pneumothorax needs more rapid treatment with immediate insertion of a wide bore cannula drainage or underwater seal drainage under local anaesthesia.
- ◆ Tension pneumothorax is a clinical diagnosis and not a radiological diagnosis. Ordering a chest radiograph may result in patient death before active treatment can be implemented.
- ◆ An associated frail chest leads to paradoxical breathing and may require assisted ventilation (i.e., intermittent positive pressure ventilation), if features of respiratory failure develop.

47.2.5 HAEMOTHORAX

This occurs when blood collects in the pleural space. Haemothorax may vary in amount from small to massive collections. Causes include trauma, post-surgical bleeding, and tumours of the chest cavity and chest wall.

Clinical Features

Depending on the magnitude of the blood collection, there could be hypovolaemia from massive bleeding, or symptoms similar to those associated with pneumothorax, except for the percussion note, which is dull for haemothorax. However, haemopneumothorax is the more common presentation following chest trauma.

Investigation

- ◆ Chest radiograph (erect, posteroanterior view and lateral views).
- ◆ Look for fractured ribs, collapsed lung(s), fluid collection in the pleural space (air-fluid level), position of mediastinum, and diaphragm.
- ◆ Specialized tests as needed.
- ◆ Other tests relevant to primary underlying cause of the haemothorax.

Management

- ◆ Resuscitation if needed
- ◆ Small haemothorax (blunting of the costophrenic angle), will resolve spontaneously. Conservative management with daily reviews.
- ◆ Large haemothorax will require underwater seal drainage.
- ◆ Physiotherapy as needed.
- ◆ For large clotted haemothorax, perform thoracotomy to drain clot or refer to a more specialized unit.
- ◆ Look at the primary problem
 - For a fracture of rib, inject 2% lidocaine about 2–5ml intercostal block.
 - Advanced malignant disease with recurrent pleural effusion. Do chemical pleurodesis using tetracycline powder etc.

47.3 Head Injury

This describes a series of injuries that can occur to the scalp, skull, brain, underlying tissue and blood vessels in the head. Early and proper management is critical in order to avoid death and long-term morbidity. Especially with a high prevalence of road traffic accidents and assaults, this is a fairly common injury.

Investigations

- ◆ Skull X-ray
- ◆ CT scan usually more informative than simple skull radiograph.

Management

- ◆ Initiate resuscitation measures.
 - ◆ Document accurately the neurological status with the Glasgow Coma Scale (See Table 49.1) or other reliable scale.
 - ◆ Ensure adequate oxygenation and monitor fluid balance. Avoid over hydration.
 - ◆ Review regularly every 15 to 30 minutes.
-

- ◆ Arrange immediate referral to a Specialized unit.
- ◆ Admit patient for hourly neurological observations
- ◆ Record hourly neurological observations to include:
 - Glasgow Coma Scale
 - Blood pressure, pulse and respiratory rate
 - Pupil size and reaction
 - Limb movements (normal, mild weakness, severe weakness, spastic flexion, extension, no response).
- ◆ Check for peripheral deep tendon reflexes.
- ◆ Carry out surgical intervention as needed.
- ◆ Rehabilitate as appropriate: Physiotherapy, occupational therapy and counselling.

Note: Regular neurological assessments performed less often than hourly are of no use for interpretation.

Note:

- ◆ If there are signs of an intracranial haematoma developing (declining conscious level, pupil signs, onset of confusion) send for an urgent CT-scan of the head.
- ◆ Compound skull fracture:
 - Thorough wound debridement and haemostasis as an emergency
 - Cover with a broad-spectrum antibiotic.
- ◆ Depressed skull fractures:
 - If it involves more than one table of the skull bone, it requires surgical elevation in theatre.
- ◆ Basal skull fracture:
 - Bloody CSF coming from the ear or nose is indicative of a basal skull fracture unless other external source of bleeding are seen.
- ◆ Give antibiotics to cover for bacterial meningitis appropriately.
- ◆ **Note:** Do not give narcotic analgesics to head injury patients. Use paracetamol
- ◆ Convulsions must be rigorously controlled by giving anticonvulsants appropriately.

47.4 Spinal Injury

Spinal injury could involve soft tissues (muscles and ligaments), bones (vertebrae and discs), and neural tissue (spinal cord and nerves). It is important for primary assessment to establish the presence of an injury and initiates immediate treatment to avoid worsening either the primary or the secondary injury.

47.4.1 CAUSES OF SPINAL INJURIES

- ◆ Road traffic accidents
- ◆ Assaults
- ◆ Blunt injury
- ◆ Penetrating injuries: sharp objects like knives, spears and firearms
- ◆ Sports injury
- ◆ Falling from a height

Bone injury could be stable (involving only one column) or unstable (involving two or more columns) and could be associated with neurological manifestation like paraplegia or quadriplegia depending on the level of injury. The injury could be a compression fracture with retropulsion of bone fragments into the spinal canal, causing spinal cord compression or complete transection of the cord.

Clinical Features

- ♦ Condition may present as part of the multiply injured patient and caution is needed not to overlook this condition.
- ♦ Neurogenic shock may be present and this refers to the haemodynamic triad of
 - Hypotension
 - Bradycardia
 - Peripheral vasodilatationresulting from autonomic dysfunction and the interruption of sympathetic nervous system control in acute spinal cord injury.

Spinal shock is defined as the complete loss of all neurological function, including reflexes and rectal tone, below a specific level that is associated with autonomic dysfunction.

Investigations

- ♦ Plain spinal radiographs.

Note: It is critical to maintain cervical stability during transfer and examination hence apply a cervical collar.

- Also see chest injury guidelines in this document and manage appropriately.
- Do a CT scan or MRI in facilities where they are available.

Management

For levels 2 and 3:

- ♦ Give anti-inflammatory analgesic.
- ♦ If open wound: tetanus toxoid as per EPI schedule and appropriate antibiotic
 - Care of the spinal column should be observed with application of a cervical collar or a hard board. **Practice log rolling procedure at all times.** Spinal immobilization should be provided during transportation. Resuscitation should continue during transportation.
 - Where facilities for surgical toilet for associated injuries are available, this may be performed prior to referral.
- Refer to a level 6 for acute treatment and thereafter spinal injury unit for rehabilitation. Transfer should be made even if the clinical manifestations of spinal injury are minor.

For level 4:

- ◆ Bone injuries to be addressed through orthopaedic surgeries.
- ◆ Spinal decompression and stabilization are managed as per the individual case appropriately.
- ◆ Skin, bladder, and bowel care should be maintained appropriately
- ◆ Rehabilitation with physiotherapy, occupational therapy, prosthetic and orthotic fittings,etc.

48. General Surgery

48.1 Abdominal Conditions

48.1.1 ACUTE ABDOMEN

“Acute abdomen” is a clinical term used to describe a syndrome that usually incorporates symptoms and signs in the abdomen. Central in the syndrome is a acute severe abdominal pain. The term is a symptomatic diagnosis and not a definitive one. It is critical in these patients that a variety of diagnoses be suspected and diagnosed or clearly excluded before definitive treatment is initiated.

The common causes of abdominal pain which should be considered as differentials are:

- ◆ Medications (eg NSAIDs),
- ◆ Gastro-enteritis
- ◆ Peptic ulcer disease,
- ◆ Acute erosive gastritis
- ◆ Appendicitis
- ◆ Acute cholecystitis
- ◆ Acute pancreatitis
- ◆ Acute intestinal obstruction,
- ◆ Renal colic,
- ◆ Diverticulitis
- ◆ Ectopic pregnancy
- ◆ Ruptured or twisted ovarian cyst
- ◆ Mittelschmerz
- ◆ Urinary tract infection
- ◆ Pelvic inflammatory disease (PID).

Clinical Features

Meticulous history and physical examination are very important in establishing the diagnosis. The clinical features include:

- ◆ Abdominal pain
- ◆ Abdominal distension
- ◆ Abdominal guarding and rigidity
- ◆ Altered bowel sounds
- ◆ Alteration of bowel habits.

There should be a high index of suspicion that should be made of signs and symptoms of:

- ◆ GIT disease,
- ◆ Genitourinary disease
- ◆ Hepatobiliary disease

- ◆ Respiratory diseases
- ◆ Metabolic disorders (diabetes mellitus, porphyrias)
- ◆ CNS diseases (neuropathies)
- ◆ Haematologic diseases (for example, thrombotic crisis in sickle cell disease)
- ◆ Cardiovascular disease.

As a result of organ displacement associated with pregnancy, clinical examination of the abdomen for abdominal pain in a pregnant female can be confusing.

Investigations

- ◆ Total blood count
- ◆ Urea and electrolytes
- ◆ Urinalysis
- ◆ Plain abdominal radiograph (erect and dorsal decubitus)
- ◆ Chest radiograph
- ◆ Ultrasound in suspected appendicitis, cholecystitis, liver abscess or pelvic inflammatory disease among others.

Management:

Details of the patient's history and condition, as well as an accurate documentation of events are important. Ensure the following

- ◆ Order nil by oral.
- ◆ Conduct nasogastric solution.
- ◆ Prepare wide bore intravenous line or other form of secure intravenous access.
- ◆ Catheterize and initiate an input output chart as indicated.
- ◆ Perform portable radiological investigations.
- ◆ Use analgesia appropriately and document.
- ◆ Refer to next level of care.

48.1.2 INTESTINAL OBSTRUCTION

Clinical Features

In infants, suspect bowel obstruction if:

- ◆ No meconium is evacuated within the first 24 hours of birth.
- ◆ There is green or bilious vomiting.
- ◆ There is abdominal distension

In older children and adults, suspect bowel obstruction if there is:

- ◆ Nausea and vomiting
- ◆ Abdominal pain

- ◆ Abdominal distension
- ◆ Altered bowel sounds
- ◆ Constipation
- ◆ Fever (if advanced obstruction is present)

Note: If there is gross abdominal distension with no pain, suspect sigmoid volvulus.

Investigations

- ◆ Full blood count
- ◆ Urinalysis
- ◆ Urea and electrolytes
- ◆ Radiograph of abdomen (erect AP and dorsal decubitus)
 - Multiple air-fluid levels, gaseous distension of gut, double bubble sign in children, among others

Management

- ◆ Initiate resuscitation with nasogastric suction, intravenous fluids, and nil orally.
- ◆ Monitor vital signs.
- ◆ Then manage as for acute abdomen above.
- ◆ Refer to higher level for appropriate management.

48.1.3 PERITONITIS

This is inflammation of the peritoneum which can be classified as acute or chronic.

The causes can be due to:

- ◆ Bacteria: pyogenic bacteria of the gut.
- ◆ Non pyogenic bacteria in the gut such as tuberculosis.
- ◆ Chemical causes which lead to asceptic peritonitis such as leaked pancreatic juices, bile juices among others.

Peritonitis usually ends up producing adhesions that may cause future bowel obstructions of varying degrees.

Clinical Features

- ◆ Abdominal distension
- ◆ Altered bowel sounds
- ◆ Rigidity and guarding
- ◆ Rebound tenderness
- ◆ Fever

Complications of peritonitis include the following:

- ◆ Abscess formation
- ◆ Surgical site infection
- ◆ Wound dehiscence
- ◆ Enterocutaneous fistulae
- ◆ Adhesions

- ◆ Organ failure

Investigations

- ◆ Full blood count, PCV
- ◆ Urea and electrolytes
- ◆ Abdominal radiograph (erect PA and dorsal decubitus) – may show air fluid levels or air under the diaphragm in case of perforated viscera.

General Management

- ◆ Correct fluid and electrolyte imbalance. These are usually disturbed by the movement of fluid and electrolytes into the third space. The disturbance could arise or be made worse by vomiting and/or diarrhoea.
- ◆ Apply nasogastric suction, as this is usually necessary because of organ hypotonia and dilatation.
- ◆ Administer antibiotics to cover a broad spectrum of bacteria. Combinations advised in order to get the appropriate cover are crystalline penicillin 2 mega units QDS, gentamicin 80mg TDS + metronidazole 500mg TDS.
- ◆ Alleviated pain only once a diagnosis has been made. Analgesic recommended in such a situation is diclofenac 75mgTDS.

Refer to higher level for appropriate management. Continue resuscitation as indicated above during transfer.

48.1.4 APPENDICITIS

Clinical Features

- ◆ Anorexia and nausea
- ◆ Vomiting may follow
- ◆ Abdominal pain; diffuse felt most prominently in the perumbilical area
 - Pain then settles in the right lower quadrant and is localized at McBurney's point.
 - Pain may be relieved briefly after perforation but is accentuated by the ensuing diffuse peritonitis. There is localized tenderness in the right lower quadrant.
- ◆ Abdominal tenderness
 - Localized tenderness in the right lower quadrant
 - Rebound tenderness
 - Pelvic tenderness in the right iliac fossa on rectal examination
- ◆ Muscle guarding and rigidity
- ◆ Cutaneous hyperesthesia
- ◆ Fever

Note: Look out for Rovin's sign, Psoas sign.

Investigations

- ◆ Full blood count with neutrophilia. Normal values do not rule our appendicitis.

- ◆ Urea and electrolytes
- ◆ Random blood sugar
- ◆ Abdominal ultrasound: May show oedema of the appendix and adjacent ileocolic region, fluid around the appendix, intraluminal faecalith impaction in the appendix.

Note: Radiological investigations should not delay management of a patient.

Management

- ◆ Initiate appropriate resuscitation. Maintain airway, breathing and circulation appropriately.
- ◆ Once diagnosis is made give analgesics and appropriate antibiotics while preparing for surgery.
- ◆ Starve the patient.
- ◆ Refer to higher level for appropriate management.

48.1.5 TRACHEOESOPHAGEAL FISTULA

This is found in young infants. It is a communication between the trachea and the oesophagus. The condition tends to have life threatening complications and needs urgent treatment soon after birth. This is dealt with under the Paediatric section.

Surgical correction should be carried out as soon as patient can be stabilized for surgery. Usually surgery is recommended within a few days of birth. Repair may be performed as a primary procedure or a staged procedure at higher level of health care.

At this level, initiate resuscitation measures as for acute abdomen above (suction, antibiotics, fluids) and refer urgently to level 5 to 6 for appropriate care.

48.1.6 INTESTINAL ATRESIA

During development, the gastrointestinal tract first develops into a tube, which later canalizes. Failure of this process during any stage may result in intestinal atresia. This can affect any section of the bowel and can have varying degrees of severity.

Clinical Presentation

For an upper GIT lesion, bilious vomiting will be the main form of presentation with abdominal distension secondary to gaseous distension. Failure to pass meconium may occur for lower level lesions.

Investigations

- ◆ Full blood count
- ◆ Urea and electrolytes
- ◆ Plain radiograph to confirm fluid levels
- ◆ A thorough check for other anomalies will be required.

Management

- ◆ Initiate resuscitation measures with intravenous lines, nasogastric suction, and fluid charts. Correct any fluid and electrolyte imbalance that may be present.
- ◆ Carry out radiological investigation if possible, at the facility
- ◆ Refer appropriately for further surgical management.

48.1.7 CHILDHOOD HERNIAS**INGUINAL HERNIA**

Inguinal hernia is an extension of the processus vaginalis, which fails to close during foetal development. Through this opening abdominal content can herniate to varying extents into the inguinal canal and scrotal sac. The communicating type is the most common form and extends down into the scrotum, while the non-communicating one is less common.

Clinical Features

- ◆ A bulge presents at either the internal or the external rings, or the scrotum for males and inguinolabial region for females and increases in magnitude with straining.
- ◆ Pain and discomfort, or it may present as an acute abdomen.
- ◆ Examination may reveal a reducible or irreducible mass.
- ◆ Trans-illumination test may be positive.

Management

Refer to next level of care.

ABDOMINAL HERNIA

This is a protrusion through the abdominal wall due to one of the following:

- ◆ Umbilical hernia which is a mild condition as a result of a defect in the linea alba. The herniated bowel has a covering of subcutaneous tissue and skin.
- ◆ Omphalocele: Due to the failure of development of the anterior abdominal wall at the area of insertion of the umbilicus, with the abdominal contents herniated out with only a peritoneal covering. There may be other associated anomalies.
- ◆ Gastrochisis: A herniation of small bowel contents with no covering at all, and often paraumbilical. Unlike omphaloceles, this condition does not have many associated anomalies.

Clinical Features

There is protrusion of bowel contents through abdominal wall to varying extents with or without other organs. Covering of the hernia varies and strangulation is a possibility.

Investigations

- ◆ Full blood count with neutrophilia.
- ◆ Urea and electrolytes

- ◆ Ultrasound has a role in the antenatal period.

Management

- ◆ Conservative management for small umbilical hernias with expectant observation.
 - ◆ Refer to the next level of care.
- Note:** For omphalocoele and gastrochisis early surgical intervention is recommended.
- ◆ Counselling and attending to associated conditions,
 - ◆ Surgical management best at specialized facility.

48.1.8 IMPERFORATE ANUS

This is failure of the anal opening to canalize and is the commonest cause of intestinal obstruction in the newborn. Anatomical presentations vary widely.

Clinical Presentation

There is failure to pass meconium, or may pass meconium per urethra or vagina.

Investigation

- ◆ Invertogram
- ◆ Check for other anomalies.

Management

Refer affected children to higher level for appropriate management.

48.1.9 INGUINAL HERNIA (ADULT)

This is usually an acquired condition and is often linked with activity associated with increase of abdominal pressure.

Complications

Complications of this condition include obstruction (when a hollow viscus goes through a ring of variable size and cannot be reduced), incarceration (when a non-hollow organ, for example the omentum, goes through a ring of variable size and cannot be reduced). Strangulation is a process whereby blood flow into the obstructed viscus is compromised and if not corrected culminates in ischaemia of the viscus supplied by the involved blood vessels. Pain and tenderness over the hernial area are ominous signs. Sudden change from reducible to irreducible status is an ominous sign, especially if discolouration of tissues over the area is present.

Clinical Features

- ◆ Protrusion in the groin region, initially on straining and later may be spontaneous.
- ◆ Irritable or painful sensation in the groin.

Examination

Observation of the bulge with the patient coughing while standing and again when lying down, and with a finger invaginated into the external ring, repeat the same examinations. This examination is able to differentiate femoral from inguinal hernia. There is no great advantage of differentiating indirect from direct inguinal hernia pre-operatively.

Management

- ◆ In strangulation with obstruction of viscus, especially bowel the usual resuscitative measures are carried out/continued before and after surgery. See details as per obstruction above.
- ◆ Surgical repair is necessary for all inguinal hernias.
- ◆ Umbilical, incisional, and lumbar hernias require similar treatment as above.

48.1.10 LOWER GASTROINTESTINAL BLEED

This may be frank bleeding depending on the cause. Common causes include:

- ◆ Haemorrhoids
- ◆ Anal fistulae and fissures
- ◆ Tumours: benign (leiomyoma, fibromas, polyps) or malignant
- ◆ Trauma
- ◆ Angiodysplasia
- ◆ Bleeding disorders

Investigations

- ◆ Full blood count with neutrophilia.
- ◆ Urea and electrolytes
- ◆ Stool for occult blood
- ◆ Abdominal ultrasound

Management

- ◆ Do blood group cross match and transfuse if necessary
- ◆ Resuscitate appropriately
- ◆ Refer suspected cases to higher level for appropriate management.

48.2 Anorectal Conditions

There is pain usually on defecation that prevents proper sitting and causes immobility (commonly due to abscess, thrombosed haemorrhoids or acute fissure-in-ano). Painless bleeding is commonly due to haemorrhoids but may be due to colorectal carcinoma.

A patient with a perianal mass complains of feeling a mass (usually prolapsed haemorrhoids or anal tags) or has anal discharge that is associated with itching, and is commonly associated with tumours, proctitis, and helminthic infestations. Perineal

discharge, on the other hand, is commonly due to fistulae and is common in obese people.

48.2.1 ANAL INCONTINENCE

Faecal incontinence is the inability to control bowel movements. It ranges from an occasional leakage of stool with passing gas to a complete loss of bowel control.

Note: A thorough examination of the patient with digital rectal examination are critical for identifying the cause of anal incontinence. The following have been associated with anal incontinence:

- ◆ Congenital abnormalities.
- ◆ Trauma to the sphincters and anorectal ring, injuring them (obstetric, operative, abuse, accident).
- ◆ Neurological abnormalities (due to spinal cord disease).
- ◆ Anorectal disease (rectal prolapse, third degree haemorrhoids, anorectal cancer).

Management

Refer to higher level for appropriate management.

48.2.2 RECTAL PROLAPSE

Rectal prolapse may be partial (mucosal) or complete (whole thickness of rectal wall). It is a common occurrence in children and the elderly (especially females, who form 85% of the affected adult population), but may occur at any age.

Degree of prolapse

- ◆ Primary prolapse with spontaneous reduction.
- ◆ Secondary prolapse with manual reduction.
- ◆ Tertiary prolapse that is irreducible.

Reducible prolapse often occurs during defecation and is associated with discomfort, bleeding, and mucus discharge. Prolapse may also be caused by mild exertion (e.g., through coughing or walking) and may also be associated with incontinence of flatus and feaces. When uterine prolapse compounds rectal prolapse, urinary incontinence may also be a feature.

Rectal prolapse is also associated with benign prostatic hypertrophy, constipation, malnutrition, old age, and homosexuality (specifically men having sex with men).

Note:

- ◆ Anorectal carcinomas should always be suspected if there are also ulcers, indurations, or masses in this area. During clinical examination it is important to check for patulous anus and for poor sphincter tone (on digital examination).

Management

- ◆ May be conservative or operative, depending on the condition of the patient.
- ◆ **Primary or secondary** prolapse conservative treatment with stool softeners, e.g., lactulose 15ml 12 hourly.
- ◆ Appropriate physiotherapy.
- ◆ Refer to the next level of care.

Note: Complications include irreducibility of the prolapse with ulceration, bleeding, gangrene and possible rupture of the bowel.

48.2.3 PRURITIS ANI

This is a common condition especially in males. Causal factors include:

- ◆ Skin conditions (psoriasis, lichen planus, contact eczema)
- ◆ Infective conditions (candidiasis, threadworms)
- ◆ Anal-rectal conditions (piles, fissures, fistula, proctitis, polyps)
- ◆ Gastrointestinal conditions (irritable bowel syndrome, ulcerative colitis, etc.)
- ◆ Drugs (quinidine, colchicine)
- ◆ Obesity

Management

- ◆ Treat as for the cause.
- ◆ Advise on improved personal hygiene for those affected.
- ◆ Refer obstinate cases to higher level for appropriate management.

48.2.4 FISSURE IN ANO

This is an elongated longitudinal ulcer of the lower anal canal. The commonest site is the midline posteriorly, followed by midline anteriorly. This condition occurs in children, but is more common in females in their midlife and uncommon in the elderly.

Clinical Features

- ◆ Pain during defecation that is often intense, may last for an hour or more but subsides only to come again during the next defecation.
- ◆ Stool is frequently streaked with blood.
- ◆ Constipation (patient is reluctant to open bowel because of the pain).
- ◆ Slight discharge occurs in chronic cases.
- ◆ A sentinel tag is usually demonstrated, with a tightly closed puckered anus.

Note: Avoid doing digital rectal examination for it causes a lot of discomfort to the patient. Perform examination under anaesthesia (EUA).

Management

Conservative management can be effective and consists of improvement of personal hygiene, use of stool softeners, proper diet, and use of saline sitz baths. These measures may bring about spontaneous healing. If these measures fail, refer to higher level for appropriate management.

48.2.5 HAEMORRHOIDS

These are varicosities of the haemorrhoidal plexus often complicated by inflammation, thrombosis and bleeding. Haemorrhoids are not commonly associated with pregnancy. Appropriate assessment is digital examination and proctoscopy (use good light).

Clinical Features

- ◆ Painless rectal bleeding
- ◆ Prolapse
- ◆ Sensation of a mass in anal area (especially during defecation)
- ◆ Mucus anal discharge

Complications

- ◆ Profuse bleeding
- ◆ Thrombosis
- ◆ Infection

Management

- ◆ Advise a high fibre diet to prevent constipation.
- ◆ Refer complicated haemorrhoids to higher level for appropriate management.

48.2.6 ANORECTAL ABSCESS

There are four types of abscesses: submucosal, subcutaneous (perianal), ischiorectal, and high intermuscular locations. Usually there is no apparent cause, but certain underlying diseases such as Crohn's disease, ulcerative colitis, rectal cancer, HIV disease, diabetes mellitus, and active tuberculosis may be present. Complications for anorectal abscess include fistula formation, recurrence of the abscess, and sinus formation.

Clinical Features

- ◆ Presents as acute painful swelling with fluctuation not always obvious and there is pain on defecation.
- ◆ Blood-stained purulent anal discharge.

Management

- ◆ Give analgesia, in the form of ibuprofen 400mg orally.

- ◆ Urgently refer those suspected to have the condition to higher level for appropriate management.

48.2.7 RECTAL TRAUMA

Rectal trauma may be caused by physical assault, road accidents, birth trauma, and sexual assault.

Clinical Features

Patients present with pain, bleeding, and purulent rectal discharge. Clinical findings include anal laceration, features of peritonitis and fever, with or without foreign bodies in the rectum.

Management

- ◆ Address the primary problem.
- ◆ For mild to moderate cases, manage conservatively, which includes:
 - Administration of antibiotics appropriately
 - Analgesics
 - Saline sitz bath
- ◆ Provide counselling and other support services of the patient as needed.
- ◆ Refer to higher level for appropriate management.

48.2.8 FISTULA IN ANO

This condition may complicate anorectal abscesses, Crohn's disease, ulcerative colitis, tuberculosis, colloid carcinoma of the rectum, LGV and HIV infections. The types of Fistula in Ano are subcutaneous (anus to skin), submucous, low anal (open below the anorectal ring), high anal and pelvirectal.

Clinical Features

- ◆ Persistent seropurulent discharge
- ◆ Periodic pain
- ◆ Pouting openings in the neighbourhood of anal verge.

Note: Appropriate examination involves palpating the anal internal opening for a nodule on digital examination and confirmation is made at proctoscopy.

Management

- ◆ Determine primary pathology.
- ◆ Refer to the next level of care for surgery.

48.2.9 DISTAL COLON AND RECTAL CARCINOMA

Distal colon and rectal carcinoma are especially found in elderly patients, presenting with rectal bleeding and change in bowel habits. They may additionally present with

abdominal or pelvic pain or even intestinal obstruction. It is important to rule out familial conditions in the family history. Clinical examination for patients suspected to have distal colon and rectal carcinoma should include rectal examination.

Investigations

- ◆ Proctoscopy

Management

Refer urgently to higher level for appropriate management.

48.3 Abscesses

An abscess formation is the culmination of an uncontrolled localized infection. There is tissue necrosis with liquefaction (pus formation).

Indications that an abscess needs incision and drainage include incomplete pus discharge, throbbing pain, a localized swelling that is tender, hot, and usually with a shiny skin and with fluctuation. Fluctuation may be absent in deep abscess.

Management

Can be carried out at all levels with referral to higher level for more complicated abscesses or those requiring general anaesthesia. Exercise caution for special abscesses like mastoid abscess, as simple incision and drainage of these will result in severe injury or in chronic sinuses. Refer such sinuses to higher level for appropriate management.

Treatment

- ◆ Incision and drainage (under anaesthesia).
- ◆ See ENT section for management of mastoid abscesses.
- ◆ Leave the wound(s) to heal by granulation.
- ◆ Hand and foot abscesses will require multiple incisions with counter incisions in some areas and elevation of the limbs.
- ◆ Perianal and ischiorectal abscesses require general anaesthesia; refer. If referred back after treatment, patients require days to weeks of sitz baths before they heal. Ask the patients to add 3–4 tablespoons of salt to the basin of water.
- ◆ Antibiotics are indicated in hand abscesses. Other abscesses may or may not need antibiotics depending on the presence or absence of local cellulites.
- ◆ Face abscesses require antibiotic cover.

48.4 Breast Conditions

Breast disease presents in a variety of forms as lumps, breast pain, nipple discharge, breast ulcers, or eczema.

48.4.1 BREAST ABSCESS

This condition is common during lactation, especially second week of puerperium, and during pregnancy, and rarely occurs at other times.

Clinical Features

- ◆ Painful breast swelling
- ◆ Fever

Investigations

- ◆ Full blood count

Management

- ◆ Incision and drainage
- ◆ Analgesics
- ◆ Broad spectrum antibiotics

Note:

The following needs to be emphasized for breast abscess

- ◆ Do not delay incision and dependent drainage. If no pus, biopsy.
- ◆ Do not wait for fluctuation or abscess to point.
- ◆ Do not stop breastfeeding (unless the nipple is cracked or discharging, and in this case continue to express milk for the baby).
- ◆ Most infections are due to staphylococcus aureus.

48.4.2 BREAST LUMPS

Breast lumps can be a result of a wide number of conditions, including the following:

- ◆ Cystic lesions that may be due to breast abscess, fibrocystic disease, cystos arcomaphylloides (serocystic disease), galactocele, or hydatid cysts.
- ◆ Solid lesions that may due to a developing breast abscess, antiroma, fibroadenoma, giant fibroadenoma, intraductal papilloma, tuberculosis lymphoma, neurofibroma, or carcinoma of breast

Investigations

- ◆ Full blood count
- ◆ History and physical examination
- ◆ Ultrasound

Management

- ◆ Identify primary pathology and treat
- ◆ Refer to the next level of care

Refer urgently to higher level for appropriate management.

48.5 Central Nervous System

Conditions affecting the central nervous system (CNS) that may require intervention may be classified as follows:

- ◆ Congenital disorders (hydrocephalus, microcephaly, encephaloceles, etc.)
- ◆ Degenerative disorders
- ◆ Vascular disorders
- ◆ Infections (e.g., brain abscesses)
- ◆ Neoplasms
- ◆ Trauma

See neurological textbook for greater detail.

48.5.1 HYDROCEPHALUS

See paediatric section for additional information. Refer to higher level for appropriate management.

48.5.2 INCREASED INTRACRANIAL PRESSURE AND SPACE OCCUPYING LESIONS

This is usually caused by increases in mass content (e.g., tumour, haemorrhage, oedema or CSF).

Clinical Features

Principle symptoms are

- ◆ Headache
- ◆ Anorexia
- ◆ Vomiting
- ◆ Visual disturbance
- ◆ Papilloedema (may be detected by use of fundoscopy)
- ◆ Weight loss
- ◆ Bradycardia
- ◆ Mild hypertension
- ◆ Intellectual deterioration

Note: Diagnosis is made on basis of clinical history, neurological examination (papilloedema) and radiograph examination (cranial ultrasound in children, CT scan head).

Management

Refer urgently to higher level for appropriate management.

48.5.1 INTRACRANIAL INFECTIONS

These include osteomyelitis of the skull commonly complicating penetrating injuries, post craniotomy infections, intracranial infections complicating otitis media, mastoiditis, paranasal sinusitis and scalp infections. Conditions that may arise from infections are skull osteomyelitis, extradural and subdural empyema, cerebral abscess, and meningitis.

Clinical Features

Clinical features will vary depending on the site and spread of infection, but will include local tenderness, focal neurological signs, etc., altered consciousness, epilepsy, or signs of meningitis.

Diagnosis is made on the basis of clinical history plus physical and neurological examination. Plain radiographs of skull may show opaque air sinuses or air bubbles in brain. Angiography or CT scan is used to confirm the diagnosis.

Management

Refer to higher level for appropriate management. The patient suspected to have this condition should receive an adequate dose of appropriate antibiotics while awaiting referral.

48.6 Chest Conditions

48.6.1 CONGENITAL HEART DISEASE

For detailed description of the different congenital heart diseases please see section in paediatrics or refer to a suitable textbook.

Management

Refer to higher level for appropriate management.

48.6.2 EMPYEMATHORACIS

In empyema thoracis there is pus in the pleural space. The condition may be classified as acute, sub-acute, or chronic, depending on the duration of presence. Immunosuppression is commonly associated with chest diseases (investigate in suspicious cases). Complications include chronicity with lung destruction, fistula formation and chronic sinuses through the chest wall.

Clinical Features

- ◆ Symptoms of underlying condition may be present.
- ◆ Shortness of breath
- ◆ Fever
- ◆ Sweating

- ◆ Diasphoresis
- ◆ Tachypnoea
- ◆ Tachycardia
- ◆ Dullness to percussion with reduced air entry on the affected side
- ◆ Weight loss

Investigations

- ◆ Chest radiograph shows fluid in the affected side or an air fluid level.

Management

- ◆ Improve general condition of the patient, e.g. nutritional status.
- ◆ Chest physiotherapy.
- ◆ Appropriate intravenous antibiotics directed at the primary pathogen.
- ◆ Refer to the next level of care.

48.6.3 ACHALASIA CARDIA

Main symptom here is dysphagia owing to failure of relaxation of the lower oesophageal sphincter. This results in dysphagia with differing degrees of food stasis and regurgitation of feeds.

Clinical Manifestations

- ◆ Long standing dysphagia, more for solids than liquids, and more common in young patients.
- ◆ Vomiting of feeds also occurs, sometimes of foods taken some days back.
- ◆ Weight loss if present is usually only slight.

Management

Refer to higher level for appropriate management.

MALIGNANT DYSPHAGIA

This is difficulty in swallowing because of carcinoma of the oesophagus.

Clinical presentation

- ◆ There is progressive dysphagia
- ◆ Weight loss.
- ◆ Regurgitation suggests a cardiac lesion
- ◆ Patients tend to be wasted in the late stages
- ◆ Dehydration. Up to 60% of these patients in Kenya will present with underweight (BMI less than 18kg/M²). Most patients present with late disease.

Management

- ◆ Counsel the patient and the patient's relatives. It is important that they understand the prognosis of the disease.
- ◆ Refer to higher level for appropriate management

48.6.4 LUNG NEOPLASM

More cases are being seen in Kenya and the association with smoking is high. Squamous cell carcinoma is the commonest histological subtype.

Clinical Features

The clinical features for this condition include the following:

- ◆ Chronic cough
- ◆ Haemoptysis
- ◆ Wheezing or stridor
- ◆ Lung infection or other sequels of bronchial obstruction
- ◆ Features of spread – nodes, malignant effusions, fistulae, etc.
- ◆ Systemic symptoms like appetite loss

Investigations

- ◆ Chest radiograph

Management

- ◆ Refer to the next level of care for a multidisciplinary approach to care.

48.7 Genitourinary System

Infections of the urogenital system are characterized by the following symptoms:

- ◆ Dysuria
- ◆ Urgency in micturition,
- ◆ Colic pain in either flanks or loins
- ◆ Pain on the lower abdomen due to inflammation of the urinary bladder (cystitis)
- ◆ Poor urinary stream
- ◆ Dribbling and hesitancy
- ◆ Nocturia
- ◆ Urinary incontinence
- ◆ Urinary retention
- ◆ Haematuria
- ◆ Renal failure.

These symptoms overlap over many specific conditions, so that a thorough examination is required to facilitate an accurate diagnosis. The following needs to be done in this regard:

- ◆ Ask about and check for urethral discharge.
- ◆ Palpate the urethra for areas of induration (stricture).
- ◆ Palpate the lower abdomen for tenderness, masses in the urinary bladder.
- ◆ Bimanually palpate the kidney for masses or tenderness.
- ◆ Perform a rectal or vaginal examination:
- ◆ Manually palpate the urinary bladder for masses.

- ◆ Feel for the prostate in a man (size, consistency, nodularity, tenderness, fixation of rectal mucosa to it etc.).

48.7.1 POSTERIOR URETHRAL VALVES

As a developmental anomaly a membrane develops in the posterior urethra of male fetus and results in bladder neck obstruction. The resulting increase in pressure is associated with developmental alterations from the normal.

Clinical presentation

Symptoms range from mild symptoms of repeated urinary tract infection to obstructive uropathy. Symptoms may also include

- ◆ Distended bladder
- ◆ Dilated ureters
- ◆ Ultimately renal failure.

Note:

Failure to pass urine within this time frame does not necessarily suggest posterior urethral valves problem.

Investigation

- ◆ Avoid cystourethrogram

Management

- ◆ Evaluate the patient and refer to higher level for appropriate management.

48.7.2 CHILDHOOD HYDROCELE

This is fluid within the processus vaginalis within the scrotum.

Clinical Features

- ◆ Swelling in the scrotal sac, which may spread down from the inguinal canal, in the communicating type, or be localized to the scrotum in the non-communicating type.
- ◆ Communicating types are associated with straining and may develop strangulation if bowel contents enter.
- ◆ In non-communicating type, one can palpate and grasp the sac towards the scrotum and get above it.

Investigations

- ◆ Transillumination test is positive.

Management

- ◆ Conservative management for non-communicating
- ◆ Refer to the next level of care

48.7.3 TESTICULAR TORSION

~ This is a surgical emergency and a high level of suspicion is needed to avoid unnecessary morbidity.

Clinical Presentation

- ◆ There is sudden onset of scrotal pain in a young male.

Note: The diagnosis mostly clinical. Testicular torsion must be differentiated from epididymocele.

Investigation

- ◆ Urinalysis
- ◆ Full blood count

Management

Refer urgently to higher level for appropriate management, communicating with receiving surgeon.

48.7.4 CIRCUMCISION

This is excision of the prepuce (foreskin of penis). Indications include ritual (religious, traditional, personal), phimosis, paraphimosis, recurrent Herpes genitalis restricted to the prepuce, recurrent balanitis (inflammation of prepuce), balanoposthitis (inflammation of prepuce and glans penis), tight frenulum, long and adherent prepuce.

Method

To perform a circumcision:

- ◆ Clean and drape the perineum.
- ◆ Local anaesthesia is used. Lignocaine 2%.
- ◆ Dilate the prepucial meatus with artery forceps.
- ◆ Retract foreskin and clean with warm saline.
- ◆ Make circular incision on inner skin approximately 3cm from the corona, taking care not to injure the urethra and the glans penis
- ◆ Pull foreskin over glans penis and make incision with surgical knife over the coronal sulcus. Leave adequate penile skin.
- ◆ Complete circumcision with scissors.
- ◆ Control all bleeders with clamps and ligatures.
- ◆ Suture incision with 2/0 plain catgut.

Note:

- ◆ Use of plastibell in circumcision of neonates is not recommended due to frequent injuries and is best left for experienced surgeons.
- ◆ Methods for infants, adolescent and adults are described above. It can be performed under local anaesthetic.
- ◆ Do not use adrenaline.

48.7.5 ADOLESCENT HAEMATURIA

This clinical condition can be macroscopic or microscopic blood within the urine. In children possible causes include:

- ◆ Glomerulonephritis
- ◆ Anaphylactoid purpura (Henoch-Schonlein purpura)
- ◆ Fever
- ◆ Strenuous exercise
- ◆ Mechanical trauma (masturbation),
- ◆ Foreign bodies
- ◆ Urinary tract infection (bacterial or parasitic)
- ◆ Hypercalciuria/urolithiasis
- ◆ Sickle cell disease/trait
- ◆ Coagulopathy
- ◆ Tumours
- ◆ Drugs/ toxins (NSAIDs, anticoagulants, cyclophosphamide, ritonavir, indinavir), anatomic abnormalities (hydronephrosis), polycystic kidney disease, vascular malformations, and hyperuricosuria.

Investigations

- ◆ Urinalysis
- ◆ Abdominal ultrasound for kidney, ureter and bladder

Note:

- ◆ Confirm the presence of and the extent of haematuria as well as the primary cause.
- ◆ Determine secondary problems.

Management

- ◆ Direct treatment against the primary cause, managing associated complications.
- ◆ Refer to higher level for appropriate management.

48.7.6 HAEMATURIA IN THE ADULT

This is a common condition that has mostly benign causes. The commonest of these causes is urinary tract infection, while the most feared causes are malignancies of the urinary tract. Other causes include bleeding diathesis, urinary tract calculi, urinary tract trauma, and hypertension. Macroscopic haematuria is more likely than microscopic haematuria to be due to urinary tract pathology. Ageing is associated with a higher incidence of significant urinary tract pathology.

Investigation

Should include the following:

- ◆ Urinalysis, culture and sensitivity

- ◆ Urine for cytology
- ◆ Urinary tract ultrasound
- ◆ Kidney ureter and bladder (KUB), radiograph

Management

- ◆ Treat as for the underlying cause.
- ◆ Treatment for bladder cancer needs special emphasis as delay in diagnosis has morbidity and mortality implications.
- ◆ Refer to higher level for appropriate management.

48.7.7 URINARY RETENTION

Inability to pass urine while the urinary bladder is full. There is an urge to micturate and if not relieved, there is severe pain with straining. The causes vary with age and gender.

Common Causes

- ◆ For children, meatal stenosis, phimosis or paraphimosis, posterior urethra valves, ruptured urethra after trauma, and constipation.
- ◆ For adults aged 20–50 years, urethral stricture, calculi (bladder and urethral stones), bladder tumours, ruptured urethra (trauma), and postoperative (any perineal operation) clot retention.
- ◆ For male adults older than 50 years, prostatism (benign prostatic enlargement, carcinoma of the prostate, prostatitis, prostatic fibrosis), calculi, urethral strictures, bladder tumours, ruptured urethra (trauma), and postoperative clot retention.
- ◆ For females, bladder tumours, calculi, pelvic tumours (cancer of the cervix), urethral stenosis, and postoperative clot retention (severe haematuria).

Note: Spinal cord compression with paraplegia/quadriplegia results in urinary retention.

General Management

- ◆ Relieve acute retention by catheterization.
- ◆ If catheterization fails, use cystostomy or suprapubic cystostomy.

Specific Management

- ◆ Perform circumcision for phimosis or paraphimosis [see circumcision].

48.7.8 URETHRAL STRICTURE

Causes of urethral stricture include congenital, traumatic (usually follows fracture of pelvis), inflammatory (follows gonorrhoea infection usually earlier in life), and instrumentation that results from indwelling catheter following endoscopy or postoperatively following prostatectomy or after amputation of the penis.

Clinical Features

Usually occurs in younger patient (below 50 years) and the early symptoms include passage of flakes in urine with early morning urethral discharge while the later symptoms include difficulties in micturition (narrow prolonged stream, dribbling, straining). There is urine retention with a distended urinary bladder.

History of urethral discharge in the past, history of pelvic injury, and history of instrumentation are significant. The urethra should be palpated for induration, with a rectal examination performed in all patients.

Investigation

- ◆ Urinalysis, culture and sensitivity
- ◆ Urea and electrolytes
- ◆ Micturating cystourethrogram and ascending urethrogram

Management

- ◆ Carry out suprapubic cystostomy or insert cystofix if there is retention of urine.
- ◆ Refer to the next level of care

48.7.9 URETHRAL INJURIES

This may result from urethral trauma (for example, a fall astride a projecting object, cycling accident), fracture of pelvis in road traffic accident, penetrating wounds (bullet wounds, etc.), and iatrogenic injuries.

Clinical Features

- ◆ Difficulty or inability in passing urine.
- ◆ There may be blood at the external meatus.

Management

- ◆ Admit for resuscitation and suprapubic catheterization
- ◆ Start on appropriate antibiotic cover
- ◆ Refer to the next level of care for further management.

48.7.10 RUPTURED BLADDER

This usually follows a blow, a kick or fall on a distended bladder, gunshot or stab wounds, passage of instruments, endoscopic resection of prostate or bladder tumour, diathermy coagulation of bladder tumour, and operative procedures in the pelvis (for example tubal ligation and hysterectomy).

Clinical Features

- ◆ Injury may be intraperitoneally or extraperitoneally
 - Intraperitoneal rupture results in sudden agonizing pain in the hypogastrium, and severe shock, with a rigid abdomen that distends slowly. The patient passes no urine. Rectal examination reveals a bulge in the pouch of Douglas.

- Extraperitoneal rupture displays similar symptoms as in rupture of posterior urethra described above.
- ◆ The patient experiences pain, has blood stained urine, and may show other features of the primary pathology.
- ◆ Severe peritonitis is an ominous complication that may develop if the patient is not attended to within 12 hours; in such situations of not being attended to, it may have a mortality rate of 100%.

Investigation

- ◆ Plain erect radiograph of the abdomen may show “ground glass” appearance of fluid in the lower abdomen.
- ◆ Intravenous urography will demonstrate a leak from the bladder.
- ◆ Conduct laparotomy after resuscitative measures are taken.
- ◆ Refer appropriately

Management

- ◆ Initiate resuscitation measures.
- ◆ Conduct laparotomy after resuscitative measures are taken.
- ◆ Refer appropriately

48.7.11 BENIGN PROSTATE ENLARGEMENT(BPE)

Benign prostate enlargement causes lower urinary tract symptoms. A big prostate is not always symptomatic or problematic, but it can cause damage to the kidneys, ureter, or bladder with minimal symptoms. Benign prostate enlargement is age related but not in a linear fashion. Benign prostate enlargement symptoms increase with size but not in a linear fashion and the condition does not always require surgery. Symptom evaluation of BPE must include the international prostate symptom score as in Table 48.1.

Clinical examination

- ◆ Digital rectal examination (DRE) will reveal enlarged prostate with smooth surfaces.

Investigation

- ◆ Urea, electrolyte, and creatinine levels
- ◆ Prostatic specific antigen (PSA)

Management

- ◆ Watchful waiting id for those with mild symptoms without damage to kidneys and ureters.
- ◆ Medical treatment (alpha reductase inhibitors, e.g., finasteride 5mg daily; review treatment after 6 months. Note: may require treatment for several months before benefit is obtained.
- ◆ Refer to higher level of care for further management and surgical treatment if necessary.

- ◆ Prostatic specific antigen (PSA).

Note: Surgery is reserved for those with complications like retention that fails trial without a catheter. Note that retention without such a trial does not qualify as an absolute indication for surgery.

Other absolute indications for surgery include:

- ◆ Bladder stone
- ◆ Bladder diverticulum
- ◆ Intractable bleeding
- ◆ Raised creatinine
- ◆ Dilated ureters and kidney
- ◆ Conservative or definitive surgical management
- ◆ Surgical includes:
 - Transurethral resection of the prostate (TURP)
 - Open prostatectomy

Table 48.1: International prostate symptom score (IPSS)

Name: _____ Date: _____

	Not at all	Less than 1 time in 5	Less than half the time	About half the time	More than half the time	Almost always	Your score
Incomplete emptying Over the past month, how often have you had a sensation of not emptying your bladder completely after you finish urinating?	0	1	2	3	4	5	
Frequency Over the past month, how often have you had to urinate again less than two hours after you finished urinating?	0	1	2	3	4	5	
Intermittency Over the past month, how often have you found you stopped and started again several times when you urinated?	0	1	2	3	4	5	
Urgency Over the last month, how difficult have you found it to postpone urination?	0	1	2	3	4	5	
Weak stream Over the past month, how often have you had a weak urinary stream?	0	1	2	3	4	5	
Straining Over the past month, how often have you had to push or strain to begin urination?	0	1	2	3	4	5	

	None	1 time	2 times	3 times	4 times	5 times or more	Your score
Nocturia Over the past month, how many times did you most typically get up to urinate from the time you went to bed until the time you got up in the morning?	0	1	2	3	4	5	

Quality of life due to urinary symptoms	Delighted	Pleased	Mostly satisfied	Mixed – about equally satisfied and dissatisfied	Mostly dissatisfied	Unhappy	Terrible
If you were to spend the rest of your life with your urinary condition the way it is now, how would you feel about that?	0	1	2	3	4	5	6

Total score: 0–7 Mildly symptomatic; 8–19 moderately symptomatic; 20–35 severely symptomatic.

48.7.12 PROSTATE CARCINOMA

Clinical Features

There is poor urinary stream, haematuria, back or leg pain, as well as urinary urgency. Other features of secondary spread may also be present. Digital rectal examination typically reveals an irregular, firm prostate or nodule.

Investigation

- ◆ Measurement of PSA levels either total or ratio of free to bound.

Management

- ◆ Catheterize those with acute retention. If this fails, revert to a suprapubic cystostomy.
- ◆ Administer antibiotics for infection according to culture reports. Start nitrofurantoin 100mg 6 hourly and await cultures.
- ◆ Initiate other emergency treatment as needed.
- ◆ Initiate hormonal therapy for advanced disease.
- ◆ Provide nutritional support.
- ◆ Refer to higher level of care for further management.

48.8 Ulcers and Tumours of the Skin

The causes of these include the following:

- ◆ Infections:
 - Bacterial: Mainly tuberculosis, leprosy, syphilis, and anthrax
 - Fungal: For example histoplasmosis
 - Parasitic: For example leishmaniasis
- ◆ Tumours
 - Squamous cell carcinoma
 - Basal cell carcinoma
 - Melanoma
 - Kaposi's sarcoma
- ◆ Vascular
 - Ischaemic (arterial)
 - Venous insufficiency
 - Sickle cell disease
 - Diabetes
 - Thromboangiitis
- ◆ Trauma
- ◆ Tropical ulcers

Clinical Features

Ulcers are mainly found in the lower limbs but may occur on any part of the body. Examination should be thorough and systematic. The following are, with brief examples, the characteristics to note:

- ◆ **Site:** E.g., 95% of rodent ulcers (basal cell carcinoma) occur on upper part of the face; carcinoma typically on the lower lip, and syphilitic on the upper lip.
- ◆ **Size:** Carcinoma spreads more rapidly than inflammatory ulcer.
- ◆ **Shape:** Rodent ulcers are usually circular while straight edges are found in dermatitis.
- ◆ **Edge:** Undermined occurs in tuberculosis, rolled edges in basal cell carcinoma, (rodent), everted edges in squamous cell carcinoma, vertically punched out edges in syphilis, and sloping edges in venous and traumatic ulcers.
- ◆ **Base:** Is palpably indurated in squamous cell carcinoma.
- ◆ **Floor:** When examined appears granulomatous in tuberculosis.
- ◆ **Discharge:** Purulent discharge indicates active infection, while greenish discharge is seen in pseudomonas infection.
- ◆ **Lymph nodes:** Are enlarged mainly in malignant tumours.
- ◆ **Pain:** Generally occurs in malignant, tuberculous and anal ulcers, while trophic ulcers are painless.

Investigations

These depend on the causative factor and may include:

- ◆ Full Haemoglobin
- ◆ Random blood sugar
- ◆ VDRL
- ◆ Mantoux test
- ◆ HIV test
- ◆ Relevant radiographs to rule out bone involvement and/or infections

Management

The following are important:

- ◆ Given antibiotics for infected wounds appropriately.
- ◆ Conduct regular cleaning and dressing with antiseptic for 3 days.
- ◆ Give tetanus toxoid 0.5ml IM.
- ◆ Identify primary cause and if able to manage at this level, then manage.
- ◆ Carry out wound excision/skin graft if no healing of the wound observed.
- ◆ Refer to higher level for appropriate management.

49. Dental and Oral Conditions

Oral health is an integral part of general health. It entails the health of the mouth (the oral cavity), the jaws, teeth and all the contiguous structures. Therefore, diseases, disorders and conditions that may be diagnosed in this area of the body can be particularly diverse. Since the mouth constitutes the main gateway into the entire body, disease processes and disorders elsewhere throughout entire body may also be reflected and diagnosed here. This chapter outlines the most common diseases, conditions, and disorders that health clinicians may encounter in their daily practice.

49.1 Bacterial Infections

The mouth is a favourite habitat of a myriad range of disease causing and commensal micro organisms. These include nearly the entire range of aerobes, anaerobes, and gram-positive and gram-negative microbes. Commonly, sites and sources of bacterial infection in the orofacial area include:

- ◆ Carious (decayed) teeth
- ◆ Root remnants in the jaw
- ◆ Periodontal infection
- ◆ Pericoronal infection
- ◆ Pre-existing pathology such as bone cysts, bone dysplasia and neoplasms
- ◆ Trauma to tissues

Remarkably, bacterial infections in the oral cavity may take diverse clinical courses and presentations as now outlined in the subsequent sections below.

49.1.1 DENTAL CARIES AND PULPITIS

The most common cause of pulpal disease is dental caries, which leads to bacterial invasion of dentine and eventually the pulp. Dental caries is a progressive damage of the enamel, dentine, and cementum initiated by microbial activity on any tooth surface in the oral cavity. The spillage of microbial toxins into the tooth pulp through the caries lesion precipitates pulpitis.

Clinical Features

This is a very painful condition that can cause extreme agony. The affected tooth will often elicit extreme tenderness to touch.

Management

- ◆ Initiate analgesic streatment.
- ◆ Consider extraction of carious teeth.
- ◆ Urgently refer to facility 4 and above.

49.1.2 CELLULITIS AND ABSCESS FORMATION

Orofacial cellulitis may emanate from any of the sources and sites earlier given. The principal micro-organisms that precipitate cellulitis produce diverse toxins, enzymes and cytokines that destroy tissue to facilitate infection that spreads through the contiguous fascial planes. In this way there is always the danger of the spillage of the infection into the bloodstream (septicaemia) and any adjacent vital organs and structures.

~ When an acute infection emanates from the mandibular structures or floor of the mouth and rapidly spreads to involve the bilateral fascial planes, it often culminates in a deadly condition referred to as Ludwig's Angina. ***All clinicians must endeavor to recognize these conditions most promptly since death can occur in a matter of hours.***

Clinical Features

There is bilateral upper neck massive swelling with board-like feel on palpation. Tongue is raised towards the roof of the mouth and the floor is heavily indurated, the tissues having a cauterized-like surface. The patient is severely distressed because of respiratory embarrassment, and onset of stridor is ominous because it implies impending death.

Management

The following is important for management:

- ◆ Start potential antimicrobial administration immediately: Amoxicillin 500mg TDS + metronidazole 500mg TDS + gentamicin 80mg TDS where gram-negative infections are suspected; also give ibuprofen 400mg TDS to control pain.
- ◆ Ensure secure airway during referral and provide competent escort.

Refer urgently to higher level for appropriate management and inform recipient hospital of the referral.

49.1.3 CERVICOFACIAL NECROTIZING FASCIITIS

This is a bacterial infection that often requires special attention since it is associated with extreme morbidity. It is a mixed bacterial infection whose pathogenesis principally involves extensive and rapid destruction of fascia, almost exclusively around the neck and craniofacial area. The exact pathophysiology of the exclusive fascial damage remains unknown, however. Paradoxically, no specific microorganisms have been implicated in the pathology of this condition. Once fascia is destroyed, the covering skin remains without nutrients and support, thereby breaking down to expose the underlying structures. Since this condition may not be as uncommon as medical literature may imply, clinicians are prompted to recognize it. The hallmark of the condition is that it may present with little suppuration and yet there will be extensive fascial necrosis with consequent skin breakdown.

Management

- ◆ Start amoxicillin 500mg TDS + metronidazole 500mg TDS and ibuprofen 400mg.
- ◆ Immediately refer to higher level for appropriate management.

49.1.4 PERIODONTAL (GUM) INFECTIONS

The periodontium is a functional unit whose main roles include the support of the teeth within the jawbones and the provision of sensory information relating to the function of chewing. The components of the periodontium, therefore, include the alveolar bone, cementum, the periodontal ligament and the gingiva (gum). Acute and chronic periodontal disease is one of the most common ailments affecting humankind. Some evidence of deterioration of the periodontal tissues can be demonstrated in almost all dentate adults. The periodontal tissues, like other tissues are subject to inflammatory, degenerative, dysplastic, and neoplastic pathological changes.

49.1.5 ACUTE ULCERATIVE GINGIVITIS

This disease has been reported to be highly prevalent in parts of our African region, where it affects children and groups of persons with congenital disorders such as Down's syndrome. Significantly, nutritional deficiencies arising from the prevalent poor socio-economic status of many of our populations may predispose to the occurrence of most of the cases that may present with acute ulcerative gingival conditions. Poor oral hygiene may be prevalent where economic empowerment is low.

Management

- ◆ Oral hygiene instructions with antibiotics and mouth wash.
- ◆ Give amoxicillin 500mg TDS + metronidazole 500mg TDS + gentamicin 80mg TDS.
- ◆ Try to address the primary cause.

If no improvement refer to higher level for appropriate management.

49.1.6 GANGRENOUS STOMATITIS (CANCRUN ORIS, NOMA)

This is an infective condition of the orofacial tissues that may cause extensive tissue destruction with severe morbidity. The condition may initially manifest as an acute ulcerative necrotizing gingival infection, which rapidly involves a block of the contiguous tissues culminating in their breakdown. Unfortunately, the clinical picture and changes associated with this condition may often be so rapid that even the keenest clinician may not notice the progression of the pathological events.

Give appropriate analgesic for pain. Refer to higher level for appropriate management.

49.1.7 BONE INFECTIONS

Infection in the jawbones may be localized or generalized. Generally, the localized forms of infection are the most common with the focal osteitis/alveolitis ("dry socket") occurring 1 to 7 days following a dental extraction. This probably is the most common bone infection after dental extraction. Patients will complain of pain that is much more severe than a toothache. The pain is usually throbbing and deep-seated. Analgesics often offer little help.

Clinical Features

Examination reveals a denuded open tooth-socket with a scanty necrotic clot, while the bone often appears literally dry, hence the term dry socket.

On the other hand, infection may involve a large part of the jawbone, most often the mandible. The source of infection may be anywhere within the oral cavity. Such infection would then be rightly designated as osteomyelitis. In its acute form, severe pain and fever are significant presentations. It may eventually develop suppurative osteomyelitis that may lead to sequestration.

In other situations the acute phase may progress into the chronic sclerosing type of osteomyelitis that is not associated with sequestration. Fortunately, osteomyelitis of the jawbones has remained relatively uncommon with the improvement of oral health facilities and the availability of antimicrobial therapy in general.

Management of Focal Osteitis/Alveolitis

- ◆ Urgently refer to level 4 and above.
- ◆ Provide analgesia.

Management of Jaw Osteomyelitis

- ◆ Initiate ibuprofen 400mgTDS.
- ◆ Refer immediately.

49.2 Trauma of the Orofacial Tissues

Injury to the teeth and the supporting alveolar bone occurs quite frequently, especially among children. Other more severe injuries to the soft and skeletal tissues of the orofacial area commonly arise through road traffic accidents, sporting activities, and interpersonal violence. Such violence where guns and other missiles are employed may lead to extensive tissue destruction with high morbidity. Injuries of the tissues in the maxillofacial area can at first appear daunting, but it is important to follow the basic principles of resuscitation as a priority: secure the airway, maintain breathing, and ensure circulation.

Manage all orofacial injuries by:

- ◆ Stabilizing as appropriate and maintaining airway.

- ◆ Administering tetanus toxoid 0.5ml STAT.
 - ◆ Giving ibuprofen + amoxicillin 500mg QID.
- Refer to higher level for appropriate management.

49.2.1 OROFACIAL CONGENITAL AND DYSPLASTIC CONDITIONS

Clefts of the lip and palate constitute the most commonly encountered congenital malformations. When they are particularly severe, they may pose feeding problems for the affected babies from birth. Special methods of feeding the affected children have to be instituted to facilitate normal growth and weight gain while awaiting surgical intervention. Fortunately, the severe forms of this condition that necessitate such drastic and innovative feeding methods are rare.

Dysplastic lesions may include those that lead to aberrant tissue growths such as congenital epulides, natal and neonatal teeth. Dysplastic lesions of bone may manifest much later in life and should be easy to recognize. Although rare, some bone dysplasias may manifest with endocrine disorders that could have generalized effects.

Management

Refer to higher level for appropriate management.

49.2.2 CYSTS AND BENIGN TUMOURS OF THE OROFACIAL REGION

Cysts may occur in the soft tissues or the facial bones. They are generally slow growing and painless. Eventually they cause swelling and disfigurement. In the bony cysts pain may manifest due to tissue tension and/or supervening infection.

Similarly, benign tumours of the orofacial region may originate from either the soft tissues or bone. Those originating from bone are much more common and often manifest late when function and disfigurement prevail. Among these neoplasms, ameloblastoma is the most important since it is the most common and particularly locally infiltrative. Early identification of this condition is extremely important because of the capacity of this tumour to infiltrate the surrounding tissues. The ossifying/cementifying fibroma is the next most important benign tumour that should be diagnosed early since it can also cause severe disfigurement.

Management

The odontogenic keratocyst has now been classified as a benign infiltrative tumour of the jawbones. A diagnostic incisional biopsy must, therefore, be performed to ascertain its existence before surgical extirpation is executed.

Refer to higher level for appropriate management.

49.2.3 MALIGNANT NEOPLASMS OF THE OROFACIAL REGION

Because of its prevalence, oral squamous cell carcinoma (OSCC) constitutes the most important malignant neoplasm of epithelial origin. The aetiological factors associated with this neoplasm include tobacco use and sustained alcohol consumption. Immunosuppressive conditions may precipitate the prevalence of OSCC. Malignant neoplasms whose cells of origin are mesenchymal in nature are broadly classified as sarcomas. As a group almost all these lesions have hardly any identified definite aetiological associations. Sadly, effective management of almost all the lesions remains most disheartening. Cells of the mononuclear-macrophage system (the reticulo-endothelial systems) may also give rise to malignant neoplasms manifesting in the orofacial region. Among these, lymphomas are common, with Burkitt's lymphoma being the most common type.

Management

Give appropriate analgesics for pain management.

Refer urgently to higher level for appropriate management.

49.3 Neuropathies of the Orofacial Region

48.3.1 PAROXYSMAL TRIGEMINAL NEURALGIA

This condition carries very high morbidity because of the severe pain associated with it – which can be intractable. This disease is common among middle-aged and elderly persons. Patients may report sequential symmetrical tooth extraction with no relief of pain. There is no known aetiological factor. The pain will be reported as severe and lancinating, lasting only a few seconds at particular sites (trigger zones) known to the patient. Often, sleep may not be disturbed at night. During the day there are usually multiple attacks of pain.

Management

Initiate analgesia – ibuprofen 400mg TDS and refer urgently to higher level cases of intractable pain.

48.3.2 FACIAL PALSY

Facial palsy may manifest as a result of a variety of factors, including trauma, deep-seated craniofacial neoplastic lesions and non-specific viral infections. More commonly, the idiopathic type of facial palsy (Bell's palsy) is seen. The history of the condition is often short and there may be no clear-cut associated aetiological events.

Management

A good history may delineate the type of facial palsy. Refer to higher level for appropriate management

48.3.3 HERPETIC INFECTIONS

The herpes group of viruses and especially Herpes zoster constitutes one of the most common causes of vesiculo-bullous lesions in the orofacial region. The lesions are usually of acute onset, manifesting with irritating pain. Where there is underlying immunosuppression due to HIV infection, fulminating Herpes zoster infection may cause extensive damage of the periodontium leading to spontaneous tooth exfoliation from the affected jaw segments.

Investigations

Investigate for HIV and carry out Mantoux and examine the sputum.

Management

- ◆ Diagnosis of the acute lesions is often made clinically as the crops of vesicles are typical.
- ◆ Do not touch these lesions without gloved hands.
- ◆ Clean if blisters are already punctured.
- ◆ Apply calamine lotion if vesicles are not punctured.
- ◆ Give analgesia – ibuprofen 400mgTDS.
- ◆ Refer to higher level for appropriate management.

49.4 Temperomandibular Joint (TMJ) Disorders

Temporomandibular joint pain and dysfunction remains enigmatic in terms of aetiology and pathogenesis. The condition maybe intertwined with stressful life events that are often difficult to elucidate clinically. The condition has become particularly common in persons in their 2nd decade of life and above. Generally, TMJ pain can be most variable in quality, may be non specific and without any clear-cut associated local events. However, it is often possible to correlate the manifestation of TMJ pain with painful conditions in other areas such as the spine, recurrent headaches and even abdominal cramps. No radiographic or other imaging modality may demonstrate a tangible biologic basis for the dysfunction and pain. Currently, consensus of professional opinion worldwide indicates that this group of conditions should be referred to as temporomandibular joint disorders (TMDS).

Management of TMDS

Give appropriate analgesics for pain management.

Refer to higher level for appropriate management.

Unmanaged stress and mental health problems can trigger temporomandibular joint disorders. Refer for counselling and further management.

49.5 Forensic Odontology

Forensic Odontology deals with the professional handling and examination of dental evidence, and expert interpretation and documentation of findings made in the interests of justice in cases of medico legal proceedings where the dentist is an expert witness. The aim is to examine and evaluate injuries to the dentition and assess bite marks, maintain and interpret dental records in dental jurisprudence cases such as malpractice or dental fraud, identify unknown persons, dead or alive.

49.5.1 IDENTIFICATION

The **primary** means of identification, using the comparative dental identification method (only possible with excellent dental record systems in place).

Management

Refer to higher level for appropriate management.

49.5.2 DETERMINATION OF AGE

These are based on tooth development and eruption, with better accuracy if root length and degree of mineralization are used.

Management

Refer to higher level for appropriate management.

49.5.3 DETERMINATION OF GENDER

Refer to higher level for appropriate management.

49.5.4 BITE MARK ANALYSIS

This is in regard to trauma caused by dentition whether on inanimate objects as evidence or bite marks on humans. Often they point to close combat situations and child abuse and sexual assault in relation to interpersonal violence.

Management

Refer to higher level for appropriate management.

49.6 Maxillofacial Injury

This injury can present with an apparently frightening clinical picture. Do not panic! Traumatic injuries to the facial structures may be classified as:

- ◆ Soft Tissue Injuries±tissue loss
- ◆ Hard Tissue Injuries±bone loss
- ◆ Combined soft and hard tissue injuries

Management

The management principles of maxillofacial injuries are:

- ◆ Advanced trauma life support (ATLS) principles (ABCDE)
- ◆ Restore Occlusion
- ◆ Restore function
- ◆ Restore Aesthetics
- ◆ A thorough history and examination is paramount to the management of maxillofacial injuries.
 - Patients with maxillofacial injury require immediate referral to higher levels for appropriate management.

49.6.1 ADVANCED TRAUMA LIFE SUPPORT

PRIMARY SURVEY

- ◆ Airway + cervical spine control: Note that maxillofacial injuries both soft tissue and hard tissue may compromise the airway.
- ◆ If the palate is collapsed on the roof of the mouth, scoop with your finger and try to elevate.
- ◆ If the tongue is pushed back in the direction of the pharynx, pull forward with forceps.
- ◆ Apply suture to hold in place if need be. Lay patient on the side.
- ◆ Apply local pressure or nasal packs soaked in liquid paraffin.
- ◆ Control Bleeding

Refer to higher level for appropriate management.

BREATHING

Refer to higher level for appropriate management urgently

CIRCULATION

- ◆ Monitor vitals such as blood pressure and pulse, which are pointers to impending or established shock.
- ◆ Administer fluids to maintain haemodynamic stability.
- ◆ Refer to higher level for appropriate management urgently.

DISABILITY

Check for consciousness and other neurological deficits (Glasgow Coma Scale GCS—and examination of all cranial nerves). Refer to Table 49.1.

Table 49.1: Glasgow Coma Scale

SerialNo.	Category	Specific function	Score
1 Eye opening (E)		Spontaneous	4
	To voice	3	
	To pain	2	
	Nil	1	
2 Best verbal response (V)		Oriented, converses	5
	Conversesbutconfused	4	
	Inappropriate words	3	
	Incomprehensible words	2	
	Nil	1	
3 Best motor response (M)		Obeys	5
	Localizes pain	4	
	Flexion withdrawal	3	
	Flexion abnormal	3	
	Extension	2	
	Nil	1	

RESUSCITATION

- ♦ Arrange transport with adequate resuscitation equipment if at level 4.
- ♦ Ensure communication with the receiving facility has been made.

49.6.2 SOFT TISSUE INJURIES

As above plus:

- ♦ Control bleeders
- ♦ Clean the wound appropriately

Refer to higher level for appropriate management urgently

49.6.3 HARD TISSUE INJURIES

These may be classified as:

- ♦ Dentoalveolar
- ♦ Mandibular fractures
- ♦ Midface fractures (Le Forte I, II and III)
- ♦ Panfacial fractures

The bones of the mid face tend to stick out and are thus prone to being injured. The nose, zygoma, and mandible are the most prone to injury, with maxillary bone injuries being relatively less common and more complicated.

49.6.4 DENTOALVEOLAR FRACTURES

This is more common in children but can occur in adults.

Give analgesics for pain management.

Refer to higher level for appropriate management.

49.6.5 MANDIBULAR FRACTURES

- ♦ These may involve any part of the mandible—the symphysis, parasymphysis, body, angle, ramus, condyle, and coronoid
- ♦ They may also be displaced or undisplaced, depending on the pull of the muscles attached to the mandible.

Management

Give analgesics for pain management

Refer to higher level for appropriate management

Indications

- ♦ Displaced unstable fracture segments;
- ♦ Associated midface fractures
- ♦ Give analgesics for pain management

Refer to higher level for appropriate management.

49.6.6 MIDFACE FRACTURES

Management

Give analgesics for pain management

Refer to higher level for appropriate management.

49.6.7 ZYGOMATIC COMPLEX FRACTURES

Management

Give analgesics for pain management.

Refer to higher level for appropriate management

49.6.8 ORBITAL FRACTURES

Management

Give analgesics for pain management.

Refer to higher level for appropriate management.

50. Ophthalmology

Eye diseases are ranked eighth among the top ten causes of morbidity in Kenya. Blindness prevalence is estimated at 0.7%. At the current population this translates to about 224,000 people being blind, with close to 672,000 suffering from low vision. Eighty percent of the causes of blindness are either curable or preventable through primary eye care (MOH document, 2004).

50.1 Ophthalmia Neonatorum (Conjunctivitis of the Newborn)

Clinical Features

There is bilateral copious pus discharge in the first month of life.

Management

- ◆ Apply prophylactic silver nitrate or povidine iodine.
- ◆ If signs develop of ophthalmia neonatorum refer to higher level to attend eye clinic immediately.
- ◆ Apply tetracycline eye ointment 8 hourly.
- ◆ Apply gentamycin eye drops both eyes 2 hourly **OR**
- ◆ Give IM gentamycin 5mg/kg single dose.
- ◆ Give tetracycline eye ointment to all newborns at birth.
- ◆ Refer to higher level if complications like corneal ulcer are observed.

50.2 Congenital Cataract

Opacification of the lens that may be progressive and not detectable at birth.

Clinical Features

There is loss or irregular red reflex. Check CNS and ears for other possible associated anomalies.

Management

Refer to specialized centres for childhood eye diseases.

50.3 Senile Cataract

It is estimated that 43% of blindness in Kenya is due to cataract. The senile form is a slow lens thickening secondary to degeneration, and the condition is highly amenable to correction.

Clinical Features

There is slowly progressive painless visual loss or blurring affecting one or both eyes with increasing glare, showing a white pupil.

Management

Refer to higher level for appropriate management.

50.4 Childhood Blindness

Approximately 10,000 cases of blindness occur during childhood, with causes including congenital cataract, corneal diseases, measles disease, congenital glaucoma, and retinoblastoma.

Clinical Features

The features depend on underlying condition but may include:

- ◆ Poor vision (older child)
- ◆ Squint (lazy eye)
- ◆ White pupil
- ◆ Growth in the eye
- ◆ Protruding eye ball

Management

Refer to higher level for appropriate management.

50.5 Retinoblastoma

This condition usually occurs among under-5's and is diagnosed on average at about 24 months of age. It may present as a unilateral or bilateral lesion.

Retinoblastoma is associated with increased risk of developing pineal tumour. Up to 40% of this condition is hereditary.

Clinical Features

- ◆ Leukocoria – white pupillary reflex
- ◆ Crossed eye or strabismus
- ◆ Red painful eye
- ◆ Poor vision

Management

Refer to higher level for appropriate management.

50.6 Common Blinding Conditions

When evaluating these conditions follow the guidelines below.

- ◆ Always check the vision for all patients using the Snellen's chart.
- ◆ Take good eye history.
- ◆ Do eye examination using a torch.

Caution:

- Never use steroid containing medicines on the eye without a prescription from an eye specialist.
- Never put any medicines on any eye that may have been perforated.
- Never use atropine drops or ointment without a prescription from an eye specialist.
- Never use traditional eye medicines in the eye.

50.7 Trachoma

Trachoma is the leading cause of preventable blindness in Kenya, accounting for 19% of blindness.

Clinical Features

There is mucopurulent discharge associated with conjunctiva corneal scarring, and inward turning of eyelids and lashes, causing pain, ulceration, and corneal scarring. There is loss of vision.

Management

- ◆ Tetracycline eye ointment 3 times daily for 6 weeks **OR**
- ◆ Tabs azithromycin 1g annually for 3 years as mass treatment. Promote regular face washing.
- ◆ Improve environmental sanitation and disseminate health education.
- ◆ Refer for surgical correction of entropion/trichiasis to higher level for appropriate management unless the capacity to provide management is at the facility. (Some health centres may have clinical officers trained in eye care who will be able to manage this condition.)

50.8 Glaucoma

Glaucoma is associated with approximately 25,000 blind cases in Kenya annually.

Clinical Features

There is unexplained gradual decrease in central or peripheral vision.

Management

Refer to higher level for appropriate management.

50.9 Refractive Errors

Clinical Features

These include the following:

- ◆ Decreased vision
- ◆ Frontal headaches
- ◆ Squinting
- ◆ Inappropriate viewing distance
- ◆ Eye strain

Management

Refer to higher level for appropriate management.

50.10 Vitamin A Deficiency

Clinical Features

These include the following;

- ◆ Dry eye
- ◆ Foreign body sensation
- ◆ Eye pain
- ◆ Night blindness
- ◆ Severe loss of vision
- ◆ In most cases features are of gradual onset
- ◆ Complications include:
 - Corneal ulcers
 - Night blindness

Management

Administer vitamin A treatment and supplementation. In case of complications, refer to higher level for appropriate management.

50.11 Herpes Zoster Ophthalmicus (HZO)

Clinical Features

The following features occur:

- ◆ Acute vesicular skin rash which follows the 5th cranial nerve dermatome
- ◆ Blurred vision
- ◆ Eye pain
- ◆ Red eye
- ◆ Fever
- ◆ Malaise

Management

Give ibuprofen 400mg TDS and then refer to higher level for appropriate management.

50.12 Chalazion

This is inflammation of the meibomian glands of the eyelid that typically forms a granulomatous inflammatory mass.

Clinical Features

The affected patient complains of eye discomfort. Typically there is a hard and painless eye lid swelling away from the lid margin.

Management

Refer to higher level for appropriate management

50.13 Painful Red Eye

A condition that should not be underestimated, this often signifies some underlying inflammatory process. A good history and physical examination may aid in identifying the primary cause. It is important to rule out emergency ophthalmic conditions, which if found should be referred immediately.

Management

Give ibuprofen 400mg TDS and refer to higher level for appropriate management, especially if there is visual loss or significant trauma.

50.14 Unexplained Vision Loss

This frightening condition can have many causes, some of which are associated with poor prognosis. Obvious causes like space occupying lesions, metabolic disorders, blood disorders, and HIV/AIDS should be looked for.

Management

Refer to higher level for appropriate management, especially through the eye clinic.

50.15 Allergic Conjunctivitis

This is an immune mediated conjunctivitis that may present seasonally or without a specific pattern.

Clinical Features

- ◆ Itching, which may be bilateral
- ◆ Watery discharge
- ◆ Redness
- ◆ Photophobia

Management

Management of this condition includes the following:

- ◆ Application of cold compress
- ◆ Application of zinc sulphate eyedrops
- ◆ Application of prednisolone eyedrops
- ◆ Refer to higher level for appropriate management

50.16 Viral and Purulent Conjunctivitis

Clinical Features

- ◆ Watery eye or pus in the eye
- ◆ Redness of the eye.

Management

Management of this condition includes the following.

- ◆ Application of tetracycline eye ointment 1% 8 hourly for 7 days **OR**
- ◆ Application of gentamycin eye drops 6 hourly for 7days.
- ◆ Prevention of this condition is by good eye hygiene.
- ◆ If no improvement, refer to higher level for appropriate management.

50.17 Asthenopia (Eye Strain)

Clinical Features

There is normal vision, but pain when reading or doing other close work like sewing.

Management

- ◆ Reassure patient.
- ◆ Refer to higher level for appropriate management if pain persists.

50.18 Corneal Ulcers

These are relatively common. They involve the loss of epithelium and usually heal spontaneously. Some form of trauma is associated with these ulcers in most cases.

Clinical Features

- ◆ Red eye
- ◆ Photophobia (inability to tolerate bright light)
- ◆ Sensation of foreign body in eye
- ◆ Tearing
- ◆ Pain

Management

- ◆ Give tetracycline eye ointment 1% three times daily, then refer to eye clinic immediately.
- ◆ **OR** give gentamicin eye drops 2 hourly as alternative.

- ◆ Refer to higher level for appropriate management if complications develop.

50.19 Styte

This is an infection of the follicles or tarsal glands that is localized to the eyelids.

Clinical Features

There is an acute painful swelling localized on the lid margin that may cause swelling of the entire eyelid. On examination, ensure the underside of the eyelid is examined.

Management

- ◆ Warm water compresses.
- ◆ Tetracycline eye ointment 1% 8 hourly for 1 week.
- ◆ If no improvement within a week refer to eye clinic, level 4 and above.
- ◆ At specialized centres – surgical drainage.

50.20 Eye Trauma

The eye is a delicate external organ and it is easy for it to be injured. Eye injuries are generally classified as penetrating and non-penetrating and include corneal and conjunctiva foreign bodies and abrasions, burns (dry heat and chemical burns), blunt trauma (contusion), penetrating injuries to the eye ball (perforations), injuries to eyelids, orbital injuries, and cranial nerve injuries.

A good evaluation of the eye injury includes the following:

- ◆ Check vision of all such patients.
- ◆ Ensure good lighting and use a magnifying lens, as these make eye examination easier.
- ◆ Ensure that the eye examination to be carried out is thorough; note that a small entry wound does not always equate to minimal injury.

Management

Management depends on the type of injury.

- ◆ **Corneal and conjunctival abrasions:** Pad the eye with tetracycline eye ointment 1% for 24 hours. If not sure refer immediately to higher level for appropriate management.
- ◆ **Foreign bodies:** Refer to higher level for appropriate management.
- ◆ **Blunt trauma:** Do the following:
 - Give ibuprofen 400mgTDS.
 - Rest the eye.
 - Note that there may be a ruptured eyeball.
 - Refer to higher level for appropriate management.

- ◆ **Chemicalburn:** Irrigate the eye with plenty of water or normal saline urgently for 30 minutes. *Washing the face is not enough.* Pad with tetracycline eye ointment. Refer immediately to higher level for appropriate management.
- ◆ **Penetrating eye injuries:** Give systemic antibiotics and analgesics, give an injection of tetanus toxoid (IM) STAT. Do not apply any topical medications to the eye. Protect the eye with a clean pad or shield. Refer without delay to a level 5 and above with a resident eye specialist. Communicate directly with specialist prior to transfer.
- ◆ **Lid injuries:** Dress wound and give tetanus toxoid. Refer immediately to facility preferably with an eye specialist. Inform specialist of arrival of the patient.

NOTE. Referral patients with injuries involving the lid margin.

- ◆ **Orbital injuries:** Refer to higher level for appropriate management.
- ◆ **Cranial nerve injuries:** These commonly occur with head injuries and need specialized treatment. Refer to higher level for appropriate management.

51. ORTHOPAEDICS

51.1 Fractures

Definition – Discontinuity of bone.

Classification

- ◆ Closed
- ◆ Open (compound)

Most fractures are secondary to trauma, although pathological fractures that are secondary to tumours, infections, osteoporosis, and congenital deformities also occur. Fractured bone segments may communicate with wound while the skin over it is intact (closed fractures) or with the skin broken and therefore exposed to the outside (open or compound). Compound fractures are always contaminated.

51.1.1 CLOSED FRACTURES

The bone fragments do not communicate through the skin.

Clinical Features

- ◆ Pain
- ◆ Swelling
- ◆ Loss of function
- ◆ Abnormal movements/deformity/crepitus
- ◆ Signs of blood loss and neurovascular complications e.g. pulselessness, cold extremity and bleeding. Always look for compartment syndromes.

Investigations

- ◆ Full blood count
- ◆ Group and cross match blood for fractures of major bones
- ◆ AP and lateral radiographs of the affected bones. Some fractures may need special views, e.g., hip fractures.

Note: For skull fractures a CT scan head is indicated to rule out intracranial injuries.

Management

- ◆ Give appropriate analgesic.
- ◆ Splint fracture; this prevents soft tissue damage and also reduces pain. Familiarize yourself with the Thomas splint and how to apply it appropriately.
- ◆ Immobilize with Plaster of Paris (POP) traction, or splints, e.g., Thomas or Braun splint. Refer to table 51.1 for the period of immobilization in plaster.
- ◆ Refer to higher level of care for further management if complicated.

Note: Must check the peripheral circulation and innervation within 24 hours of plaster application.

- ◆ Check radiograph before removing POP.

Table 51. 1: Period of immobilization in plaster

	Adults	Children
Upper limbs	6–8 weeks	3–4 weeks
Lower limbs		
Femur only for children below 6 years		6 weeks
Tibia	8–12 weeks	4–5 weeks

For all fractures it is essential to check for neurovascular complications pre and post cast application. If present, immediately split the plaster or decompress the affected compartment.

Hazards of POP consist of the following:

- ◆ Compartment syndrome
- ◆ Gangrene and even loss of limb
- ◆ Stiffness of joint
- ◆ Contractures
- ◆ Skin reactions
- ◆ When POP harbours insects

51.1.2 OPEN/COMPOUND FRACTURE

The treatment is as for closed fractures except that these are contaminated and referral to a higher level of care for further management should be initiated.

51.2 Joint and Tendon Injuries

These injuries are usually due to sports injuries, road accidents, assault and occupational hazards. They may be classified as:

- ◆ Dislocations
- ◆ Fracture dislocations
- ◆ Haemarthrosis, which may occur as a complication of any of the above injuries or may occur spontaneously as in haemophilia.
- ◆ Ligamentous injuries may occur following twisting, traction or bending forces.

Usual sites of joint and tendon injuries include:

- ◆ **The knee:** Commonly affected are the medial and lateral, collateral, and cruciate ligaments, occasionally the menisci.
- ◆ **The ankle joint:** This is a major weightbearing joint and its stability depends on the surrounding ligaments. Proper diagnosis and accurate reduction is important if congruity of the joint is to be maintained.
- ◆ **The elbow:** Dislocations here occur in the posterior direction resulting from a fall on an outstretched hand. Spasm of the triceps muscle then locks the elbow in the dislocated position.

Clinical Features

In general joint injuries present with the following:

- ◆ Pain
- ◆ Swelling
- ◆ Loss of function
- ◆ Deformity
- ◆ Crepitus (if there is an associated fracture)
- ◆ Neurovascular complications

Management

Treatment of dislocation should be urgent because of possible damage to neurovascular structures.

- ◆ Analgesics and anti-inflammatory: relieve pain and inflammation.
- ◆ Splint of the dislocation/fracture.
- ◆ Urgently reduce and immobilize.
- ◆ Check radiograph if not adequately reduced repeat the procedure or perform an open reduction.
- ◆ Reduce dislocation under anaesthesia if need be.
- ◆ Stabilize reduced joint.
- ◆ Initiate physiotherapy and occupational therapy.
- ◆ Immobilize for 2 to 3 weeks.
- ◆ Refer to higher level of care for further management.

51.3 Club Foot

◆ Description

- Heel inverted
 - Forefoot and mid foot inverted and adducted (Varus)
 - Ankle in equinus (the foot is planter flexed with toes at a lower level than heel)
- ◆ Incidence: Club foot is one of more common congenital deformities of the foot.
- ◆ It is bilateral in 50% of cases, and hereditary plays a role:
- Monozygotic twins: 32.5%
 - Dizygotic twins: 2.9%
 - There is rapid decrease in incidence from first to second to third degree relatives (2.9% of siblings, 0.6% of aunts and uncles, and 0.2% of cousins).
 - It is thought that intra-uterine mechanical factors may also play a role.

Management

- ◆ Early serial splinting is important. An above the knee cast is applied with the knee in 90° of flexion. Cast is changed once to twice weekly.
- ◆ Ponseti technique of casting has a greater chance of succeeding in foot correction.

- ◆ Where available, a foot abduction splint is used for several weeks after achieving foot correction.
- ◆ Complications
 - Pressure sores due to tight casts
 - Rocker bottom deformity of the foot
 - Failure to achieve correction
 - Where conservative treatment fails

Ponsetti technique – (Physiotherapist/Orthopaedic technologist)

51.4 Acute Osteomyelitis

This is caused by haematogenous spread of bacteria from a primary source, which may or may not be obvious. The commonest causative agent is *Staphylococcus aureus*. Other organisms that may be responsible include *Streptococcus pyogenes*, *Pneumococcus pneumoniae*, *Staphylococci albus*, and sometimes *Salmonella typhi* in sickle cell disease.

Clinical Features

- ◆ Pain is the major presenting symptom. The severity increases with time. There is accompanying fever, and the patient becomes toxic.
 - ◆ Localized tenderness, loss of function of the limb, and swelling. Commonly involved bones are proximal tibia, distal femur, and distal humerus.
- Note:** The clinician needs to have a high index of suspicion for this condition, especially in children following a minor fall.

Investigations

- ◆ Haemogram: A leucocytosis will be demonstrated
- ◆ Radiograph of affected limb may not show any changes in the early stages: periosteal elevation is a late feature (2-3 weeks).

Management

- ◆ Analgesia to relieve pain
- ◆ Elevate and rest the limb.
- ◆ Administer appropriate parenteral antibiotic therapy for 3 weeks
 - Flucloxacillin: 50-100 mg/kg per day IV 6 hourly **OR**
 - For MRSA (methicillin resistant Staph aureus): Parenteral vancomycin 12 hourly.
- ◆ If there is any indication that the situation is not changing or is deteriorating within about 24 to 48 hours refer for surgical intervention.
- ◆ Address issues related to primary cause if possible.

51.5 Chronic Osteomyelitis

This follows inadequate management of acute osteomyelitis, infected compound fractures, spread from infected tissue including prosthesis and bone surgery.

Clinical Features

Infection may remain quiescent, with acute or subacute exacerbations that manifest as discharging sinuses.

Investigations

As for acute osteomyelitis

Management

- ◆ Antibiotic therapy, as per culture/sensitivity results for a minimum period of 6 weeks.
- ◆ Refer for surgical treatment as indicated.

51.6 Septic Arthritis

This is an acute infection of the joint space.

Aetiology

- ◆ Haemogenous spread from a primary focus elsewhere in the body.
- ◆ Direct penetrating injuries into the joint.
- ◆ Extension of infection from a compound fracture of the neighbouring bone.
- ◆ The commonest causative organisms are *Staphylococcus aureus*, *Streptococcus pyogenes*, *Haemophilus influenzae*, and to a lesser extent *Salmonella typhimurium* or *typhi*.
- ◆ Large joints such as shoulder, knee, ankle, and hip are more often affected.
- ◆ Septic arthritis is most common in children under 3 years of age

Clinical Features

- ◆ Fever, chills and irritability.
- ◆ Swollen, warm, very tender joint(s).
- ◆ Pseudoparalysis of the joint.
- ◆ Multiple joints may be affected.

Investigations

- ◆ Full haemogram – anaemia and leucocytosis present.
- ◆ Radiograph of the affected joint shows increased joint space, synovial thickening, and later rarefaction of the adjacent bone surfaces.
- ◆ Pus for culture and sensitivity.

Management

- ◆ Admit the patient
- ◆ Start on broad spectrum antibiotics
- ◆ Give appropriate analgesics

- ◆ Splint the joint and initiate physiotherapy
- ◆ Aspirate the joint and send specimens for culture and sensitivity. If there is frank pus then refer for urgent arthroscopy
- ◆ Review daily until discharge
- ◆ Review monthly after discharge
- ◆ Rehabilitate as necessary
- ◆ Give ibuprofen 400mg TDS

Note:

- ◆ Watch for features of a worsening condition, which include the following:

- The fever persists for more than 7 days of full treatment.
- The joint swelling does not subside within 3 weeks.
- New joints get involved while on treatment.
- As much as possible, refer the patient to an appropriate facility before the following complications have developed, or refer immediately if they present with any of these complications:
 - The affected joint starts to discharge pus spontaneously.
 - Shortening of the limb occurs.
 - There is persistent deformity of the joint.
 - There is loss of function related to the infection.

Refer to higher level for appropriate management.

51.7 Osteogenic sarcoma

This is a highly malignant bone tumour of late childhood and early adulthood. Commonly involves long bones, i.e., distal femur and proximal humerus. Tumour presents with pain, noticeable swelling, tenderness, or pathological fractures.

Refer to higher level for appropriate management.

Investigations**X-ray affected limb:**

- ◆ Radiological findings show periosteal elevation with new bone formation (Codmann's triangle), sunray appearance; chest radiograph may show metastatic lesions.
- ◆ Ct scan chest in metastatic disease.

Management

Refer for multidisciplinary team approach

51.8 Lower Back Pain

Aetiological Factors

- ◆ Trauma
- ◆ Inflammatory: Rheumatoid arthritis, ankylosing spondylitis etc.
- ◆ Degenerative: Spondylosis (degenerative disease), prolapsed intervertebral disc, spondylolisthesis
- ◆ Neoplastic: Usually secondary tumours
- ◆ Infection: Pyogenic, non-pyogenic (tuberculosis – Pott's disease)
- ◆ Spinal stenosis: Congenital, degenerative
- ◆ Others: Kyphoscoliosis

Clinical Features

- ◆ Pain
 - Sharp and localized, chronic and diffuse
 - Referred pain (sciatica): Pain radiates into the lower limb, may be aggravated by coughing, straining etc.
 - Stiffness
 - Deformity, e.g., TB spine
- ◆ Numbness or paraesthesia in the lower limb
- ◆ Urinary retention or incontinence (can be due to pressure on cauda equina)
- ◆ There may be history of trauma, heavy lifting, neoplasm, connective tissue disorder like rheumatoid arthritis.
- ◆ Physical findings at presentation are demonstrable by:
 - Inspection
 - Skin – may show scars, pigmentation, abnormal hair.
 - Shape and posture maybe abnormal and suggestive.
 - Palpation
 - Feeling for tenderness is likely to elicit it.
 - Motion – May be impaired.
 - Sensation – May be diminished if nerves are involved.
 - Reflexes – May be diminished if nerves are involved.
 - Straight leg raising test - Discloses lumbosacral root tension.
 - Examining the other systems.

Investigations

- ◆ Plain radiographs: Anteroposterior, lateral, and oblique views of spine may show:
 - Osteophytes and disc degeneration in spondylosis
 - Loss of lumbar lordosis, which signifies muscle spasm due to pain

- Anterior shifts of an upper segment on a lower segment which indicates spondylolisthesis.
 - Bone destruction with sparing of intervertebral discs is noted in tumours
 - Sclerotic metastases are seen in cancer of the prostate
 - Bone destruction in infective conditions e.g. TB. There may be a gibbus (sharp angulation) deformity.
 - Fracture in traumatic cases.
- ◆ Other investigations include:
- Those based on the likely working diagnosis, e.g., abdominal ultrasound in suspected tumours.
 - Erythrocyte sedimentation rate (ESR) in suspected tumour, TB, connective tissue disease.

Management

Most cases of disc prolapse will improve on conservative management.

- ◆ Give analgesics to control pain.
- ◆ In suspected tuberculosis, diagnostic test are readily available to confirm a diagnosis.
 Treat with anti-tuberculosis drugs. Refer to the Kenya TB regimen)
- ◆ Initiate physiotherapy for spondylosis.
- ◆ Spondylolisthesis give complete bed rest for 2 weeks and physiotherapy.
- ◆ Stable fractures will heal conservatively on bed rest (orthopaedic bed). A hard lumbosacral corset may be fitted after 6–8 weeks and used for a further 4–6 weeks or until the pain is bearable.
- ◆ For unstable fractures for decompression and stabilization.
- ◆ In suspected tumours involve multidisciplinary team approach.

52. Ear, Nose, and Throat Conditions

52.1 Epistaxis

Bleeding through the nose, resulting from nose picking, trauma (fall in games, assault, etc.,), nasal and paranasal neoplasms, nasal infection, systemic derangements, e.g., acute fevers, hypertension, renal disease with uraemia, abnormalities of blood clotting, and foreign bodies in the nose.

Management

- ◆ Immediate: Sit the patient up (to avoid aspiration).
- ◆ Pinch the nose for 10–20 minutes. This is usually sufficient to stop bleeding.
- ◆ Apply ice or cold packs on the bridge of the nose.
 - To pack the nose, remove clots with a suction catheter. Apply xylocaine nasal spray, then pack (preferably using Tiley's forceps) with ribbon gauze or narrow strip of gauze impregnated with liquid paraffin. Start packing from the floor of the nose towards the roof. The pack should fit lightly to be effective. Do not use adrenaline.
 - A paraffin pack should be removed within 24–48 hours. Bismuth iodoform paraffin paste (BIPP) or zinc iodoform paraffin paste (ZIPP) packs can be left in situ for up to 48 hours.
 - A patient with a nasal pack should be put on:
 - Broad spectrum antimicrobial e.g. cotrimoxazole or amoxicillin for seven days
 - Analgesic, e.g., paracetamol 500mg 8 hourly for 5 days (children 40mg/kg/day QDS)
- ◆ Attend to primary cause.
- ◆ Consider referral if the following are observed:
 - Bleeding is uncontrolled with packs.
 - Bleeding is from the postnasal space or posterior nose.

52.2 Foreign Bodies in the Ears

The types of foreign bodies include metallic pieces (hair clips, smooth pellets, needle, etc.), wooden items (e.g., match sticks, vegetable matter like seeds and insects).

Clinical Features

Obvious history of foreign body insertion into the ear, conductive deafness, pain or discomfort in ear. Discharging ear, disturbing noise (insects), and bleeding (traumatic insertion especially by a child).

~ **Danger signs: Foreign bodies in the ear with bleeding from the ear and external evidence of trauma suggest foreign body entry into the middle ear.**

Management

Most foreign bodies can be removed fairly easily with crocodile forceps, a hook, an ear probe or by suction and gentle syringing with warm, clean water. Rounded objects may if pushed further into the ear rupture the eardrum. Also refer complications such as perforation of eardrum or a suspected foreign body in the middle ear.

~ If you lack the instruments for extraction of foreign bodies, please refer.

52.3 Foreign Bodies in the Nose

Covered in Paediatrics, Section 27.6.2.

52.4 Foreign Bodies in the Oesophagus

The commonest objects are fish bones or meat in adults. All other forms of foreign bodies can be found in psychiatric patients. The commonest objects encountered in children are coins.

Clinical Features

There is pain in retrosternal area and/or in the back, dysphagia, pooling of saliva in the mouth or regurgitation of food. The affected patient may present with dyspnoea and hoarseness if there is laryngeal oedema from compression by the foreign body and localized tenderness in the lower part of the neck. As a number of children are not able to communicate their problem, child may present later with complaints relating to the presence of a foreign body.

Management

Refer to higher level for appropriate management.

52.5 Wax in the Ears

If soft, remove by syringing with clean, warm water. If hard but not blocking the eardrum, remove with a hook or by gentle syringing with clean water. If hard and blocking the ear canal, soften over few days with water and liquid paraffin and then syringe.

Advise patients to leave wax to migrate out of the ear on its own instead of attempting to remove it with ear buds, as this encourages impaction.

Referral to higher facilities usually not needed unless keratosis is suspected.

52.6 Hearing Impairment

In the paediatric age group, pay special attention to young children. A high index of suspicion and proper history are important, especially among children born prematurely, those born with lowbirth-weight, those born after difficult delivery, those who develop yellowness of eye (neonatal jaundice) or whose mothers had febrile

illness during pregnancy, and those treated for meningitis. Do not ignore parents' complaint of a child not hearing or a child who is slow to develop speech. Use changing voice intensity to assess grossly the state of hearing. If suspect hearing loss, refer at whatever age to higher level for appropriate management. A child who does not hear can be helped at any age but the earlier the better.

Refer to an institution specializing in dealing with hearing impairment with facilities for audiometry, tympanometry, and rehabilitation.

52.7 Mastoiditis

This is infection of the mastoid air cells and mastoid bone occurring as a complication of acute otitis media or chronic suppurative otitis media.

Clinical Features

This is a painful swelling above the ear in children under 2 years of age. There is tenderness, oedema and possible flatulence behind the ear in other children often with preceding otitis media and mastoid tenderness. There is fever and sagging of the posterosuperior meatal wall.

Management

Give antibiotics as for otitis media.

Refer if:

- ◆ The swelling points and/or bursts to discharge pus. If an abscess develops refer to level 4 and above. Do not carry out an incision and drainage at level 2 and 3 as this condition requires a formal mastoidectomy to adequately clear all the pus and infected material. Inadequate incision and drainage will result in a chronic sinus.
- ◆ The child develops a squint in the eye or facial palsy on the same side as the mastoiditis. The child develops signs of meningitis or brain abscess.

52.8 Laryngeal Trauma

These can be blunt or penetrating injuries. The priority is to secure and maintain an airway, then refer urgently to an ENT specialist for endoscopy and repair.

52.9 Allergic Rhinitis

Immunoglobulin IgE-mediated rhinitis is characterized by seasonal or perennial sneezing, nasal congestion, pruritis, and often conjunctivitis and pharyngitis. Symptoms vary in severity from day today or hour to hour.

Management

- ◆ Avoid the allergen (precipitating factor).

- ◆ Give antihistamines: chlorphenamine 4mg 6 hourly adults and 0.35mg/kg in children in 4 divided doses
- ◆ Give sodium cromoglycate nasal spray 4 hourly as a prophylaxis.
- ◆ Topical steroids are safe and effective.

Refer to higher level for appropriate management.

52.10 Parotid Mass

These may be true parotid swellings (e.g., parotitis, parotid abscess, cysts, dialepticism, tumours, etc.), or pseudoparotomegaly due to swellings in nearby structure, (e.g., hypertrophy of the masseter, jaw swellings, parapharyngeal masses, lymph enlargement, facial nerve tumours, etc.). Parotid swellings may also occur in other systemic conditions(e.g., malnutrition, diabetes mellitus, HIV/ AIDS, Sjogren's syndrome). Infective masses may be associated with other features of infection like fever and pain and there is local inflammation or discharge from the opening of the parotid duct. Most parotid swellings are painless unless infected or malignant. Presence of facial nerve palsy is highly suggestive of a malignant process.

Management

Refer to higher level for appropriate management.

52.11 Acute Otitis Media

This is covered in Paediatrics, Section 27.1.

52.12 Chronic Suppurative Otitis Media (CSOM)

There are 2 types of CSOM: Tubo-tympanic and Attico-antral.

52.12.1 TUBO-TYMPANIC TYPE

There is discharge of pus from one ear or both ears for more than 2 weeks following untreated or unresolved acute otitis media with a central perforation. There is recurrent ear discharge usually after upper respiratory tract infection. Secondary infection may be present with Gram-negative organisms, yeast, and fungi.

Clinical Features

A purulent discharge from the ear for more than 2 weeks, usually not foul smelling. There is impaired hearing with a central perforation in the ear drum.

Treatment

- ◆ Do not syringe such ears.
- ◆ Refer to higher level for appropriate management.

52.12.2 ATTICOANTRAL

Clinical Features

There is foul smelling discharge and hearing impairment with attic or marginal perforation with cholesteatoma.

Treatment

Do not syringe such ears.

52.13 Ear Nose and Throat Manifestations of HIV/AIDS

In general, 40% of AIDS patients present with otolaryngological symptoms. These include:

- ◆ Infections: These can be viral, bacterial, or fungal, e.g., rhinitis, sinusitis, pharyngitis, glossitis, tonsillitis, laryngitis, parotitis, deep neck space cellulitis and abscesses, otitis externa, otitis media, and labyrinthitis.
- ◆ Tumours: There is an increase in head and neck cancers associated with HIV/ AIDS, especially Kaposi's sarcoma, lymphomas, squamous cell carcinoma, and salivary gland tumours.
- ◆ Other features: Adenoid hypertrophy, oropharyngeal and oral ulcers, atrophic rhinitis, lymphadenopathy, parotid cysts, otitis media with effusion, vertigo, deafness, tinnitus, and cranial nerve palsies.

Management

Is directed at the presenting lesion.

52.14 Nasopharangeal Carcinoma

Clinical Features

Commonly presents first as neck mass. As a general rule, any mass in the angle of the mandible can be assumed to be nasopharangeal carcinoma until proved otherwise. Other non-specific symptoms may include congestion, rhinorrhea, epistaxis, or ear pain, to mention a few.

Management

Refer to higher level for appropriate management.

52.15 Carcinoma of the Larynx

Clinical Features

- ◆ Unremitting hoarseness for more than four weeks
- ◆ Dyspnoea
- ◆ Cough
- ◆ Haemoptysis
- ◆ Stridor
- ◆ Neckmass

Management

Refer to higher level for appropriate management.

PART IV: Obstetrics and Gynaecology and Related Disciplines

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53. Gynaecology

53.1 Abortion

This section mainly involves the cohorts of pregnant women and the newborn, adult women of reproductive age (WRA), postmenopausal women, and sometimes infants and children in relation to sexual assault. Issues covered include abortion/miscarriage, pelvic masses, menstrual disorders, carcinomas, and sexual assault.

53.2 Abortion (Miscarriage)

The old working clinical definition of abortion denotes termination of pregnancy before the 28th week of gestation. With advancement in modern neonatology, the technical definition denotes termination of pregnancy when the foetus weighs less than 500g. There are many types of abortion; these are summarized in Table 53.1 and described in more detail below.

53.2.1 THERAPEUTIC ABORTION

Where the health of the mother and /or foetus is at risk, therapeutic abortion may be performed if recommended by two senior and experienced doctors as per the Penal Code section 240 and the Medical Practitioners and Dentists Board Code of Ethics and Professional Conduct 2003.

~ When termination of pregnancy is done outside of the provisions stated above, the punishment under the law is provided by sections 158, 159, and 160 of the penal code. (See Box 53.1).

53.2.2 UNSAFE ABORTION

WHO defines unsafe abortion as a procedure for terminating an unwanted pregnancy either by persons lacking the necessary skills or in an environment lacking the minimal medical standards or both. Illegally induced unsafe abortion by mainly unqualified people is associated with incompleteness, sepsis, genital and visceral injuries, and death. Investigations and management is as for septic abortion. Repair of genital and visceral injuries is mandatory. Refer to Table 53.2 for management and staffing recommendations.

53.2.3 THREATENED ABORTION

Clinical Features

These are summarized in Table 53.1.

Investigations

- ◆ Haemogram
- ◆ Blood slide for malaria parasites in malaria endemic areas
- ◆ Urinalysis and microscopy.
- ◆ Refer for ultrasound examination to exclude "Blighted Ovum" or hydatidiform mole and reassure if normal intrauterine pregnancy is seen

Table 53.1: Diagnosis and management of various types and stages of abortion

Types of abortion	Diagnosis	Management
Threatened abortion	Mild abdominal pain and mild PV bleeding Cervix closed	Bed rest Mild sedation Follow up Treat any underlying cause
Inevitable abortion	Abdominal pains PV Bleeding Cervix open All POCs still in uterus	- Expedite expulsion by oxytocin 20IU in 500ml normal saline drip over 4 hours or Misoprostol 600mcg per vaginam if greater than 14 weeks (include on EML) - Evacuate if less or some POCs are retained after expulsion.
Incomplete abortion	Abdominal pains PV bleeding Cervix open Some POCs retained	- Evacuate uterus by MVA under paracervical block (2.5ml of 1% Lignocaine Hcl Inj at 2, 4, 8, and 10 o'clock positions). Ensure it is not intravascular. OR misoprostol 600mcg orally Antibiotics: Doxycycline 100mg BD and metronidazole 400mg TDS for 7 days. Analgesia: Ibuprofen 400mg TDS for 5 days.
Complete abortion	Little or no bleeding or pain Uterus contracted Cervix closed	Observe Reassure Discharge
Missed abortion	History of amenorrhoea Symptoms of pregnancy regress, uterine size smaller than dates Mild PV bleeding	Induce if more than 12 weeks Evacuate if less than 12 weeks (Ultrasound scan if available) OR Misoprostol 800mcg orally for less than 12 weeks
Molar abortion	Presents as threatened or incomplete, uterine size larger, grape like vesicles Ultrasound if available	Evacuate or induce as in missed abortion. X-match and drip for evacuation as excess bleeding is a risk. Strict follow up for possible choriocarcinoma. Manage as per details in Section 54.1.12.
Septic abortion	Any of the above with symptoms and signs of infection	Parenteral broad spectrum antibiotics Evacuate with MVA in severe cases without delay Or in mild cases misoprostol 600mcg orally. Manage as per details in Section 54.1.7.
Habitual abortion	Three or more consecutive spontaneous abortions	Treat emergency. Management depends on the underlying cause, refer to Section 54.1.9.
Therapeutic abortion	Life threatening conditions in woman/foetus, compliance with law and MPDB guideline	Manage as per details in Section 54.1.10.

Table 53.2: Recommended emergency abortion care activities by level of health care facility and staff

Level	Staff may include	Abortion care provided
First referral (Level 4: County, sub-county, mission hospital, nursing home)	Nurses, trained midwives, general practitioners, specialists with training in obstetrics and gynaecology	All activities as in Table 54.1 plus: Emergency uterine evacuation through the second trimester treatment of most abortion complications, blood cross match and transfusion; local and general anaesthesia; counselling; laparotomy and indicated surgery are available
Diagnosis & referral for severe complications, e.g., septicaemia, peritonitis, renal failure		
Secondary & tertiary referral (Levels 5 & 6)	Nurses, trained midwives, general practitioners, obstetrics and gynaecology specialists.	All activities above plus: Uterine evacuation as indicated for all emergency abortion treatment of severe complications (including bowel injury, tetanus, renal failure, gas gangrene, severe sepsis); treatment of coagulopathy and counselling

Source: Adapted from *Clinical Management of Abortion Complications: A Practical Guide* (WHO, 1994).

Box 53. 2: Abortion and the Law

Box 53. 3: Abortion and the Law

skill a surgical operation upon any person for his benefit, or upon an unborn child for the preservation of the mother's life, if the performance of the operation is reasonable, having regard to the patient's state at the time and to all the circumstances of the case".

Medical Practitioners and Dentists Board Code of Ethics and Professional Conduct 2003

"The Laws of Kenya do not allow for termination of pregnancy 'on demand' and severe penalties are meted out to those found guilty of procuring or attempting to procure an abortion or miscarriage. There is room, however, for carrying out termination when in the opinion of the attending doctors it is necessary in the interest of the health of the mother or baby. In these circumstances, it is strongly advised that the practitioner consults with at least two senior and experienced colleagues, obtains their opinion in writing, and performs the operation openly in hospital if he considers himself competent to do so in the absence of a gynaecologist. In all cases of illegal termination of pregnancies, the sentences shall be suspension or erasure".

Penal Code Section 158. Attempt to Procure Abortion

Any person who, with intent to procure miscarriage of a woman, whether she is or is not with child, unlawfully administers to her or causes her to take any poison or other noxious thing, or uses any force of any kind, or uses any other means whatever, is guilty of a felony and is liable to imprisonment for fourteen years.

Penal Code Section 159. Attempt to Procure Abortion by the Pregnant Woman

Any woman who, being with child, with intent to procure her own miscarriage, unlawfully administers to herself any poison or other noxious thing, or uses any force of any kind, or uses any other means whatever, or permits any such thing or means to be administered or used to her, is guilty of a felony and is liable to imprisonment for seven years.

Penal Code Section 160. Supply Drugs or Instruments to Procure Abortion

Any person who unlawfully supplies to or procures for any person any thing whatever, knowing that it is intended to be unlawfully used to procure the miscarriage of a woman whether she is or is not with child, is guilty of a felony and is liable to imprisonment for three years.

Management

- ◆ Order bed rest at home or in the facility.
- ◆ For pain, offer PO hyoscine butylbromide 20mg 8 hourly and/or PO paracetamol 1g 8 hourly for 5 days.
- ◆ Sedate with PO phenobarbitone 30mg OD for 5 days **OR** PO diazepam 5mg 8 hourly for 5 days to help allay anxiety and enforce bed rest.
- ◆ If more bleeding and signs of progression to incomplete abortion occur, do MVA under a para-cervical block (2.5ml of 1% lignocaine HCL injection at 2,4, 8, 10 o'clock position) as above or stabilize and refer to higher level for appropriate management.

Patient Education

- ◆ If on bed rest at home, return to health facility if features of progression to incomplete abortion intensify, e.g., more bleeding.
- ◆ Abstain from sexual intercourse for at least 2 weeks to prevent progression to incomplete abortion and risk of infection.

53.2.4 COMPLETE ABORTION**Clinical Features**

As shown in Table 53.1.

Investigations

Haemogram, malaria parasites, urinalysis

Management

- ◆ Stabilize as necessary, for example with intravenous fluids, e.g., IV fluids.
- ◆ Administer antibiotics: Amoxicillin-clavulanate 625g BD **OR** doxycycline 100mg BD for 7 days and metronidazole 400mg TDS for 7 days.
- ◆ Give ferrous sulphate and folic acid in standard dosage for appropriate period to restore normal haemoglobin. Ferrous sulphate should be given after completing the course of tetracycline.

~ **Transfusion is necessary.**

Refer to higher level for appropriate management

Patient Education

- ◆ If further pregnancy is desired, refer to a higher level for further investigation.
- ◆ If further pregnancy is not desired, discuss and offer appropriate contraception.

53.2.5 INCOMPLETE ABORTION**Clinical Features**

As shown in Table 53.1 for threatened abortion.

Management

- ◆ Resuscitate with fluids (normal saline and dextrose). If the patient is in shock, transfer to higher level for appropriate management.
- ◆ Give oxytocin 10 IU IM or ergometrine 0.5mg IM STAT.
- ◆ Remove POC from cervical os digitally or with ovum forceps.
- ◆ Manage pain: IM diclofenac 75mg STAT or para cervical block during MVA (use a total of 10ml lignocaine hydrochloride 1% 2.5ml at 2, 4, 8, and 10 o'clock positions of the cervix); provide verbal support.
- ◆ Give antibiotics: PO doxycycline 100mg 12 hourly+PO metronidazole 400mg 8 hourly for 7days.

Patient Education

As for complete abortion.

53.2.6 SEPTIC ABORTION

Clinical Features

As shown in Table 53.1.

Investigations

- ◆ As for threatened abortion
- ◆ Blood cultures for patients in endotoxic shock

Management

- ◆ Refer all cases having evidence of septic abortion to higher level for appropriate management that involves in patient care.
- ◆ Resuscitate as in incomplete abortion.
- ◆ Give IV crystalline penicillin 2 mega units QDS and IV gentamicin 80mg TDS+ IV metronidazole 500mg TDS **OR** chloramphenicol IV 1g 6 hourly and metronidazole 500mg IV 8 hourly for 3 to 7 days depending on the severity of the infection then change to orals on discharge for 5days.
- ◆ Evacuate the uterus soon after initial antibiotic doses.
- ~ **Patients with severe septic abortion or with features of endotoxic shock should be referred urgently to higher level for appropriate management.**

Patient Education

As in complete abortion.

53.2.7 MISSED ABORTION

Clinical Features

As shown in Table 53.1.

Investigations

- ◆ As for threatened abortion.
- ◆ Refer for ultrasound to confirm absence of intrauterine life.
- ◆ Bleeding and clotting time in case disseminated intravascular coagulopathy (DIC) has developed.

Management

- ◆ Give antibiotics: Doxycycline 100 mg BD for 7days+metronidazole 400mg TDS 7days
- ◆ Evacuate the uterus as in incomplete abortion.
- ◆ Refer to higher levels for appropriate management all cases of intrauterine foetal death (IUFD).

Patient Education

As for complete abortion.

53.2.8 HABITUAL ABORTION

Clinical Features

As shown in Table 53.1.

Management

Refer all cases of habitual abortion to higher level for appropriate management.

53.2.9 POST-ABORTION CARE (PAC) AT LEVEL 2-3

All women should have access to comprehensive quality services for the management of post-abortion complications. PAC services include resuscitation, evacuation of the uterus by MVA, post-abortion counselling, education and family planning services to help reduce repeat unwanted and unsafe abortions, and linkages to other reproductive health and support services. It also includes community participation. Some mid-level providers (nurses and clinical officers) are trained to provide PAC. The MOH has supplied MVA kits to some health centres and dispensaries.

53.2.10 MOLAR ABORTION (HYDATIDIFORM MOLE)

Clinical Features

A hydatidiform mole usually presents as a threatened or incomplete abortion. In the threatened stage, before the cervix opens, the diagnosis of hydatidiform mole is suspected if bleeding does not settle within a week of bed rest. The uterine size is larger than gestational age and foetal parts are not palpable. Foetal movements are not felt at gestation 18–20 weeks and beyond. Features of hyperemesis gravidarum, nausea, vomiting, and ptalism are still present and severe after 3 months. When the cervix opens, passage of the typical grape-like

vesicles confirms the diagnosis. Bleeding may be very heavy when a mole aborts spontaneously.

Management

Resuscitate and refer to higher level for appropriate management.

53.3 Ectopic Pregnancy

Ectopic pregnancy is a pregnancy outside the uterine cavity, most of which are in the fallopian tube. Ectopic pregnancy is usually due to partial tubal blockage and therefore the patient is often sub fertile. There are two types: acute ectopic pregnancy and chronic (slow leak) ectopic pregnancy. Differential diagnosis for this condition include pelvic inflammatory disease (PID), appendicitis, abortion, and ruptured ovarian cyst.

Clinical Features

For acute ruptured ectopic pregnancy:

- ◆ Amenorrhoea 6–9 weeks.
- ◆ Abdominal pain of sudden onset.
- ◆ Shock and anaemia.
- ◆ Abdominal distension and tenderness.
- ◆ Shoulder tip pain due to haemoperitoneal diaphragmatic irritation.
- ◆ Cervical excitation tenderness present.

For chronic (slow-leak) ectopic pregnancy:

- ◆ Abdominal pain
- ◆ Irregular PV bleeding, usually dark blood (amenorrhoea may be present).
- ◆ Anaemia, fainting attacks.
- ◆ Low abdominal and pelvic tenderness and possibly a mass.
- ◆ Cervical excitation present.

Management

If ectopic pregnancy is suspected from clinical features, refer for emergency laparotomy.

- ◆ Fix IV drip, give analgesia (IM diclofenac 75mg STAT).
- ◆ Obtain specimens for haemogram and cross-match to accompany patient.
- ◆ Refer and organize travel of patient to higher levels for appropriate management.
Organize for competent escort to accompany the patient to referral facility.
- ◆ Take blood donors if possible.

53.4 Infertility

Infertility is usually defined as the failure to conceive after 1 year of sexual intercourse without contraception. It is divided into 2 types:

- ◆ Primary: The woman has never conceived in spite of having unprotected sexual intercourse for at least 12 months.
- ◆ Secondary: The woman has previously conceived but is subsequently unable to conceive for 12 months despite unprotected sexual intercourse.

Causes of Infertility

These include the following:

- ◆ Tubal factor: There is bilateral occlusion of fallopian tubes as a result of PID.
- ◆ Male factor: The sperm ducts are damaged as a result of previous STIs leading to abnormalities of sperm function.
- ◆ Endocrine disorders affecting the woman.
- ◆ Tropical diseases in both the man and the woman including leprosy, filariasis, schistosomiasis, or tuberculosis.
- ◆ Cervical mucus abnormalities.
- ◆ Congenital disorders.

Management

Simple screening by history and physical examination of any cases of infertility should be done.

- ◆ Refer all cases to a higher level for appropriate management.
- ◆ Since infertility results from either (or both) female problems or male problems, both partners should undergo evaluation.
- ◆ Diagnosis.
- ◆ History from couple and individually.
- ◆ Physical examination of both partners.

53.5 Pelvic Masses

Do simple screening by history and physical examination for any lower abdominal swellings but refer to higher levels for appropriate management any which may include further investigations. The differential diagnosis for pelvic masses includes normal pregnancy, distended urinary bladder, uterine fibroids, pelvic abscess, tubal-overian mass, and ovarian cyst.

53.5.1 NORMAL PREGNANCY

Is easy to diagnose from history of amenorrhoea and enlarged cystic midline pelvic mass. Foetal movements and heart sounds may be noted after 18 weeks.

Refer to higher level for appropriate management if in doubt.

53.5.2 DISTENDED URINARY BLADDER

Acute retention of urine is the commonest. It is commonly associated with acute urinary tract infection in young girls and may be associated with other pelvic tumours in older women. Catheterization and administration of nitrofurantoin 100mg TDS for 10 days. Antibiotic and urine examination will suffice in urinary tract infection (UTI).

53.5.3 UTERINE FIBROIDS

Clinical Features

Uterine fibroids are benign growths of the uterine wall muscle. They occur commonly in age groups 30 years and above. They are associated with nulliparity, low parity, subfertility and infertility. Uterine fibroids present with features of swelling in the lower abdomen and dysmenorrhoea or heavy periods.

Vaginal examination reveals a mass that is firm, nodular, non-tender and moves with the cervix. Diagnosis is essentially clinical.

Management

Refer to higher level for appropriate management.

53.5.4 PELVIC ABSCESS AND TUBO-OVARIAN MASS

Clinical Features

Essential features for diagnosis of this condition include the following;

- ◆ History of STI or pelvic infection
- ◆ Lower abdominal and pelvic pain
- ◆ Nausea and vomiting
- ◆ Tender adnexal mass
- ◆ Fever and tachycardia
- ◆ Rebound tenderness

Management

- ◆ Start on a drip of normal saline **OR** dextrose 5% 500ml.
- ◆ Give IV benzylpenicillin 5mu STAT and gentamycin 80mg STAT.
- ◆ For pain relief, give diclofenac IM 75mg then refer.

53.5.5 OVARIAN CYSTS

Clinical Features

These are usually benign and may occur in women of any age group. Menses are usually normal in simple cysts. Abnormal menses including amenorrhoea occur in functional cysts. Ovarian cysts may undergo torsion to cause acute pain. A cystic mass in one or other side of pelvis is essential for diagnosis

Management

Refer to higher level for appropriate management.

53.5.6 NEOPLASMS (MALIGNANT GROWTHS)

These may present as pelvic masses.

Refer to higher level for appropriate management.

53.6 Menstrual Disturbances

Most women suffer some form of menstrual disturbance in their lifetime. Common types are mentioned here. Health service providers should sensitize community members that menstrual disturbances may be a symptom of serious illness and advise their patients to seek help from health facilities when they have menstrual disturbances.

52.5.1 AMENORRHOEA

Amenorrhea means the absence of menstruation for 2 cycles or more. It is a symptom and not a disease. Primary amenorrhea refers to a patient who at any age has never menstruated. Secondary amenorrhea refers to cessation of the periods after menstruation has been established. There are 2 varieties of amenorrhea: cryptomenorrhoea (hidden periods) and true amenorrhea (primary and secondary).

CRYPTOMENORRHOEA

Clinical Features. The menstrual fluid is retained in the genital tract. The commonest variety seen is imperforate hymen occurring after menarche (12–14 years) with cyclic abdominal pains. Vulval inspection will reveal a bluish bulging hymen. There may be or may not be lower abdominal mass.

Management

Refer to higher level for appropriate management.

TRUE AMENORRHOEA

True amenorrhea can be physiological as the period before puberty, during pregnancy, during lactation, and after the menopause. However, it may also be pathological.

Clinical Features

The clinical features depend on age of presentation in physiological type and on the level of disturbance in the pathological type of amenorrhea.

Investigations

In physiological type of amenorrhea, a good menstrual history and physical examination is usually sufficient to confirm physiological amenorrhea. A pregnancy test and/or ultrasound usually confirms early pregnancy.

In the pathological type the causes may be uterine lesions, ovarian lesions, pituitary disorders, other endocrine disorders, psychiatric illness or emotional stress and severe general illness.

Management

Refer to higher level for appropriate management.

52.5.2 DYSFUNCTIONAL UTERINE BLEEDING (DUB)

Anormalmenstrualperiodlasts2–7dayswithanaverageof3–5days.The normal menstrual cycle lasts between 21–35 days. The term “menorrhagia” refers to excessive bleeding during the menstrual periods.

“Dysfunctional uterine bleeding” refers to those cases in which the bleeding is not due to some obvious local disorder, such as pelvic infection or new growth, or some complication of pregnancy, but rather some form of hormonal imbalance.

Clinical Features

Irregular periods associated with lack of ovulation that are commonest at puberty and during perimenopausal period and at times, during the reproductive years, (14–44 years). As a consequence, there may be anaemia and poor health. At puberty it may be associated with changes in climate and environment, school examinations, stress, and intercurrent illness and pregnancy. It is important to exclude abortion, ectopic pregnancy, and fibroids during the reproductive years, while pregnancy and uterine and cervical cancers should be excluded during perimenopausal years.

Management

Refer to higher level for appropriate management.

52.5.3 DYSMENORRHOEA

Dysmenorrhoea is pain before or during period, sufficient to interfere with the woman's normal occupation. It may be associated with nausea, vomiting and disturbance of bowel function. There are 2 types of dysmenorrhoea, namely Primary Dysmenorrhoea and Secondary Dysmenorrhoea.

PRIMARY DYSMENORRHOEA

Clinical Features

This is the commonest type of dysmenorrhoea, occurring in girls or young women less than 20 years of age. The pain is spasmodic or colicky in nature. It starts on the first day of the period and may last a few hours or throughout the period. It may be associated with nausea, vomiting and/or diarrhoea, or constipation. It may be incapacitating and interfere with normal daily activity.

Good history and examination are necessary to rule out coexisting disease.

Management

- ◆ Reassure the patient.
- ◆ Counsel on stress and treat as appropriate.
- ◆ Administer analgesics: PO paracetamol 1g 8 hourly or PO ibuprofen 400mg 8 hourly or aspirin 600mg 8 hourly with hyoscine butyl bromide 20mg 8 hourly for 3 days.
- ◆ Suppress ovulation by use of contraceptive pill for three cycles, for example Ethinylestradiol 30mg + levonogestrel 150mcg. Note that this is not recommended as a remedy in young girls. In a majority of cases, pain may cease after first delivery.
- ◆ Follow up is as appropriate.

SECONDARY DYSMENORRHOEA

Clinical Features

This is secondary to organic disease, for example PID, fibroids, and associated infertility. Features of underlying cause may be evident. Often the pain precedes the onset of a period by a week to 10 days.

Management

- ◆ Administer aspirin 600mg TDS, paracetamol 1g TDS, **OR** ibuprofen 200mg TDS as in primary dysmenorrhoea.
- ◆ Refer to higher level for appropriate management.

52.5.4 PREMENSTRUAL TENSION SYNDROME

Clinical Features

This manifests as premenstrual discomfort in lower abdomen and back 7–10 days preceding menses. It gives a sensation of distension or pelvic engorgement. There is relief after flow begins. It is accompanied by nervous irritability, depression, headache, listlessness, and discomfort in breasts. Occasionally there is fluid retention. A good history and physical examination are important for accurate diagnosis.

Management

- ◆ Reassure. Administer drugs with mild tranquillizer effect like phenobarbitone 30 nocte or diazepam 5mg nocte.
- ◆ If severe or persistent, refer to higher level for appropriate management.

53.7 Neoplasms (Potentially Malignant Conditions)

Health service providers should sensitize community members on symptoms of gynaecological cancer and advise them to seek help from health facilities. They should also be encouraged to have routine annual gynaecological checkups by qualified health personnel. Health service providers should use simple cancer screening technologies such as visual inspection with acetic acid (VIA) and visual inspection with Lugol's Iodine (VILI) and breast examination. They should refer suspicious cases to higher levels for appropriate management.

53.7.1 OVARIAN CANCER

Clinical Features

The following features are noted:

- ◆ May occur at any age but commoner in women aged 40 years and above.
- ◆ May have a mass in the lower abdomen.
- ◆ There is wasting.
- ◆ There is ascites.
- ◆ There is irregular vaginal bleeding.

Management

Refer urgently to higher levels for appropriate management.

Prevention

Annual pelvic examination and pelvic ultrasound are recommended as preventive measures for early detection and management.

53.7.2 CANCER OF THE CERVIX

This is the most common gynaecological cancer. The risk factors for this condition are early age of first coitus, multiple sexual partners, having a spouse with multiple sexual partners, high parity, infection with human papilloma virus, and infection with Herpes simplex type II.

Clinical Features

- ◆ Commonest in age group 30 and above.
- ◆ There is post-coital bleeding.
- ◆ There is post-menopausal bleeding.
- ◆ There is foul smelling vaginal discharge.
- ◆ There is intermenstrual PV bleeding.
- ◆ Pain, anaemia, and cachexia are late presenting features.
- ◆ Speculum examination reveals an easily bleeding growth on the cervix.

Management

Refer to higher level for confirmation of diagnosis by biopsy and histology, staging, and definitive treatment.

Prevention

- ◆ Avoid risk factors listed above
- ◆ Pap smear every 3 years for early detection.
- ◆ Visual inspection (of cervix) with acetic acid (VIA) or with Lugol's iodine (VILI) are simple screening methods that can be applied for all women from sexual debut.
- ◆ HPV vaccine before sexual debut and for those who are HPV negative.

~ **High index of suspicion is essential as early detection is important, but many patients present late with advanced disease.**

53.7.3 CARCINOMA OF THE ENDOMETRIUM

This is probably the third commonest cancer in women in Kenya after cervical cancer and breast cancer. Commonest age at onset is peri and post-menopausal period. It is associated with low parity, obesity, diabetes, and hypertension and may be preceded by endometrial hyperplasia due to unopposed oestrogen stimulation of endometrium.

Clinical Features

The condition presents with abnormal uterine bleeding at peri or post-menopausal age. Clinical findings may sometimes be unremarkable in early disease, although enlarged uterus and evidence of metastasis may be evident in late cases.

Management

Refer suspected cases to higher level for appropriate management.

53.7.4 CARCINOMA OF THE VULVA

Clinical Features

- ◆ Majority of patients present after the menopause.
- ◆ May be preceded by pruritic conditions of the vulva.
- ◆ Presents as an ulcer on the vulva.
- ◆ May have inguinal lymphadenopathy.
- ◆ Diagnosis is by clinical features and confirmed by biopsy and histology. Differential diagnoses include granuloma inguinale, lymphogranuloma venereum, syphilitic chancre or gumma, and chancroid.

Management

Refer all suspected cases to higher levels for appropriate management.

53.7.5 CARCINOMA OF THE VAGINA

This is a rare cancer, with peak incidence from age 45 to 65.

Clinical Features

There is post coital bleeding, dyspareunia, watery discharge, urinary frequency or urgency, and painful defecation. Cancers are commonly found in the upper part of the vagina on posterior wall. Speculum and digital examination reveals growth in the vaginal wall.

Management

Give supportive management (nutrition, vitamins, haematinics) Refer urgently to higher levels for appropriate management.

53.8 Pelvic Inflammatory Disease (PID)

Pelvic inflammatory disease is the inflammation of pelvic structures above the cervical os, including the uterus, the fallopian tubes, the ovaries, and all the related structures. It is essentially a consequence of STI (gonorrhoea and Chlamydia trachomatis), but can follow puerperal sepsis, abortion, or TB.

Clinical Features

Diagnosis of this condition is mainly clinical. The clinical features include:

- ◆ Lower abdominal pain
- ◆ Fever
- ◆ Signs of pelvic peritonitis
- ◆ Toxic appearance with vomiting
- ◆ Dyspareunia, infertility, mucopurulent cervical discharge, and bilateral adnexal tenderness
- ◆ Adnexal induration and/or masses(tubo-ovarian).

Management

~ Refer urgently to higher levels for appropriate management

Management may include amoxicillin/clavulanate 625mg BD for 7 days or PO doxycycline 100mg 12 hourly for 10 days + PO metronidazole 400mg 8 hourly for 10 days. Advise patient to avoid alcohol.

Patient Education

In case of multiple partners, condoms should be used.

53.9 Abscesses and Fistulae

53.9.1 BARTHOLIN'S ABSCESS

Bartholin's glands are located bilaterally in the vulva, adjacent to the vaginal orifice. Cysts arise when the glands' ducts become occluded. Bartholin's abscesses occur

when the gland becomes secondarily infected with one of many common bacterial pathogens.

Clinical Features

Patient may complain of any combination of symptoms that include local pain, low-grade fever, perineal discomfort, labial swelling, dyspareunia, purulent PV discharge and difficulty in sitting. Physical examination may reveal tender, fluctuant abscess lateral to and near the posterior fourchette, local swelling, erythema, labial oedema and painful inguinal adenopathy. Most abscesses develop over 2–3 days and spontaneous rupture often occurs within 72 hours.

Management

- ◆ Treatment of acute phase includes bed rest, analgesics, e.g. administer PO ibuprofen 400mg 8 hourly for 5 days, hot wet compresses.
- ◆ PO doxycycline 100mg 12 hourly for 10 days.
- ◆ Refer to higher level for appropriate management.

53.9.2 GENITAL FISTULA

This is communication between the genital tract and the urinary or alimentary tracts and may occur singly or in combination. It is due to:

- ◆ Obstetrical injury: Obstructed labour usually leads to pressure necrosis of the bladder and vaginal wall and the rectum. Necrotic tissue sloughs off, leading to vesico-vaginal fistula (VVF) and recto-vesical fistula (RVF).
- ◆ Instrumental delivery: May cause perforation of the vagina and rectum.
- ◆ Operative injury: A fistula may be caused during total abdominal hysterectomy and caesarean section;
- ◆ Extension of disease: Malignancy of the bowel or any pelvic abscess may perforate into the rectum and posterior vaginal wall.
- ◆ Radiotherapy: Heavy radiation of the pelvis causes ischaemic necrosis of the bladder wall and bowel, causing urinary or faecal fistula.

Clinical Features

The patient complains of urinary or faecal incontinence or both. Secondary amenorrhoea is common.

Management

- ◆ Reassure the patient that the condition is usually correctable with surgery.
- ◆ Refer to higher level for appropriate management.

53.10 Sexual Assault

Sexual assault (rape) is a violent crime directed predominantly against women. Under Kenyan laws rape is defined as carnal knowledge of a woman without her consent or by use of force, duress or pretence. A girl below 18 years of age is not legally deemed to be able to give consent (Children Act). Neither are mentally retarded or psychiatric women.

Clinical Features

These will range from none or mild to very severe injuries that may be life threatening. The medical personnel must approach the rape victim with great understanding, respect and concern for her well-being. The patient may appear deceptively calm, and is usually withdrawn and detached. A careful history and medical record are important because this information will be required in court. If the patient has eaten, drunk, bathed, or douched, this may affect the outcome of laboratory tests. History must be taken to evaluate the risk of acquisition of sexually transmitted disease and pregnancy.

During physical examination, it is important to document location, nature and extent of external trauma to face, neck, breast, trunk, limbs, the genitalia, and vagina; in addition, cervical trauma must be documented. Clothes and attire are retained as exhibits. Psychological trauma is evaluated and managed.

Investigations

These will depend on clinical findings, but key investigations include:

- ◆ Pregnancy test
- ◆ HIV test
- ◆ Urine test for analysis of STI, semen
- ◆ High vaginal swab(HVS)
- ◆ Refer to *National Guidelines for Medical Management of Rape and Sexual Assault*

Management

- ◆ Patients and relatives should be encouraged to report all cases to the police.
- ◆ Discourage private deals by perpetrators to evade the law.
- ◆ Treat physical injuries, noting that some tears or cuts may require surgical repair.
- ◆ Administer tetanus toxoid deep IM 0.5ml for soiled lacerations.
- ◆ If female, do pregnancy test;if negative, give emergency contraception within 72 hours of intercourse: Levonorgestrel 750 mcg STAT, then repeat the same dose 12 hours later, **OR** ethynodiol 30mcg + levonorgestrel 150mcg , 2 tablets STAT, repeat after 12 hours.
- ◆ Give HIV post-exposure prophylaxis for HIV infection PO Zidovudine 300mg 12 hourly + PO lamivudine 150mg 12 hourly within 72 hours, and determine the HIV status of the victim. If positive, stop and refer the victim to a comprehensive care centre (CCC);if negative, continue ARV treatment for 28 days.
- ◆ Give PEP for STIs PO doxycycline 100mg 12 hourly for 7 days and ciprofloxacin 500mg STAT.
- ◆ Give tranquillizers, e.g. PO diazepam 5mg 8 hourly **OR** sedatives PO phenobarbitone 30mg 8 hourly
- ◆ Refer to higher level for appropriate management.

Psychological and psychiatric review is necessary and long-term psychological and psychiatric care may be required. Major or reconstructive surgery may be required for medical/legal reasons.

54. Obstetrics

54.1 Antenatal Care and Complications

Uncomplicated antenatal care could be carried out at all levels of health care, while complicated antenatal care should be carried out only at 4 to 6 levels of health care.

54.1.1 ANTENATAL CARE

The goal of antenatal care is to ensure a healthy mother and a healthy baby. Antenatal care is organized to achieve this goal through several main objectives:

- ◆ Prevention and treatment of pregnancy complications.
- ◆ Provision of nutritional, social, emotional or physical support.
- ◆ Detection and treatment of disorders or diseases.
- ◆ Provision of patient education.
- ◆ Planning for labour and delivery.

Conduct of Antenatal Care

Antenatal care should start as early as possible in the pregnancy. Per WHO guidelines (refer to Figure 54.1), the initial visit should include:

- ◆ General history: Past medical and surgical history is recorded as is any family history of diabetes, hypertension, TB, hereditary diseases, and multiple pregnancy.
- ◆ History of the current pregnancy: Last menstrual period (LMP), estimated date of delivery (EDD), maturity at present, any problems encountered so far, e.g., bleeding. LMP is the first day of the LMP and gestation is calculated in weeks from LMP. Thus the EDD is calculated by adding 7 to the first day of the LMP and 9 to the month of the LMP; for example, for an LMP of 1/1/93, the EDD is 8/10/93.

A physical exam is then done, to include:

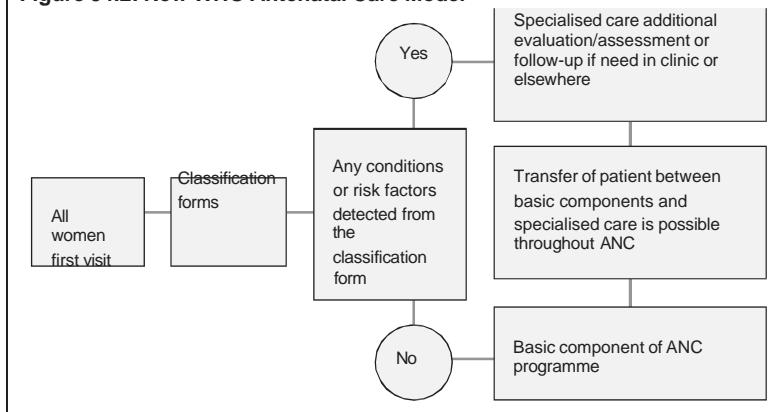
- ◆ Blood pressure, weight, urinalysis.
- ◆ General physical exam.
- ◆ Abdominal exam: Fundal height, lie, presentation, foetal heart sounds, presence of multiple gestation, sizes of liver and spleen and presence of other masses.
- ◆ Vaginal exam: This is indicated as follows:
 - At early pregnancy to confirm and date pregnancy.
 - In late pregnancy at 36 weeks to assess pelvic adequacy.
 - In labour to confirm diagnosis and monitor progress.
 - Other times to evaluate symptoms and complaints from the patient.
 - ◆ Other tests as appropriate for individual patient.

The New WHO Antenatal Care Model

Criteria for classifying women in the basic component of the new antenatal care model (refer to Figure 54.2). The 4 visits are 1st by 16 weeks, 2nd by 24–28 weeks, 3rd at 32 weeks, and 4th at 36 weeks.

Figure 54.1: New WHO Antenatal Care Model

Figure 54.2: New WHO Antenatal Care Model



At each return visit antenatal care should include:

- ◆ Interval history of symptomatology and/or problems. Date of first foetal movements.
- ◆ Weight: Amount and pattern of weight change.
- ◆ Blood pressure, check for oedema.
- ◆ Urinalysis for glucose, proteins, ketones.
- ◆ Obstetric examination, vaginal examination/speculum as indicated.
- ◆ Repeat laboratory tests, if necessary e.g.
 - PCV at 28–36 weeks.
 - Serology for syphilis and HIV at 36 weeks.
 - Special laboratory tests as indicated for individual patients to assess maternal/foetal wellbeing:
- ◆ Examination of amniotic fluid.
- ◆ Foetal heart movements monitoring and evaluation.
- ◆ Decision on place and expected mode of delivery should be discussed and agreed with the patient not later than 36 weeks of gestation.
- ◆ Counseling should be provided for FP in general and for postpartum voluntary surgical contraception (VSC). Duly signed informed consent forms should be available at admission
- ◆ Patients should be advised to report to the health facility promptly if they have PV bleeding, draining of liquor, blurred vision, or labour pains.

Those who check NO for all questions follow the 4 visits model, while those with problems may require extra visits.

Management

Principles of management include:

- ◆ Prenatal investigations and counseling in appropriate cases.
- ◆ Early start of antenatal care.
- ◆ Close medical supervision during pregnancy.
- ◆ Special tests and examinations to evaluate foetal development and wellbeing as well as maternal wellbeing.
- ◆ Timely intervention for therapy and delivery.

Figure 54.3: Criteria for classifying women in the basic component of the new antenatal care model

Name of patient:	Clinic record number:	
Address:	Telephone:	
INSTRUCTIONS: Answer all of the following questions by placing a cross mark in the corresponding box.		
OBSTETRIC HISTORY		
1. Previous stillbirth or neonatal loss?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2. History of 3 or more consecutive spontaneous abortions?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3. Birthweight of last baby < 2500g?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. Birthweight of last baby > 4500g?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5. Last pregnancy: hospital admission for hypertension or pre-eclampsia/eclampsia?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6. Previous surgery on reproductive tract? (Myomectomy, removal of septum, cone biopsy, classical CS, cervical cerclage)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
CURRENT PREGNANCY		
7. Diagnosed or suspected multiple pregnancy?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8. Age less than 16 years?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9. Age more than 40 years?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
10. Isoimmunization Rh (-) in current or in previous pregnancy?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
11. Vaginal bleeding?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
12. Pelvic mass?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
13. Diastolic blood pressure 90mm Hg or more at booking?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
GENERAL MEDICAL		
14. Insulin-dependent diabetes mellitus?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
15. Renal disease?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
16. Cardiac disease?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
17. Known 'substance' abuse (including heavy alcohol drinking)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
18. Any other severe medical disease or condition?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Please specify _____		
A "Yes" answer to any ONE of the above questions (i.e. ONE shaded box marked with a cross) means that the woman is not eligible for the basic component of the new antenatal care model.		
Is the woman eligible?	(circle)	NO
If NO, she is referred to _____	YES	
Date _____	Name _____	Signature _____ (staff responsible for ANC)

Consult Table 54.1 for a selection of common complaints in pregnancy, how to manage them, and what to tell women so as to avoid them.

~ Refer complicated cases to high risk clinic of the hospital (levels 4–6) for management.

54.1.2 ANAEMIA IN PREGNANCY

Anaemia in pregnancy is a major obstetric problem in Kenya. Locally, anaemia is generally accepted as Hb <10g%. Mild anaemia Hb 8–10g, moderate Hb 6–7g, severe Hb 4–5g, and very severe below Hb 4g.

In severe anaemia the pregnancy is in danger of abortion, premature labour or IUFD, while in very severe anaemia the mother's life is also in danger. Most cases are due to iron deficiency as a result of dietary deficiency or blood loss from hookworm infestations. Anaemia is also due to haemolysis caused by malaria, sickle cell disease, and folate deficiency due to inadequate intake especially in urban areas. Iron deficiency and folic acid deficiency often occur together, causing "Dimorphic Anaemia".

Table 54.1: Common complaints in pregnancy

Complaint	What to do	What to avoid
Abdominal pain, backache	Exclude UTI and local lesion; if none reassure. Physiotherapy	Avoid unnecessary medication
Morning sickness (nausea & vomiting)	Reassure up to 3 months. If severe with dehydration admit for hydration. Exclude UTI, malaria, and typhoid	Avoid anti-emetics
Indigestion (flatulence, heartburn & constipation)	High roughage diet. If severe give mild laxative and antacid, e.g., Bisacodyl 5mg in the morning 2 at bedtime x 5 days. Magnesium trisilicate 10ml TDS x 5 days	Avoid strong laxatives or enema
Ptyalism (Excessive salivation)	Reassurance	Avoid anticholinergic drugs
Food fads; pica (Craving for unusual foods and substances)	Advise on a balanced diet. Eat according to desire. Give haematinic supplements as for prophylaxis	Discourage harmful and contaminated materials, e.g., soil
Generalized pruritus	Reassurance: Mild anti-pruritic (chlorpheniramine 4mg TDS) 5 days; Exclude skin and systemic diseases	Avoid steroids
Pruritus vulvae	See under vaginal discharge	Avoid douching
Muscle cramps	Calcium lactate 300mg daily Physiotherapy	Avoid NSAIDs
Fatigue	Reassurance; bed rest 3–7 days Advise on balanced diet	Avoid drugs
Breast tenderness	Reassure; advise on breast support	Avoid NSAIDs and breast massaging
Bleeding gums	Oral hygiene, massage gums, vitamins ABC Refer to dentist if necessary	Do not excise hypertrophied gums(epulis)

Clinical Features

There is general weakness, dizziness, pallor, oedema. In addition, in haemolytic anaemia there may be jaundice and hepatosplenomegaly.

Investigations

- ◆ PCV, stool for ova of hookworm and schistosomiasis where applicable
- ◆ Blood slide for malaria parasites

Refer to higher level for appropriate management.

Prevention

- ◆ Balanced diet: Prophylaxis iron (PO ferrous sulphate 200mg 8 hourly+folate 5mg OD) until the Hb is above 10, throughout pregnancy.
- ◆ Prophylaxis antimalarial using PO sulfadoxine 500mg/pyrimethamine 25mg STAT, then repeat every 4 weeks.
- ◆ De-worm with PO albendazole 400mg STAT.
- ◆ Early detection is important. Routine antenatal Hb screening at first visit and near term.

Management

As detailed in Table 54.2, principles of management include:

- ◆ Raise Hb (oral ferrous sulphate 200mg TDS+folic acid 5mg OD—refer if needed).
- ◆ Remove cause—dietary deficiency, treat malaria, treat hookworms, give haematinics if dietary deficiency exists.
- ◆ Prevent recurrence.

Table 54.2: Management of anaemia in pregnancy

Severity	Hb (g%)	Management
Mild	8–10	Treat cause oral haematinics with ferrous sulphate 200mg TDS and folic acid 5mg OD, as for prophylaxis
Moderate	6–7	Refer
Severe	4–5	Refer
Very severe	Below 4	Resuscitation and treatment as for severe cases

Complications of Anaemia in Pregnancy

The complications of anaemia in pregnancy include the following:

- ◆ Cardiac failure: may lead to death.
- ◆ May worsen effects of minor PPH leading to death.
- ◆ May worsen effects of minor hypoxia during anaesthesia causing death.
- ◆ Reduces resistance to infection.
- ◆ Causes late abortions, premature labour.
- ◆ Perinatal mortality and morbidity is increased even in term babies.
- ◆ Babies become anaemic (iron deficiency) after 2–3 months of life. Administer prophylactic haematinics. Refer to a paediatrician.

~ Whereas mild anaemia can be taken care of at all levels of health care, moderate to severe anaemia needs to be taken care of at 4 to 6 levels of healthcare.

54.1.3 ANTEPARTUM HAEMORRHAGE(APH)

Antepartum haemorrhage (APH) is defined as vaginal bleeding after the twentieth week of pregnancy. APH is associated with increased foetal and maternal morbidity and mortality. The foetal and maternal status will depend on amount, duration, and cause of bleeding.

The causes of APH are:

- ◆ Local causes including cervical lesions (e.g., trauma, cancer of cervix, cervical polyps), vaginal lesions (tears/lacerations) and infections.
- ◆ Placental causes: Placental abruption (abruptio placentae)
- ◆ Placenta praevia: Occurs when any part of the placenta implants in lower part/segment of the uterus.
- ◆ Vasa praevia: A rare cause of APH in which the umbilical cord is inserted into placental membranes with blood vessels traversing and presenting over the internal cervical os.

Refer all cases of APH to a higher level for appropriate management.

54.1.4 CARDIAC DISEASE IN PREGNANCY

In Kenya, this is often of rheumatic heart disease origin.

Clinical Features

There may be history of rheumatic fever in childhood, or known rheumatic heart disease, dyspnoea, palpitations, body oedema, cough, easy fatigability, evidence of heart enlargement, murmurs, thrills, left parasternal heave, prominent neck veins and tachycardia. There may also be hepatomegaly, ascites and basal crepitations.

Investigations

Routine antenatal profile (Hb, VDRL, blood group, urinalysis)

Management

This depends on the functional classification of the New York Heart Association: Class I – Asymptomatic; Class II – Symptomatic with heavy work; Class III – Symptomatic with light work or exercise; and Class IV – Symptomatic at rest.

Refer all patients with suspected heart disease during pregnancy to higher level for appropriate management.

Patient Education

Advise on family planning. Cardiac patients should have small families of 1 or 2 children or none. Suitable methods include mini laparotomy, tubal ligation under local anaesthesia, vasectomy, barrier methods, progesterone only agents, e.g., microlut pill, depo, noristerat injection and norplant. Oestrogen containing methods are contraindicated in such patients.

Refer to higher level for advice on suitable method.

54.1.5 DIABETES IN PREGNANCY

Diabetes mellitus is a metabolic disorder characterized by elevated glucose levels in blood. Covered in the section in Internal Medicine.

Clinical Features

This includes history of diabetes in family, history of having big babies weighing over 4kg at birth, history of stillbirths and neonatal deaths. Overt diabetes may manifest with polydipsia, polyuria, weight loss, blurred vision, lethargy. Routine ANC urinalysis shows glucosuria.

Refer for fasting blood sugar or oral glucose tolerance test (OGTT).

Complications of diabetes include hypertension, nephropathy, pregnancy-induced hypertension, foetal macrosomia, intrauterine growth retardation, polyhydramnios, foetal distress, and hypoglycaemia in the baby after birth.

Management

Refer suspected cases to higher level for appropriate management

Patient Education

This should involve the following:

- ◆ Pre-pregnancy counseling to facilitate achieving optimum glucose control before pregnancy to minimize foetal complications in diabetic pregnancy
- ◆ Family planning: Advise on a small family.
- ◆ Recommended FP methods include VSC, barrier methods, norplant/jadelle, IUCD, and progesterone-only pill.
- ◆ Oestrogen containing methods are contraindicated.

54.1.6 DRUGS IN PREGNANCY

Drugs taken by the mother during pregnancy can be harmful to the developing foetus in a variety of ways. Drugs taken just before delivery can also affect the baby. Table 54.3 provides guidelines on drugs that are considered safe or relatively safe in

pregnancy. These drugs should be used with caution and only when necessary, and drugs that are contraindicated should be avoided.

54.1.7 MALARIA IN PREGNANCY

Malaria in pregnancy may present as acute febrile illness with various clinical manifestations including severe haemolytic anaemia, hypoglycaemia, coma/convulsions, and pulmonary oedema. Complications of malaria in pregnancy include abortion, intrauterine death, premature labour, and intrauterine growth retardation. Among semi-immune women (those from endemic area), malaria may be asymptomatic, despite placental infection. Malaria causes severe anaemia and low birth weight and is more common in primigravidae than multigravidae.

Investigations

- ◆ PCV
- ◆ Blood slide for peripheral blood film for identification of parasites. This may be negative in women from endemic areas, however, despite placental parasitization.

Management

This consists of supportive and pharmacologic portions of management.

Supportive management includes:

- ◆ Correction of dehydration.
- ◆ Evacuation if incomplete/inevitable abortion.
- ◆ Delivery if foetal death or established labour.

Pharmacologic management includes:

- ◆ For clinical disease it is essential to use the most effective antimalaria drug available.
- ◆ Immediate treatment is essential.
- ◆ For uncomplicated disease the following is recommended:
 - Quinine hydrochloride orally 600mg TDS for 7days
 - Artemether-lumefantrine 4 tabs STAT, then after 8 hours then BD for 2 more days. This treatment can be used in the second and third trimesters and even in the first trimester if quinine is not available

For severe or complicated disease the following is recommended:

~ **This is a medical emergency that puts both the life of the mother and foetus at high risk. Aggressive management is essential.**

- ◆ Start quinine IM quinine 15–20mg/kg of body weight max 900–1,200mg
- ◆ Give oral glucose and refer.
- ◆ Start analgesic/antipyretic: IM diclofenac 75mgSTAT
- ◆ Other drugs that can be used for treatment in pregnancy are artemisinin derivatives in absence of quinine
- ◆ Refer severely ill patients to higher level for appropriate management.

Prevention

In endemic areas all women should receive 4 doses of sulphadoxine- pyrimethamine with one dose being given in the second trimester (between 16 and 27 weeks) and the second dose being given in the third trimester (between 28 and 36 weeks).

Preventive doses should be given at least 4 weeks apart. Non-immune pregnant women should be advised not to visit a malarious area. If travel is not avoidable they should take special precautions in order to prevent being bitten such as using mosquito repellents and an insecticide treated bed net. In addition, they should take chemoprophylaxis of either daily proguanil (e.g., paludrine) 200mg or if in the second or third trimesters, mefloquine 250mg weekly.

~ Drugs that are contraindicated in pregnancy are doxycycline and primaquine. Health care providers should refer to the latest edition of National Guidelines for Treatment and Control of Malaria as protocols may change from time to time.

Table 54.3: Drug use in pregnancy

Types of medication	Degree of safety for use in pregnancy		
	Safe or relatively safe	Some risk – Use with caution	Contraindicated in pregnancy
Analgesics	Codeine, morphine, paracetamol, pethidine	Indomethacin, salicylates	
Anticonvulsants	Ethosuximide, phenobarbitone, primidone	Clonazepam, phenytoin	
Antimicrobials	Ampicillin, amoxicillin, cephalosporins, clindamycin, dicloxacillin, erythromycin, gentamicin, isoniazid, miconazole, oxacillin, penicillin	Chloramphenicol, metronidazole, nitrofurantoin, streptomycin, sulfonamides, trimethoprim, rifampicin, kanamycin	Tetracycline
Anticoagulants	Dipyridamole, heparin	Dicumarol, warfarin	
Antiemetics	Hydroxyzine, meclizine, prochlorperazine	Phenothiazines	
Antihypertensive	Hydralazine, methyldopa, propranolol	Diazoxide	Nitroprusside
Bronchodilators	Aminophylline, beclomethasone	Cromolyn sodium	
Cardiac drugs	Atropine, digoxin, lidocaine, procainamide, quinidine	Disopyramide, nifedipine	
Decongestants	Pseudoephedrine		
Diuretics	Furosemide, Hydrochlorothiazide		Acetazolamide
Gastrointestinal drugs	Antacids, cimetidine, ranitidine		
Hypoglycemics	Insulin		Chlorpropamide, tolbutamide
Sedative & psychotics	Barbiturates, flurazepam	Diazepam, chlordiazepoxide, haloperidol, lithium, phenothiazines, tricyclic antidepressants	
Thyroid preparations	L-thyroxine, propylthiouracil		Iodide
Vaccines	Polio, tetanus, rabies		Rubella, measles, smallpox
Other drugs	Ferrous sulphate, probenecid		Antineoplastic drugs, oestrogens, DES

54.1.8 MULTIPLE PREGNANCY

In multiple pregnancy there is more than one foetus in utero. In most situations it is a twin pregnancy, but those involving more foetuses like triplets may be encountered. Multiple pregnancies may be associated with use of fertility drugs and are generally associated with higher risk for adverse outcomes (antenatal, intrapartum, and postpartum) than for a singleton.

Clinical Features

The uterus is larger than gestation dates would indicate. There are multiple foetal parts or more than 2 foetal poles. There may be a family history of twins and on examination foetal heart rates can be identified at two different areas with a difference of 15 beats per minute. There is increased risk for having PET, polyhydramnios, anaemia, APH, PPH, malpresentation, congenital foetal anomalies and premature labour.

Investigations

Refer for ultrasonography.

Management

For antenatal care, refer such patients to higher level for appropriate management.

54.1.9 PRE-ECLAMPSIA AND ECLAMPSIA

Pre-eclampsia (PET) and eclampsia are a continuum of the same syndrome. PET is defined as the onset of hypertension with either proteinuria, oedema or both at gestation of 20 weeks or more. Hypertension is here defined as a blood pressure of 140/90 mmHg or higher on more than 2 occasions of about 6 hours apart. Eclampsia is the presence of convulsive seizures in a patient with PET. Eclampsia carries a high foetal mortality and high maternal morbidity and in cases of poor management a high maternal mortality as well. The aetiology of pre-eclampsia and eclampsia is unknown, remaining as "a disease of theories".

The risk factors associated with pre-eclampsia and eclampsia are listed below:

- ◆ Parity, mostly affecting primigravidae
- ◆ Positive family history of PET
- ◆ Associated with the following medical diseases:
 - Diabetes mellitus
 - Chronic hypertension
 - Renal disease; chronic pyelonephritis, acute glomerulonephritis, polycystic kidneys
- ◆ Age extremes
- ◆ Obstetric conditions
 - Multiple pregnancy
 - Hydatidiform mole
 - Hydrops fetalis

Clinical Features

For management purposes the clinical features may be graded by the criteria shown in Table 54.4.

Table 54.4: PET grading

Category	Diastolic BP	Proteinuria (dipstick)	Oedema (Variable)
Mild	Up to 100mmHg	-	+
Severe	> 100mmHg	++	++

Management

~ All cases of hypertensive disease in pregnancy should be referred to higher level for appropriate management.

~ For eclampsia, admit in the resuscitation room. Management – General

- ◆ Observe the ABC's – airway, breathing, circulation
- ◆ Clear the airway:
 - Suction of excess secretions
 - Nurse on the lateral position
 - Introduce a mouth gag, plastic airway, or spatula
 - Administer oxygen through a nasal catheter
- ◆ Introduce an indwelling Foley's catheter to monitor urine output and check for proteinuria
- ◆ Assess condition of mother and foetus.

Management – Pharmacological

◆ Control the convulsions:

- Magnesium sulphate 20% 4g IV over 5 min and then 50% 5g in each buttock deep IM.
- If MgSO₄ not available:
 - Diazepam 20mg IV immediately.
 - Then put an IV line of 500ml 5% dextrose with 40mg diazepam to keep patient deeply sedated but arousable.
- ◆ After stabilization, refer to hospital with skilled escort and a referral letter.

54.1.10 RHESUS (RH) INCOMPATIBILITY

Rhesus isoimmunization occurs in pregnancy where a Rhesus negative mother is pregnant with a Rhesus positive foetus. Other ways of isoimmunization include transfusion with Rhesus incompatible blood, ectopic pregnancy, hydatidiform mole, and abortion.

Clinical Features

Usually none but severe isoimmunization can lead to spontaneous abortion, intrauterine foetal death (hydrops foetalis) and neonatal death. Severely affected neonates who require exchange transfusion need to be referred to higher level for appropriate management, to avoid hyperbilirubinaemia.

Refer to higher level for appropriate management.

Prevention

- ◆ A Rh-negative woman who delivers or aborts a Rh-positive baby/foetus must have anti D 500mcg within 72 hours of delivery if she is not already isoimmunized (i.e., Rh antibody negative) (confirm if 250mcg will suffice).
- ◆ The same applies for un-isoimmunized Rh-positive mothers who have an abortion, ectopic pregnancy, or hydatidiform mole.

54.1.11 URINARY TRACT INFECTION (UTI) IN PREGNANCY

This is an infection of the urethra, bladder, ureter and the kidney. It is more common in pregnancy because of the physiological changes that cause dilatation of the urinary system and relative stasis of urine. Glycosuria and aminoaciduria in pregnancy also encourage bacterial growth. UTI can lead to abortion, premature labour, low birth weight, and intrauterine growth retardation.

ASYMPTOMATIC BACTERIURIA

Clinical Features

This condition occurs when there are 100,000 or more bacteria per milliliter of urine without any symptoms. It occurs in 2–10% of all pregnant women. If left untreated pyelonephritis will develop in 25–30%.

Investigations

- ◆ Urinalysis

Management

Oral antibiotic therapy, oral amoxicillin 500mg TDS or nalidixic acid 500mg QDS or erythromycin 500mg 6 hourly. All for 10 to 14 days.

Can be managed at all levels of health care provided culture and sensitivity results are provided.

URETHRITIS AND CYSTITIS

Clinical Features

There is dysuria, frequency, urgency, hesitancy, suprapubic pain, and false labour.

Management

- ◆ Advise on adequate hydration
- ◆ Give Oral antibiotic therapy as above
- ◆ Relieve pain using hyoscine butylbromide 20mg TDS or paracetamol 1g TDS for five days.

PYELONEPHRITIS

Clinical Features

There is fever, vomiting, renal angle tenderness, particularly on the right, and rarely premature labour.

Management

Refer to higher level for appropriate management.

54.2 Intrapartum Care and Complications

54.2.1 NORMAL LABOUR

Normal labour and delivery can be managed at all levels of health care, but they require a skilled provider linked to emergency obstetric care (EmOC) facilities through an effective referral system.

Normal labour is characterized by the onset of regular uterine contractions at term accompanied by progressive cervical dilatation and expulsion of the foetus.

Labour is divided into 3 stages:

- ◆ **First stage:** From onset to full dilatation of the cervix.
- ◆ **Second stage:** From full dilatation to expulsion of the foetus.
- ◆ **Third stage:** From delivery of the baby to delivery of the placenta.

Management

Proper management of labour reduces maternal and perinatal mortality and morbidity. It includes:

- ◆ Provision of rapid counseling and testing for HIV for those who missed during prenatal period.
- ◆ Making correct diagnosis of labour, with cervical effacement and dilatation 3– 4cm and regular uterine contractions.
- ◆ Regular assessment consisting of maternal blood pressure, temperature, respiratory rate 1 hourly, foetal heart rate half hourly, and VE 4 hourly.

- ◆ Use of partogram, which is a simple but essential tool in labour management that provides a graphic display of the labour record to show the progress of labour in terms of cervical dilatation, descent of the head, foetal condition, and maternal condition. An "alert line" and an "action line" should be noted. Parameters are charted against time. The partogram is especially useful where there is a shortage of staff, and where the majority of labours and deliveries are managed by midwives, clinical officers, or medical officers, or patients have to be transferred to other facilities for operative deliveries (e.g., caesarean section)
- ◆ The expected rate of cervical dilatation is at least 1cm/hour.
- ◆ Avoid artificial rupture of membranes unless there is a clear indication.
- ◆ Vaginal examination is done at least 4 hourly to assess cervical dilatation, moulding, caput and position. Descent assessed by abdominal palpation, noting the number of fifths of the head felt above the pelvic brim.
- ◆ Foetal condition is monitored by the foetal heart sounds and the colour of liquor.
- ◆ Maternal condition is monitored by BP, temperature, pulse, and urinalysis. Most normal labours are completed within 12 hours. The few (approximately 20%) that go beyond 12 hours should be critically evaluated to rule out cephalopelvic disproportion (CPD), inadequate uterine contraction, malpresentation, or malposition.
- ◆ Proper management of the first stage ensures the woman reaches second stage strong enough for safe delivery. Patients in labour require:
 - Psychological support.
 - Appropriate analgesia if desired by patient, e.g. pethidine 100mgIM STAT at 4–6cm cervical dilation.
 - Hydration and nourishment.
- ◆ Refer all complicated cases to higher level for appropriate management.

54.2.2 NORMAL DELIVERY

Clinical Features

Second stage (full dilatation) is achieved when contractions become strong and frequent, patient grunts and bears down and develops the urge to push the head descends further, the perineum bulges and the overlying skin becomes tense and glistening, and the anus may "gape".

Management

- ◆ Full dilatation should be confirmed by digital vaginal examination (VE).
- ◆ Mother should be encouraged to bear down with contractions and relax in between.
- ◆ At crowning, perineum should be supported with the fingers to prevent perineal tear.
- ◆ If necessary episiotomy should be done under lignocaine hydrochloride 1%5 to 10ml STAT.
- ◆ When the head is born, it is allowed to rest, the cord round the neck is checked and loosened if present.
- ◆ Anterior shoulder is delivered followed by the posterior.

- ◆ Oxytocin 10IU IM is given after delivery of shoulders; **OR** if oxytocin is not available ergometrine 0.5mg unless contraindicated (hypertension, cardiac disease, delivery of first twin).
- ◆ Cord is clamped and cut leaving adequate length for administration of drugs if needed.
- ◆ Application of tetracycline 1% tetracycline eye ointment is recommended as prophylaxis against ophthalmia neonatorum.
- ◆ APGAR (A=appearance,P=pulse,G=grimace,A=activity,R=respiration) scoring is done.
- ◆ Identification tag is applied, and the baby wrapped in warm towels and given to the mother to initiate breastfeeding.
- ◆ Baby is given a full physical examination when stable.
- ◆ Following delivery of the baby, the health care provider employs the two other AMSTEL manoeuvres, which include gentle massaging of the uterus, then delivery of the placenta.
 - Deliver the placenta by controlled cord traction.
 - Gently massage the uterus.
 - Examine the placenta and membranes for completeness, infarcts, retroplacental clot, and any other abnormalities.
 - Weigh the placenta.
- ◆ The perineum, vagina, and cervix are then examined for tears. The episiotomy and any tears discovered are repaired immediately. Patients are then observed closely for 1–2 hours before being transferred to the postnatal ward. This period of observation after delivery of the placenta is called Fourth Stage of Labour and involves monitoring of blood pressure, temperature and pulse rate hourly, together with uterine palpation, vulva inspection, and estimation of degree of blood loss.

54.2.3 COMPLICATED LABOUR AND DELIVERY

Patients in labour should be referred before labour becomes obstructed. Complications of labour may affect the mother, the baby, or both. Most complications are associated with obstructed labour. Cephalopelvic disproportion (CPD) is the major cause of obstructed labour and ruptured uterus.

Maternal complications of labour include:

- ◆ Genital tract infection
- ◆ Fistula formation
- ◆ Laceration of the genital tract
- ◆ Peripheral nerve palsies
- ◆ Foot drop

Foetal/infant complications of labour include:

- ◆ Foetal distress
- ◆ Meconium aspiration
- ◆ Hypoxia/Asphyxia
- ◆ Injuries
- ◆ Foetal death

54.2.4 CEPHALOPELVIC DISPROPORTION (CPD)

This occurs when the baby is too big for pelvis or the pelvis is too small for the baby. CPD may be due to faults in the pelvis or faults in the foetus, or a combination of both.

The faults in pelvis maybe:

- ◆ Contracted pelvis
- ◆ Deformed pelvis

The faults in the foetus may be:

- ◆ Too large baby
- ◆ Hydrocephalus
- ◆ Foetal monsters
- ◆ Locked twins(rare)

CPD is the most important cause of obstructed labour. Other causes of obstructed labour are malpresentations or malpositions of the foetus, and soft tissue abnormalities of the genital tract. Obstructed labour is the commonest cause of ruptured uterus and a major cause of maternal mortality. Obstructed labour and ruptured uterus can be prevented by appropriately timed caesarean section.

54.2.5 OBSTRUCTED LABOUR

The requirements for a diagnosis of obstructed labour are:

- ◆ The cervix fails to dilate despite good uterine contractions.
- ◆ There is oedema of the cervix and vulva.
- ◆ The head fails to descend.
- ◆ The degree of moulding increases.
- ◆ Bandl's ring occurs.
- ◆ There is urinary retention, blood stained urine on catheterization.
- ◆ There is foetal distress.
- ◆ There is maternal distress, manifested by
 - Dehydration
 - Fever
 - Tachycardia

Management

Give supportive management.

~ Refer urgently to higher level for appropriate management.

54.2.6 RUPTURED UTERUS

Ruptured uterus is an obstetric catastrophe and should be prevented. Major causes are:

- ◆ Obstructed labour
- ◆ Previous operations on uterus (C/S, myomectomy)
- ◆ Ecbolic herbs and improper use of oxytocin
- ◆ Grand multiparity
- ◆ Perforations during evacuation of uterus or D&C are a type of ruptured uterus

Clinical Features

Clinical features may be insidious ("quiet") or obvious ("classical"). In classical cases the patient who was in labour complains of severe abdominal pains, has PV bleeding, and goes into shock. Examination shows hypovolaemic shock with signs of intraperitoneal haemorrhage.

Impending rupture of the uterus can be diagnosed by:

- ◆ Observing rise in maternal pulse (more than 100 beats per minute)
- ◆ Localized abdominal pains
- ◆ Foetal distress (irregular foetal heart, meconium stain)
- ◆ PV bleeding

Management

Once recognized, refer urgently to higher level for appropriate management.

54.2.7 INDUCTION OF LABOUR

Patients who require induction of labour should be referred to higher level for appropriate management. Such patients include those with:

- ◆ Intrauterine foetal death from any cause
- ◆ Prolonged gestation (postdates, from the 42nd week and above)
- ◆ Diabetes mellitus
- ◆ Pre-eclampsia and eclampsia
- ◆ Rhesus isoimmunization

54.2.8 OPERATIVE VAGINAL DELIVERY

Level 3 with specially trained, competent and experienced provider may perform vacuum delivery(ventouse). Indications and case selection must be appropriate to avoid maternal and/or foetal injuries. These include:

- ◆ Poor maternal effort.
- ◆ Delayed second stage (within 30 minutes from full dilatation) in the absence of CPD.
- ◆ Cord prolapse in second stage.

Requirements for vacuum delivery are:

- ◆ Cephalic presentation
- ◆ Full cervical dilation
- ◆ Low head (good descent)
- ◆ Empty bladder
- ◆ Episiotomy

Contraindications for vacuum delivery are:

- ◆ CPD
- ◆ Previous caesarean or myomectomy scar
- ◆ Malpresentation (breech, transverse lie, oblique,etc.)
- ◆ Malpositions (brow and face malpositions).

54.3 Postpartum Care and Complications

54.3.1 POSTNATAL CARE

Postnatal care can be given at all levels by a skilled provider appropriately supported. Postnatal care is the care of the woman in the immediate postpartum period and within 6 weeks of delivery. This is the time the woman is returning to her normal pre-pregnant status. Targeted postnatal care has a minimum of 3 checkups. The emphasis is on starting early in the postpartum period, with the first review being 24 to 48 hours after delivery, the second review within two weeks after delivery, and the third between 4 and 6 weeks after delivery. The aim of postnatal care is to protect and promote maternal and infant health, support breastfeeding, and provide family planning counselling and services.

Immediate Postpartum Care

This includes the following:

- ◆ Repairing the episiotomy as soon as possible.
- ◆ Closely observing and monitoring maternal BP, pulse, and temperature for 1–2 hours.
- ◆ Ensuring that the uterus is well contracted, lochia loss is normal and urine has been passed.
- ◆ Encouraging the mother to establish bonding and initiate breastfeeding.

- ◆ Giving paracetamol 1gm TDS for after pains and episiotomy pain and providing rapid counseling and testing for HIV for those whose status is unknown and also giving the prophylactic ARVs to the baby (within 72 hours) if mother is positive.
- ◆ Transferring the mother to the postnatal ward.
- ◆ Continuing the above observations at least twice daily.
- ◆ Encouraging rooming-in (or “bedding-in”) of mother and baby.
- ◆ Continuing to give paracetamol 2 tabs TDS.
- ◆ Advising on nutritious diet and generous fluid intake for successful lactation.
- ◆ Giving the baby first immunizations (BCG and first polio).
- ◆ Documenting and notifying the birth to the civil registrar.
- ◆ If no problem, discharging after 24–48 hrs to avoid ward congestion. Women who deliver at home should return for checkup with their babies within 24–48 hours.

Second Follow up Visit and Review between 1 and 2 Weeks

- ◆ See at 1–2 weeks to check and treat for secondary PPH, sub-involution of uterus, puerperal infection, and whether baby is well and breastfeeding.

Third Follow up Visit and Review between 4 and 6 Weeks

- ◆ For those not breastfeeding, the visit and review should be at one month for family planning
- ◆ Otherwise the third visit is at 4–6 weeks to check for any problems in mother or baby, see whether periods and/or intercourse have resumed, and provide counseling on family planning, baby care, breastfeeding, and immunizations.
- ◆ At 6 weeks, family planning service should be provided if required. Suitable methods for lactating mothers include:
 - Progesterone-only pill given daily for 6 months with no break in between. Then change to combined pill.
 - Intrauterine device (“coil”) – provide if trained or refer.
 - Depo medroxyprogesterone acetate 150mg every 3 months **OR** norethisterone 200mg every 2 months (“injection”)
 - Etonogestrel 68mg put subdermally 21–28 days after delivery and replaced after 3 years.

Refer to higher level for voluntary surgical contraception (VSC) or “tubal ligation”.

54.3.2 COMPLICATIONS OF PUERPERIUM

The puerperium is defined as the time period of 6 weeks following delivery. Some of the maternal complications include postpartum haemorrhage, puerperal sepsis, deep vein thrombosis, psychosis, breast engorgement, mastitis, and breast abscess.

POSTPARTUM HAEMORRHAGE (PPH)

Levels 2–3 managing labour and delivery should recognize postpartum haemorrhage and initiate treatment, then refer appropriately with blood donors. The skilled provider should be supported by an effective referral system. PPH is defined as bleeding from the genital tract after delivery. Further definition categorizes it into primary and secondary PPH.

Primary Postpartum Haemorrhage

There is bleeding of more than 500ml within the first 24 hours postpartum. Clinical experience and empirical estimates of blood loss are important for diagnosis of PPH.

Secondary Postpartum Haemorrhage

There is abnormal bleeding occurring after 24 hours and up to 6 weeks postpartum. PPH is a condition that can sometimes be preventable by proper management of all stages of labour. An understanding of the factors that predispose to PPH will lead to the practice of precautionary measures that minimize its occurrence.

Patients at high risk of developing postpartum haemorrhage include the following:

- ◆ Those with prolonged or obstructed labour.
- ◆ Those with grand multiparity.
- ◆ Those with past history of PPH.
- ◆ Those with past history of retained placenta.
- ◆ Those with multiple pregnancy.
- ◆ Those with polyhydramnios.
- ◆ Those with antepartum haemorrhage, either placental abruptio or placenta praevia.

The commonest causes of PPH are:

- ◆ Uterine atony.
- ◆ Failure of adequate contraction and retraction of uterus after delivery associated with:
 - Prolonged labour
 - Precipitate labour
 - Over-distension of the uterus e.g. by multiple pregnancy and /or polyhydramnios
 - Grand multiparity
 - Fibroids
- ◆ Halothane use in general anaesthesia.
- ◆ Concealed haemorrhage in placenta abruption leading to intramyometrial haemorrhage and manifested as couvelaire uterus.

- ◆ Uterine sub-involution.
- ◆ Retained placental fragments or membranes: This is a common complication in which there is delay in completion of the third stage of labour due to adherent placenta. Adherent placenta manifests usually as actual placental invasion of the myometrial wall in the following forms:
 - Placenta accreta, which is superficial myometrial invasion
 - Placenta increta, which is deep myometrial invasion
 - Placenta percreta, which is uterine wall perforation by placenta.
- ◆ Lacerations or tears of the birth canal: This can be cervical, vaginal, or vulvoperineal.
- ◆ Other causes include disseminated intravascular coagulation (DIC), which is usually secondary to other causes like intrauterine foetal death, amniotic fluid embolism, abruptio placentae, and pre-eclampsia/eclampsia.
- ◆ Rupture of the uterus where there is previous scar, oxytocin hyper-stimulation, obstructed labour in multigravidae, and use of ecbolic herbs.
- ◆ Uterine inversion and when there is excessive cord traction, adherent placenta, manual removal of placenta, and poor technique of placental delivery.

Investigations

- ◆ Hb or PCV, most important
- ◆ Bleeding time
- ◆ Clotting time

Management

General measures include

- ◆ Put up an IV line.
- ◆ If can't manage, refer. Specific measures depend on the cause.

UTERINE ATONY

Do a bimanual uterine massage and express any clots. This may also provoke uterine contractions. Put up an oxytocin drip 20 units in 500ml dextrose or normal saline to run at 20 drops per minute for about 2 hours. If this is not sufficient, refer.

RETAINED AND ADHERENT PLACENTA

Retained Placenta also causes uterine atony. The following is recommended:

- ◆ **Apply general measures as above.**
- ◆ Manual removal of the placenta in lithotomy position on the delivery couch, and administer:
 - 10–20mg diazepam IV, then
 - Try manual removal of placenta using the ulnar surface of the right hand with the left hand supporting the uterus. If this is not possible then see below.

ADHERENT PLACENTA

Refer to higher level for appropriate management.

LACERATIONS/TEARS OF GENITAL TRACT

Cervical Tear

The following are important for cervical tear:

- ◆ Review in lithotomy position and in good light.
- ◆ Secure a good exposure of cervix by 2 Sims's specula.
- ◆ Carry out a careful evaluation of the extent of the tear.
- ◆ Repair cervix with No. 1 catgut and achieve haemostasis.

Refer the patient with cervical tear to higher level for appropriate management if skills and facilities for repair not available or general anaesthesia be required because of a big tear or laparotomy considered necessary.

Vaginal Tear

The following are important for vaginal tear:

- ◆ Examine in lithotomy position.
- ◆ Carry out ligation of bleeders and repair of tears and laceration with No.1 catgut.
- ◆ Carry out evacuation of haematoma.

Vulvoperineal Tear

Proper management of episiotomy involves:

- ◆ Define upper end.
- ◆ Stitch vaginal epithelium with continuous catgut No. 1 suture.
- ◆ Stitch muscle layer with the same interrupted stitch.
- ◆ Stitch skin with interrupted catgut.
- ◆ Repair all other tears.
- ◆ Refer to higher level for appropriate management if suspected to have disseminated intravascular coagulopathy (DIC) (refer with blood donors) or because of bleeding with failure to clot.

Ruptured Uterus

Resuscitate and refer to higher level for appropriate management.

Uterine Inversion

Perform manual replacement or refer:

- ◆ Initiate oxytocin drip 20 units in 500ml 5% dextrose 20 drops per minute.
- ◆ The inserting fist to remain until uterine cavity is well contracted.

54.3.3 PUERPERAL INFECTIONS

These are any postpartum infection of the genital tract complicating labour or delivery, an important contributor being wound sepsis after caesarean section. Extra genital causes of puerperal fever must be considered and looked for. These include upper and lower urinary tract infections, deep vein thrombosis, respiratory tract infections, and mastitis with associated breast engorgement.

Clinical Features

There is fever of greater than 38°C during the first 6 weeks after delivery. Other features include lethargy, general malaise, toxicity, dehydration, lower abdominal tenderness, foul-smelling lochia, parametrial pain, and thickening and retained membranes.

Management

Carry out first aid, give first dose of broad spectrum parenteral antibiotics then urgently refer to higher level for appropriate management.

PUERPERAL SEPSIS

This is usually a polymicrobial infection presenting as a combination of endometritis, endomyometritis, and endoparametritis. Associated risk factors are: prolonged labour, prolonged rupture of membranes, low socioeconomic status, caesarean section, and underlying chronic debilitating disease. Anaerobic organisms are encountered in most infections associated with puerperal sepsis.

Investigations

- ◆ Haemoglobin and PCV
- ◆ Urinalysis

Management – General

General measures/non-pharmacological therapy on admission are as follows:

- ◆ For rehydration: Start an IV line of 500ml 5% dextrose.
- ◆ Keep patient warm.
- ◆ Arrange for infant care in nursery or by relatives.
- ◆ Evacuate uterus for any remaining placental tissue or membranes.

Management – Pharmacological

◆ *Oral therapy for mild sepsis:*

- Amoxicillin/Clavulanic 625 mg BD for 5 days + metronidazole tablets 400mg TDS for 5 days+paracetamol tablets 2 TDS for 5 days.

◆ *Parenteral therapy for severe sepsis:*

- Crystalline penicillin injection 3 mega IV or IM QDS for 5 days + gentamicin 80 mg IV or IM TDS+metronidazole 500mg IV TDS for 5 days.

Management – Surgical

Refer patients with the following:

- ◆ Patient toxic
- ◆ Patient febrile >39.C
- ◆ Patient dehydrated
- ◆ Patient not able to take oral drugs
- ◆ Pelvic abscess or peritonitis suspected
- ◆ Also refer cases of severe infections or those who may require surgery to higher level for appropriate management

54.3.4 SEPTIC PELVIC THROMBOPHLEBITIS

This condition occurs with development of ovarian vein thrombophlebitis in a patient with preceding pelvic soft tissue infection. It presents as a definite mass extending caudally and is a rare condition that is diagnosed mainly by exclusion. Response to therapy is poor.

Refer to higher level for appropriate therapy. Heparin 10,000 units 4 hourly until symptoms abate is part of good management.

54.3.5 EXTRA-GENITAL DIFFERENTIAL DIAGNOSES

These include urinary tract infection, deep vein thrombosis and respiratory tract infections. Respiratory complications are an infrequent cause of puerperal morbidity, with lobar pneumonia being the most serious infection and may be complicated by atelectasis. Patients who have delivered through caesarean section are the most susceptible to developing this condition.

54.3.6 BREAST CONDITIONS

These involve the following conditions:

- ◆ Breast engorgement: This is accompanied by inflammation of breast and fever. Adequate breastfeeding and paracetamol 1g TDS for 5 days are usually adequate.
- ◆ Mastitis: This is infection of the parenchyma of mammary glands. It may occur any time postpartum but usually 2–3 weeks after. Predisposing factors include: breastfeeding per se, fissures in nipple, and recent weaning.

Presentation and Diagnosis

Diagnosis of mastitis is usually made on the basis of the pain on the same side, localized cellulitis, and axillary lymph nodes that may be palpable and tender. The most common causative organism is *Staphylococcus aureus*.

Management

- ◆ Express milk on affected side.
- ◆ Apply ice packs.
- ◆ Support affected breast.
- ◆ Antibiotics: Amoxicillin/ clavulanate 625mg 12 hourly **OR** flucloxacillin 500mg 6 hourly for 5 days; plus paracetamol 1g 8 hourly for 5 days.

Breast abscess may be a sequelae of mastitis. In addition to the above measures incision and drainage will be necessary as well as stoppage of breastfeeding when there is a purulent discharge. If abscess does not respond to this, refer to higher level for appropriate management.

54.3.7 DEEP VEIN THROMBOSIS (DVT)

The risk of symptomatic thromboembolic disease during pregnancy is about 6 times greater than in the non-pregnant state and the incidence is even higher in the postpartum interval. Risk factors include advanced maternal age, grand multiparity, history of DVT, operative delivery, and venous stasis (e.g., prolonged bed rest).

Management - Pharmacological

The mainstays of DVT treatment are anticoagulation therapy, stockinet, and ibuprofen 400mg TDS.

Patient Education

- ◆ Avoid contraceptives containing oestrogen. Use non-hormonal or progesterone only injectable contraceptives or oral progesterone contraceptive as appropriate.
- ◆ Avoid prolonged bed rest, where appropriate. Exercise legs even during bed rest.

54.3.8 PUERPERAL PSYCHOSIS

The following are risk factors of puerperal psychosis:

- ◆ Family history of major psychological illness of close relative, e.g. mother.
- ◆ Major emotional complications during and after a previous pregnancy
- ◆ "Reaction" of current pregnancy.
- ◆ "Fear" of labour from a previous experience.
- ◆ Traumatic childhood.
- ◆ Deprivation of emotional support during adult life, e.g., single mother.
- ◆ Severe prolonged or multiples somatic symptoms with no apparent organic cause during current/or succeeding pregnancy.
- ◆ Major sustained mood changes or repeated rapid mood swings or abnormal sleep patterns.
- ◆ Refer to Mental Illness chapter for clinical features and management.

55. Family Planning (FP)

Family planning means that “everyone should plan their family so that all children are born when wanted, expected, and welcome”. The health benefits of family planning play a major role in protecting the lives of infants, children, women and the family as a whole. See also National Family Planning Guidelines for Service Providers 6th edition (RMHSU 2018).

Many categories of people can be involved in the provision of FP advice, information, and services, provided they have received the necessary training and instruction. Similarly, FP can be provided in varied settings (including levels 2–3) and within facilities operated by various providers (public, faith based, private) provided they conform to the basic requirement for the provision of the particular FP method.

Family planning methods are grouped roughly as hormonal and non-hormonal. Table 55.1 indicates whether a method is or is not recommended for a particular group of women, and Table 55.2 shows the effectiveness of various methods. Subsequent sections discuss the range of family planning choices.

55.1 : Family planning methods and their suitability for various types of users

<u>Method recommended for the</u>	<u>Not recommended for the</u>
<u><i>Combinedpill</i></u>	
Women under 40 years, of any parity Women who want highly effective contraception Breastfeeding mothers after 6 months postpartum Younger women/adolescents who are sexually active and have been adequately counselled	With suspected pregnancy Who are over 35 years and smoke With history of blood clotting disorders or heart disease With lump in either breast, liver disease With unexplained abnormal vaginal bleeding. With BP over 140/90mm/Hg confirmed on revisit
<u><i>Progestin-only pill</i></u>	
Women of reproductive age, of any parity Breastfeeding mothers after 4–6 weeks postpartum	With suspected pregnancy With history of blood clotting disorders or heart disease With lump in either breast, liver disease Unexplained abnormal vaginal bleeding
<u><i>Injectable methods</i></u>	
Women of proven fertility Breastfeeding mothers after 6 weeks postpartum Women who want long-term contraception Women who want at least 2 years between pregnancies	With suspected pregnancy With history of blood clotting disorders or heart disease With lump in either breast, liver disease With unexplained abnormal vaginal bleeding
<u><i>Implants</i></u>	
Women needing long-term protection Breastfeeding mothers after 6 weeks postpartum (Long term highly effective contraception) Women who have their desired family size but do not want permanent surgical contraception	With suspected pregnancy With history of blood clotting disorders or heart disease With lump in either breast, liver disease With unexplained abnormal vaginal bleeding
<u><i>Intrauterine devices</i></u>	
Women who have delivered 1 or more times Breastfeeding mothers Women who want long-term contraception Women in a stable monogamous sexual relationship Women after 6 weeks postpartum; before 6 weeks if provider has specialized IUD insertion training	With suspected pregnancy, history of PID or ectopic pregnancy. With anaemia or heavy menstrual bleeding Having no menses after 6 weeks postpartum With history of heart disease With abnormalities or cancer of pelvic organs Having unexplained vaginal bleeding or severe menstrual pains At risk of exposure to STDs
<u><i>Male and female condom</i></u>	
Men who desire to take contraceptive initiative Couples needing an immediately effective method Couples waiting to rule out a suspected pregnancy Couples at risk of exposure to HIV, STDs	Who desire or require highly effective protection against pregnancy Who are allergic to latex

Continued

Table 55.1: continued

Method recommended for the group	Not recommended for the group
<u>Natural family planning</u>	
Couples willing to learn about the woman's cycle and to practise abstinence 1–2 weeks each cycle Couples who, for religious or any other reasons, desire to practice periodic abstinence	Who need/want more effective contraception With irregular menstrual cycle Who are breastfeeding Who must not become pregnant for health or any other reasons Who are unwilling to abstain during fertile period
<u>Tubal ligation or vasectomy</u>	
Couples or individuals who have been fully counselled, understand and have voluntarily signed consent form. Couples with desired family size. Women for whom age or health problems might cause an unsafe pregnancy. Couples who are certain they want no more children regardless of accidental death of a child or children	Who do not fully understand VSC (Voluntary Surgical Contraception (VSC) or are willing To agree to items on the consent form. Note: Men or women whose spouses oppose VSC should be considered on a case by case Basis for the procedure.

55.2 : Guide to family planning methods

Method	Pregnancy rate?	Used at inter-course?	Effect on STD risk?	Compatible with breast-feeding?	Return to fertility after stopping?
Male sterilization	0.15 (0.1)	No	None	Yes	Permanent method
Female sterilization	0.4 (0.2)	No	None	Yes	Permanent method
Implants	0.2 (0.04)	No	Probably none	Yes, but not a preferred method. Wait 6 weeks postpartum	Immediate on removal
Combined oral contraceptives	1–8 (0.1–3)	No	May protect against some forms of PID, but increase risk of infection with some STDs	After 6 months postpartum, but not preferred method if breastfeeding	Immediate to short delay (average 2–3 months)

Continued

Table 55.2, continued

Method	Pregnancy rate?	Used at inter-course?	Effect on STD risk?	Compatible with breastfeeding?	Return to fertility after stopping?
Progestin-only minipill	3–10 (0.5–3)	No	None	Yes, but not preferred method. Wait 6 weeks postpartum	Immediate to short delay
Injectables	0.3–0.4	No	Unknown	Yes, but not preferred method. Wait 6 weeks postpartum	Delayed 4–12 months
Intrauterine devices (IUCD)	3 (0.3–2)	No	Increase risk of PID in women at risk of STDs	Yes	Immediate after removal by trained provider
Condoms	12 (2)	Yes	Protective (70% against AIDS)	Yes	Immediate
Natural family planning	20 (1–9)	No	None	No, method not reliable	Immediate

55.1 Hormonal Contraceptives

In this category of contraceptives are “the pill”, which has been modified over the years to reduce side effects and improve effectiveness, as well as injectables and implants. They all work to affect the body’s hormone functions. Some combine both progestogen and oestrogen and others have only one or the other. They are described in turn.

55.1.1 COMBINED ORAL CONTRACEPTIVE PILL

This pill contains a combination of progestogen and oestrogen in proportion and quantity that vary across the various preparations. The pill acts by inhibiting ovulation and thickening the cervical mucus, thus providing a physical barrier to spermatozoa and making the endometrium too thin for implantation.

Client Education

This should contain the following information with regard to the pill:

- ◆ It is highly protective against pregnancy.
- ◆ Pregnancy rate increases if the pill is not taken regularly.
- ◆ It may be associated with minor complaints, such as nausea, headache, weight gain, and gastrointestinal upsets.
- ◆ It is unsuitable for breastfeeding mothers because of its suppressive effect on milk output.

- ◆ If you forget to take one pill, take it as soon as you remember. The next pill should be taken at the regular time even if this means that you have to take 2 pills on the same day.
- ◆ Return to the clinic if you experience the following:
 - Suspected pregnancy.
 - Swelling or pain in legs.
 - Yellowing of skin or eyes.
 - Pain in the chest, or arms or shortness of breath.
 - Severe headaches, depression, vision difficulties.
- ◆ Side effects: Although many side effects of oral contraceptives use have been eliminated with low dose pills, some women still experience irregular menstrual bleeding, nausea, weight gain, headaches, skin colour changes, and other side effects. These may go away after several months or continue for as long as oral contraceptives are taken
- ◆ Complications: Increased risk of cardiovascular disease in women over 35 years of age who smoke, and increased risk of hypertension. Users exposed to STIs may be at risk of serious diseases, including PID and possibly cervical cancer.
- ◆ Non-contraceptive benefits:
 - Reduces menstrual flow (lighter, shorter periods).
 - Decreases dysmenorrhoea.
 - Protects against ovarian and endometrial cancer.
 - Decreases benign breast disease.
 - Gives some protection against ectopic pregnancy.

55.1.2 PROGESTOGEN-ONLY PILL (MINIPIILL)

This is a pill that is taken daily. It contains only a progestogen and acts by altering the cervical mucus, making it thicker/denser, thus preventing sperm transport. It also suppresses ovulation and inhibits implantation of fertilized ovum.

Client Education

This should include the following:

- ◆ Used in breastfeeding mothers because it does not interfere with lactation.
- ◆ Has a high level of pregnancy protection.
- ◆ There is need for compliance on a daily regimen.
- ◆ Unrelated to sexual intercourse.
- ◆ May cause menstrual irregularities.
- ◆ If one forgets to take one pill, one should take it as soon as they remember (see combined pills).
- ◆ One should return to the clinic immediately for a pregnancy check if 45 days have passed since one's last menstrual period.
- ◆ Side effects: Users may experience irregular bleeding patterns.
- ◆ Complications: Studies to date have shown no long-term complications.
- ◆ Non-contraceptive benefits:
 - Does not affect lactation.
 - Lighter shorter periods.

- Decreased breast tenderness.
- Does not increase blood clotting.
- Decreases dysmenorrhoea.
- Protects against endometrial cancer.

55.1.3 EMERGENCY CONTRACEPTIVES

Emergency contraceptives reduce the occurrence of pregnancy from unprotected intercourse by 8% to 2% (75% protection).

Unprotected intercourse as a result of:

- ◆ Choice
- ◆ Intoxication/drug use
- ◆ Rape
- ◆ Condom leakage
- ◆ Condom breakage/slippage

Types of Emergency Contraceptives

- ◆ Ethinyl estradiol 50mcg + norethisterone 1mg take 2 tablets then repeat after 12 hours). Requires a total of 4 tablets. **OR**
- ◆ Four tablets of ethinyl estradiol 30mcg+levonorgestrel 150 mcg(e.g., microgynon or nordette) to be taken within 72 hours of unprotected intercourse. Repeat the same dose 12 hours later.
- ◆ One tablet of 75mcg levonorgestrel 2, and repeat the same dose 12 hours later all within 72 hours of exposure.

55.1.4 INJECTABLE CONTRACEPTIVES

These are either progesterone only or combined progesterone plus oestrogen. They consist of long acting progestogen usually administered as deep intramuscular injections. They act by suppressing ovulation, inducing a thin atrophic endometrium, and producing a thick cervical mucus that is difficult for sperm to penetrate.

Types of Injectables

They are available in two forms:

- ◆ Depo medroxyprogesterone acetate (Dmpa),e.g.,Depo-Provera:150mg per vial and given as a deep (depot) intramuscular injection every 3 months.
- ◆ Norethisterone enanthate (NetEn),e.g. Noristerat: As 200mg vials and given at 2-month intervals

A third group of injectables consists of combined (oestrogen+progesterone) and given monthly:

- ◆ Cyclofem (DMPA 25mg + oestradiol cypionate 5mg).
- ◆ Mesiyna/Norigynon (Net En50mg + oestradiol valerate 5mg).

Client Education

- ◆ May be associated with heavy menses, amenorrhea or spotting.
- ◆ Regular administration is required.
- ◆ Return to the clinic as scheduled to continue using this method.
- ◆ Return to the clinic if one suspects pregnancy, has dizziness or experiences heavy bleeding.
- ◆ Side effects: Users may experience menstrual irregularity (amenorrhea, spotting, and rarely, heavy bleeding).
- ◆ Complications: Studies to date have shown no long-term complications.
- ◆ Advantages: They contain natural oestrogens and hence have a protective effect on CVS and CNS and give a better cycle control.

55.1.5 SUB-DERMAL IMPLANTS

These are Implanon and Jadelle (etonorgestrel 68mg). Jadelle contains 2 rods of progestogen, inserted under the skin of the arm, that slowly release progestogen for up to 5 years. The method acts by thickening cervical mucus, suppressing ovulation, and causing atrophic changes in the endometrium that make it unsuitable for zygote implantation. Implanon is a single rod combined progesterone oestrogen implant that gives protection for 3 years.

Client Education

The following is important:

- ◆ May be associated with prolonged menses, spotting, or amenorrhea.
- ◆ Requires a minor surgical procedure for insertion and removal.
- ◆ If possible return to the same clinic if you desire implant or removal.
- ◆ Return for removal anytime you desire, but it can be kept in place for 5 years.
- ◆ Return to the clinic if you:
 - Suspect pregnancy.
 - Experience pain, swelling or pus at the implant site
 - Experience dizziness or headache.
 - Experience heavy bleeding.
- ◆ Benefits include the following:
 - Highly effective.
 - Immediate return to fertility.
 - Offers continuous, long-term protection.
 - Reduces menstrual flow.
 - Protects against endometrial cancer and ectopic pregnancy.
 - Does not affect lactation.
- ◆ **Side effects:** Users may experience infection at insertion site, irregular menstrual bleeding (longer bleeding episodes, amenorrhea, or spotting).
- ◆ **Complications:** Studies to date have shown no serious long-term complication

55.2 Intrauterine Contraceptive Device (IUCD)

This forms a highly effective long-term widely used family planning method worldwide (refer to Table 55.3 for the various types). The modern IUCD is a plastic device usually bound with copper wire and is placed in the uterus through the cervix. Lippes's loop has no copper. The IUCDs act by preventing the implantation of fertilized ovum, inhibiting sperm mobility, and inhibiting fertilization.

55.3 : Types of IUCDs

Device	Duration of effectiveness
CopperT380A	Up to 12yrs
Nova T	5yrs
Multiload-MLCu-375	5yrs
Multiload-MLCu-250	3yrs
CopperT220	3yrs
Gynefix	8yrs
Hormone releasing IUCDs: e.g., Mirena (LNG-IUCD), Progestasert(Progesterone IUCD)	5yrs

Client Education

The following is important:

- ◆ Check regularly to ensure IUCD is in place.
- ◆ Return for removal any time, but most can be worn for 3–10 years and the Lippes Loop R for an indefinite period of time.
- ◆ May cause dysmenorrhea and menorrhagia.
- ◆ Return to the clinic in case of:
 - Signs of pregnancy, heavy bleeding or spotting.
 - Abnormal sexual pain or vaginal discharge.
 - Chills or fever.

Benefits include the following:

- Highly and immediately effective.
- Long-term protection with immediate return to fertility upon removal.
- Does not interfere with intercourse.
- Can be used in women who are breastfeeding.
- **Side effects:** Users may experience pain on insertion and increased menstrual bleeding and abdominal cramps for the first 1 or 2 periods.
- **Complications:** Increased risk of anaemia if heavy bleeding occurs, uterine perforation(rare), and increased risk of PID and associated infertility, especially within 4 months of insertion and in women at risk of STDs.

- Displacement: When threads are not visible at the cervix and pregnancy is ruled out then:
- Refer to higher level if difficult to remove for appropriate management.
- If one conceives with the IUCD in place, remove it if possible; otherwise leave alone until delivery (ultrasound if possible) and counsel client accordingly.

55.3 Barrier Methods

In this category are the condoms, diaphragm, spermicides, and cervical cap.

55.3.1 THE MALE CONDOM

Offer physical barrier to sperm deposition in the vagina. Condoms also offer some protection against STIs including HIV/AIDS, HBV, and carcinoma of the cervix.

Client Education

The following is important:

- ◆ Before every intercourse, place condom on erect penis, leaving tip empty to collect semen.
- ◆ Withdraw the penis from the vagina after each ejaculation while the penis is still erect.
- ◆ Remove condom after use.
- ◆ Do not re-use condoms.
- ◆ Discard used condom immediately in toilet or pit latrine.
- ◆ Using spermicides with condoms increases the effectiveness.
- ◆ Complications may include local irritation if allergic to latex/lubricants.
- ◆ May interfere with sexual pleasure for some people.
- ◆ **Side effects:** Some users experience sensitivity to rubber or lubricants.

Benefits

- ◆ Fairly effective if used properly.
- ◆ Immediately effective.
- ◆ Highly effective protection against STIs/HIV/AIDS
- ◆ May prevent premature ejaculation.

55.3.2 THE FEMALE CONDOM

The female condom is a thin (0.05 mm) polyurethane sheath, 7.8cm in diameter and 17cm long. It is soft, loose fitting, and has two flexible rings. One ring is inserted into the vagina and acts as an internal anchor. The other ring forms the open edge of the device and remains outside the vagina after insertion. The female condom provides protection for one act of intercourse. It can be inserted up to 8 hours before intercourse but must be removed immediately after.

55.3.3 SPERMICIDES

Spermicidal creams, jellies and/or foaming tablets are inserted into vagina before sexual intercourse and act by inactivating the spermatozoa and physically preventing entry into uterus. Best used with condoms.

Client Education

The following is important:

- ◆ Interferes with natural spontaneity of sexual act.
- ◆ May cause local irritation.
- ◆ May be difficult to insert by client.
- ◆ Low effectiveness as a contraceptive.
- ◆ **Side effects:** Some users experience sensitivity to spermicide.
- ◆ **Complications:** None.

54.2.1 DIAPHRAGM AND CERVICAL CAP

A flexible rubber cover or cap to cover the cervix, inserted before sexual intercourse forming a physical barrier for sperm entry. Should be used with a spermicide. It is not a commonly used contraceptive owing to difficulty of self- insertion and its associated high failure rate. However, it is protective against cancer of the cervix risks in the long term.

Client Education

- ◆ Diaphragm and cervical cap:

- Must be fitted by a provider and refitted after marked weight change.
(5kg gained or lost, or after childbirth).
- Must be kept clean and stored properly.
- Must be used with spermicide.
- Diaphragm, or cervical or contraceptive sponge.
- Can be inserted up to 6 hours before intercourse.
- Can remain in place for 6 hours (not longer than 24hours).
- Contraceptive sponge must be moistened with water to activate its spermicide. Contraceptive sponge must never be re-used and must not be used during menstruation.

- ◆ **Side effects:** Some users experience sensitivity to rubber or lubricants/ spermicides; some diaphragm users experience increased frequency of urinary tract infection.

- ◆ **Complications:** None.

55.4 Surgical Contraception

Many factors have contributed to improved safety of voluntary surgical contraceptive in the last 20 years. These include improved anaesthetic methods, better surgical techniques, asepsis, improved training of personnel, and better selection and monitoring of clients.

55.4.1 TUBAL LIGATION

A voluntary irreversible procedure for fallopian tubal occlusion that can be done under general or local anaesthesia by minilaparotomy or laparoscopy.

~ Refer to level 4 for provision. Client Education

- ◆ More or less irreversible (permanent).
- ◆ Failure is very rare when done by a trained professional.
- ◆ Counseling is absolutely necessary.
- ◆ No loss of libido or vigour or health.
- ◆ Return to the clinic if one experiences:
 - Postoperative fever, pus, or pain at the surgical site.
 - Weakness or rapid pulse.
 - Vomiting or persistent abdominal pain.
- ◆ Benefits:
 - Permanent, highly and immediately effective
 - No change in sexual function
 - Good for client if pregnancy would be a serious health risk
 - Does not affect lactation
- ◆ **Side effects:** Some users experience minor pain and bleeding and wound infection following procedure
- ◆ **Complications:** Injury to other organs (e.g., gut, bladder) and rarely death; risk of complications increased if general anaesthesia is used. Haemorrhage.

55.4.2 VASECTOMY

A voluntary surgical procedure to cut and ligate the vas deferens so that spermatozoa cannot be ejaculated. Done under local anaesthesia. Now gradually becoming acceptable in Kenya.

Client Education

- ◆ Counselling necessary: permanent and irreversible.
- ◆ Use condom for at least 15 ejaculations.
- ◆ Return to the clinic if one experiences:
 - Postoperative fever.
 - Excessive swelling, pus, or pain at the surgical site.

- ◆ **Side effects:** Some users experience minor swelling, pain, infection, and bruising following procedure.
- ◆ **Complications:** Risk of serious complications or death extremely low.

55.5 Periodic Abstinence (Natural Family Planning)

Avoidance of sexual intercourse during ovulation and for a safety margin before and after ovulation. Various methods may be used to determine the fertile period: cervical mucus, basal body temperature, rhythm/cycle.

Benefits

- ◆ No physical side effects and it is cheap.
- No need for prescriptions by medical personnel.
- Improved knowledge of reproductive system and possible closer relationship between couples.

Client Education

Requires high motivation and highly cooperative partners.

Has a high failure rate.

Assumes a regular, perfect menstrual cycle.

Requires proper record-keeping.

Has no health risks, except for pregnancy.

Side effects: None.

Complications: None.

PART VI: Principles of Oxygen Use

IN THIS SECTION

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56. Introduction

The aim of this section is to describe the indications and procedure for use of oxygen therapy and its mode of delivery.

When used as a form of medical treatment, oxygen is regarded as a drug and thus must be prescribed. Clinicians must bear in mind that supplemental oxygen is given to improve oxygenation, but does not treat the underlying causes of hypoxaemia which must be urgently diagnosed and treated.

Definitions

Oxygen therapy-is a lifesaving treatment that provides the patient with supplemental oxygen through a device

Hypoxaemia-is the medical term for a low blood oxygen level, and should always be monitored and treated by a skilled health worker.

Hypoxia-is low oxygen in the tissues such as can occur in acute illness due to failure in any of the systems that deliver and circulate oxygen. Hypoxaemia is the most common cause of hypoxia.

56.1 Principles of Oxygen Use

56.1.1 SIGNS AND SYMPTOMS OF HYPOXAEMIA

These include the following:

- ◆ Shortness of breath
- ◆ Fast breathing
- ◆ Increased heart rate and blood pressure, which may progress to low heart rate and low blood pressure if not treated
- ◆ Tiredness
- ◆ Anxiety or agitation
- ◆ Paleness, which may progress to Cyanosis if not treated.
- ◆ Headache, which may progress to confusion,
- ◆ Blurred vision,
- ◆ Loss of muscle coordination and eventually coma if not treated
- ◆ Tissue damage due to hypoxia

56.1.2 HOW TO DETERMINE WHEN OXYGEN THERAPY IS NEEDED

Apart from using the symptoms, blood oxygen levels can be determined through the following;

- i) **Pulse oximetry:** *Pulse oximetry is a test in which a tiny clip like electronic device (the pulse oximeter) is used to find out blood oxygen saturation. For healthy individuals, oxygen will usually fall between 95% and 100%.*

When the blood oxygen levels registers between 90 and 92%, a patient may need supplemental oxygen, and readings below 90% indicate immediate medical attention and intervention is required.

- ii) **Arterial blood gas saturation:** *This is a blood gas test that gives a more accurate measure of how much oxygen and carbon dioxide is present in blood. It is a measure of how efficiently the lungs are exchanging gases.*

56.1.3 INDICATIONS FOR OXYGEN THERAPY

Some conditions where oxygen therapy can be prescribed include but are not limited to the following:

Chronic obstructive pulmonary disease, Pulmonary fibrosis, Pneumonia, Severe asthmatic attack, Cystic fibrosis, pleural effusion, pulmonary embolism, pneumothorax, sleep apnoea.

Cardiac arrest or resuscitation, acute heart failure, severe anaemia, post -operative breathlessness

Hypoxia from excessive bleeding, shock, sepsis, major trauma, drowning, anaphylaxis, major pulmonary haemorrhage, status epilepticus and carbon monoxide poisoning

NB; Refer to the specific section dealing with these conditions for the detailed information on their management and oxygen therapy in those conditions.

56.1.4 ADMINISTRATION OF OXYGEN/STARTING THERAPY

Knowing when to start patients on oxygen therapy can save many lives, however ongoing assessment and evaluation should be carried out to ensure the therapy is safe and effective. Oxygen should be prescribed to achieve a target saturation of 94-98% for most acutely ill patients or 88-92% or patient specific target range for those at risk of hypercapnic respiratory failure. The specific ranges are provided in the relevant sections within these guidelines

Some key points before the administration of oxygen include the following:

- ◆ Shortness of breath
- ◆ Hypoxia is an indication that oxygen therapy should be started
- ◆ Oxygen does not treat breathlessness in the absence of hypoxaemia
- ◆ A target oxygen saturation range should be prescribed to guide therapy
- ◆ A lower target saturation range should be prescribed for patients who are at risk of hypercapnia
- ◆ The amount of oxygen received by the patient is dependent on the delivery device used, thus health workers should ensure appropriate and correct selection and use of the devices.

When starting oxygen therapy, the health worker should be keen on the following;

- ◆ Document the baseline observations including saturations, respiratory rate, blood pressure and pulse rate
- ◆ Ensure pulse oximetry is available to monitor response to oxygen therapy
- ◆ Note the patients respiratory effort, colour and level of consciousness
- ◆ Confirm the prescription of oxygen with a stated target saturation range (except in dire emergencies such as cardiac arrest where documentation may be done post procedure)
- ◆ Ensure delivery device is connected via tubing to oxygen supply and turned on to the appropriate rate
- ◆ Have explained to the patient and get appropriate consent where possible. Reassure the patient if they are very breathless
- ◆ Monitor response to oxygen therapy-recheck saturations, vital signs, colour and level of consciousness
- ◆ Document all adjustments, with saturations recorded.

Weaning with reduction of oxygen therapy should be considered upon satisfactory oxygen saturation in the patient. Oxygen should be discontinued once the patient can maintain saturations within or above the target range breathing air.

Humidification of oxygen: When oxygen is delivered at a flow rate of 1-4L/min by mask or nasal prongs, the oropharynx or nasopharynx provides adequate humidification. At higher flow rates or when oxygen is delivered directly to the trachea humidification is necessary. The type of humidification device selected will depend on the oxygen delivery system that is in use, and the patients requirements

56.2 Methods of Delivering Oxygen

Oxygen is delivered via variable performance or fixed performance devices.

Variable performance devices, also known as uncontrolled oxygen systems or low flow oxygen delivery devices include non-re-breathing masks, nasal cannulae and simple face masks. The amount of oxygen delivered through these devices is dependent on the oxygen flow rate, the patient's inspiratory volume, respiratory rate and proportion of room air added during breathing.

Non rebreather masks (or Reservoir masks) are recommended for short term use in patients who are critically ill. Oxygen at 10-15L/Min via a reservoir mask delivers oxygen at concentrations of 60-85%.

The simple face mask is usually intended for short term use, such as post-operative recovery period, with oxygen being delivered at 2-10L/min and supplemented with air drawn into the mask during breathing

Nasal cannulae are used for patients who are stable to provide supplementary oxygen therapy. They are more comfortable and well tolerated by patients. They do not need to be removed when the patient is talking or eating. Oxygen is inhaled even when breathing through the mouth.

Fixed performance devices, also known as controlled oxygen or high flow delivery systems deliver a fixed proportion of air and oxygen via a venture valve, thus ensuring accurate concentration of oxygen is delivered. Fixed performance devices are used in acute illness patients who are at risk of carbon dioxide retention and include venturi

mask, trans-tracheal catheters, continuous positive airway pressure (CPAP) therapy and ventilators.

56.3 Risks of Oxygen Therapy

Like any drug, there should be clear indications for treatment with oxygen and appropriate methods of its delivery. Inappropriate dose and failure to monitor treatment can have serious consequences including hyperoxaemia, carbon dioxide narcosis, depressed ventilation and lung collapse. Vigilant monitoring to detect and correct adverse effects is essential. To ensure safe and effective treatment prescriptions should cover the flow rate, delivery system, duration, and monitoring of treatment.

PART V: Management of Blood and Blood Products

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57. Introduction

This section of the managements of blood and blood products has been prepared by the Ministry of Health to assist physicians and other health care providers in the correct selection of patients for transfusion, and the safe administration of blood and blood products.

Severe anaemia is a major health problem in Kenya and is frequently treated with blood transfusion. Transfusion of blood and products can save lives, but are not without risks or costs. Some of the possible complications include the transmission of infectious diseases such as HIV, Hepatitis B, Hepatitis C, syphilis and malaria, as well as haemolytic and non-haemolytic transfusion reactions, immunosuppression, and alloimmunization. Safe blood is a scarce and valuable resource that is expensive to collect, process, and administer. Limiting transfusion to patients whose chance of survival or quality of life is improved with blood will help to lower the high demand for blood and will reduce unnecessary exposure of patients to the risks of transfusion.

For effective implementation of blood transfusion the hospital should establish a Hospital Transfusion Committee which serves to ensure that the quality of blood transfusion services and practices is maintained at a high level. The Transfusion Committee will oversee all policies and procedures relating to blood utilization for the hospital, namely selection of patients for transfusion; ordering, distribution, handling, and administration of appropriate blood and blood components; and the monitoring of the effects of blood on patients, including the investigation of blood transfusion reactions (refer to hemovigilance guidelines).

The following are recommended for appropriate transfusion practice:

- ◆ Blood should be transfused only when required to save a life. The decision to transfuse should be based on an estimate of the patient's risk for developing complications of inadequate tissue-oxygen delivery and should be based on both the haematological and the clinical status of the patient.
- ◆ Red cell transfusion is recommended for patients whose haemoglobin is less than 5g/dl. Stable patients at even this level of haemoglobin may not need blood transfusion.
- ◆ Efforts should be made to stabilize patients through use of intravenous therapy with crystalloids and colloid solutions and oxygen therapy before blood is available.
- ◆ A patient should be re-evaluated by clinical and nursing staff immediately prior to blood transfusion to ensure that the transfusion is still required. The patient may have stabilized with supportive measures and may no longer need transfusion. The patient should not be transfused purely because compatible blood is available.
- ◆ Effective transfusion requires a minimum of 1 unit of blood for an adult or 20ml whole blood (10–15 ml packed cells) per kilogram body weight for a child.

- ◆ Before transfusing a second unit, the post transfusion haemoglobin level should be compared with the pre-transfusion value to assess the efficacy of the transfusion.

58. Use of Red Cell Products

The following general information is important when using red cell blood products:

- ◆ A red blood cell (RBC) transfusion is intended to increase the delivery of oxygen to the tissues. Red blood cells can be transfused as either whole blood or packed red blood cells (PRBCs).
- ◆ A unit of whole blood measures approximately 400–500 ml and has a hematocrit of 38–54%. A unit of packed red blood cells (PRBCs) consists of the red blood cells concentrated from a unit of whole blood. Each unit of PRBCs contains approximately 230–330 ml of RBCs and 50–70 ml of plasma. The hematocrit of PRBCs is 60 to 80%. Each unit of blood contains approximately 60g of haemoglobin and 250 mg of iron, predominantly in the form of haemoglobin. Both whole blood and PRBCs contain a small amount of citrate anticoagulant and additional preservative solutions. Blood units that are collected in CPDA-1 anticoagulant can be stored for up to 35 days and 42 days for PRBCS with additive solution (saline adenine glucose, mannitol).
- ◆ PRBCs should not be used to treat long-standing anaemia that can be corrected with non-transfusion therapy such as iron to increase blood volume, oncotic pressure, coagulation factors, or platelets.
- ◆ Red blood cells must be compatible with the ABO antibodies present in the recipient patient's serum, and must be cross-matched in order to confirm compatibility. Unless the patient is bleeding or haemolysing, the post- transfusion haemoglobin can usually be accurately predicted. One unit of blood (or the equivalent volume in a child) usually increases the patient's haemoglobin by 1g/dl. In acute haemorrhage, blood transfusion should be initiated as soon as possible to offset the deficit; however, too rapid infusion of large volumes of cold blood with excess extracellular potassium, reduced pH, and excess citrate can sometimes have undesired effects on cardiac rhythm.
- ◆ The risk of mortality increases significantly in otherwise stable patients when the haemoglobin level falls to approximately 3.5–4 g/dl. In ischaemic heart disease, the risk of mortality significantly increases when the haemoglobin falls between 6 and 7.5g/dl. Perioperative RBC transfusion experience suggests that patients usually require transfusion when their haemoglobin level is less than 6g/dl, and only rarely when their haemoglobin level is above 10g/dl. For levels between 6 and 7g/dl, the transfusion needs depend on the amount of blood loss, underlying coronary/cardiac disease, and overall patient status.

58.1 Acute Blood Loss, Chronic Anaemia and Surgery Transfusion

58.1.1 ACUTE BLOOD LOSS

In a patient with acute blood loss, an early haemoglobin level will not accurately reflect the severity of blood loss until there has been adequate plasma volume replacement. Serial haemoglobin levels are required to determine the need for red cell transfusion as well as evaluation of the clinical status of the patient.

The following is anticipated with varying degrees of blood loss:

- ◆ As a general rule, a loss of blood volume of less than 15% results in minimal symptoms; 15–30% results in tachycardia; 30–40% in signs of shock; and greater than 40% in signs of severe shock.
- ◆ Some patients with underlying diseases may require transfusion at 30–40% blood loss. All patients with losses greater than this require transfusion.
- ◆ The first treatment for hypotension, shock, and acute blood loss is volume expansion with normal saline (without dextrose), infused in a volume at least three times the volume lost. Normal saline up to 50ml/kg is recommended for initial volume replacement. This should be followed by colloid solution, e.g. 6% dextran or 6% hydroxy-ethyl starch, given in equal volume to the blood volume lost. The 6% dextran should not exceed 50ml/kg body weight, and the 6% hydroxy-ethyl starch 20ml/kg body weight in 24 hours.
- ◆ The decision to transfuse should be made on the basis of parameters such as heart rate, blood pressure, haemoglobin, and the presence of active bleeding.

Blood may be required to restore blood volume and oxygen-carrying capacity in patients with massive haemorrhage (blood loss greater than 40%). In massive transfusion (more than four units within 1 hour in an adult, or the replacement of the equivalent of the patient's blood volume within 24 hours), platelets or fresh frozen plasma should be given according to the results of the patient's platelet count and coagulation profile, if possible. Consider giving ABO compatible fresh frozen plasma (FFP) in a dose of 15ml/kg if the prothrombin time (PT) is prolonged, and platelet concentrate (4–6 donor units for an adult) when the platelet count falls below 20,000/mm³. If the platelet count or coagulation profile is not available, consider giving 2 units of FFP and 6 donor units of platelet concentrate for every 6 units of blood transfused within a period of 24 hours.

Table 58.1: Massive Transfusion Protocol

	PRBCs	FFPs	Platelets	Cryoprecipitate
Round 1	6U	6U	6U	
Round 2	6U	6U	6U	10U
Round 3	Tranexamic Acid 1 g over 10 min			
Round 4	6U	6U	6U	10U

Adapted from Guidelines of Appropriate Use of Blood and Blood Products

56.1.1 PERIOPERATIVE TRANSFUSION

It is important to know the following with regard to perioperative transfusion:

- ◆ In the perioperative patient, transfusion decisions should be based not only on a haemoglobin level but also on clinical signs and symptoms and prior medical history. In anaesthetized patients, vital signs alone do not reflect the patient's real situation. During the intraoperative period, the patient's cardiopulmonary reserve, the amount of anticipated blood loss, oxygen consumption and the presence of atherosclerotic heart disease affect the decision for transfusion.
- ◆ Prior to elective surgery, all efforts should be made to correct anaemia without the use of blood. Patients with a Hb level less than 5g/dl may need transfusion prior to surgery if anaemia cannot be corrected by other means.
- ◆ Blood should be cross-matched and made available for immediate use during surgery for patients with a high likelihood of needing a transfusion. Transfusion maybe necessary during surgery for patients with a Hb level less than 8g/dl or who lose more than 1 litre of blood during surgery.
- ◆ In the case of postoperative or postpartum haemorrhage, the source of bleeding must be identified and stopped. Transfusion is not indicated as treatment of anaemia in postoperative or postpartum patients if no active bleeding exists.

56.1.2 CHRONIC ANAEMIA

With respect to chronic anaemia, the following is recommended:

Blood should be used only to relieve clinical signs of cardiac and respiratory distress in severely anaemic patients, in order to achieve haemodynamic stability. Blood should not be used to correct chronic anaemia. Most patients with chronic anaemia have nutritional and/or mild blood loss anaemia that responds rapidly and effectively to specific therapies. In case of transfusion, it should be done preferably using PRBCs

and should be done slowly with careful monitoring of the patient. This is because these patients have normal blood volumes and the transfusion of whole blood may cause circulatory overload, with harmful effects.

- ◆ Do not transfuse above 7g/dl Hb unless the patient is symptomatic. .
- ◆ Treat nutritional and mild blood loss anaemia with specific therapeutic agents as indicated (iron, folic acid, VitaminB12).

Use specific strategies for congenital anaemias including sickle cell disease.

56.1.3 RED BLOOD CELL TRANSFUSION GUIDELINES

The following guidelines are recommended for red blood cell transfusion for acute, pre-operative blood loss and also for chronic anaemia.

Acute and Peri operative Blood Loss

- 1) Evaluate patient for risk of ischaemia
- 2) Estimate blood loss:
 - If >30-40% of rapid blood loss: transfuse RBCs and use volume expanders
 - <30-40% of rapid blood loss: RBCs not usually needed in otherwise healthy person
- 3) Monitor vital signs:
 - Tachycardia and hypotension not corrected with volume expanders: RBCs needed
- 4) Measure haemoglobin:
 - If Hb >10g/dl: RBCs rarely needed
 - Hb <5g/dl: RBCs needed
 - Hb 5–10g/dl: RBCs may be needed, determined by additional clinical conditions

Chronic Anaemia

- ◆ Transfuse only to decrease symptoms and to minimize risk (generally at Hb of less than 5g/dl). Do not transfuse above 5g/dl Hb unless the patient is symptomatic.
- ◆ Treat nutritional and mild blood loss anaemia with specific therapeutic agents as indicated (iron, folic acid, B12).
- ◆ Use specific strategies for sickle cell disease and thalassaemia.

58.2 Blood Transfusion in Pregnancy

Anemia in pregnancy is defined as first trimester hemoglobin (Hb) less than 11.0 g/dl, second/third trimester Hb less than 10.5 g/dl, and postpartum Hb less than 10.0 g/dl. For normocytic or microcytic anemia, a trial of oral iron should be considered as the first step and further tests should be undertaken if there is no demonstrable rise in Hb at 2 weeks and compliance has been checked. Pregnant women should be offered screening for anemia at first antenatal visit and at 28 weeks. Women with multiple pregnancies should have an additional full blood count done at 20–24 weeks.

The following information is important with regard to blood transfusion in pregnancy:

- ◆ In pregnancy, maternal plasma volume increases by 40%, and red cell mass by 25%. Blood loss is usually well tolerated during pregnancy. The mean blood loss during vaginal delivery is 500 ml, while 1,000 ml is lost during caesarean delivery.
- ◆

Indications for transfusion in the pregnant and postpartum patient are similar to those for the non-pregnant patient.

- ◆ In addition to the clinical assessment of pallor, all women should have their haemoglobin measured at the first antenatal visit, and subsequently once during every trimester. Clinical evaluation of mucous membranes (conjunctiva and tongue) or palmar pallor may not detect mild or moderate anaemia that may lead to adverse effects later in pregnancy or at the time of delivery.
- ◆ All women should have ABO blood grouping and Rhesus (Rh) factor typing performed at the first antenatal visit. Where facilities exist, a screen for unexpected antibodies should be done. All Rh-negative women, with no evidence of immunization, delivering a Rh-positive foetus (or who have an abortion) should be given Rh immunoglobulin (RhoGAM) in a dose of 300mg IM within 72 hours of delivery or abortion.
- ◆ Nutritional education must be an integral part of routine antenatal care, including recommendations for protein and dark green leafy vegetables in the diet.
- ◆ Women with Hb of less than 10 g/dl should receive ferrous sulphate 200 mg (60mg elemental iron) 3 times a day throughout pregnancy. Clinically stable pregnant women with severe anaemia (<7 g/dl) should be evaluated for the cause of their anaemia and treated appropriately. These women should be monitored every 2 to 4 weeks, including measurement of the Hb level. It may be necessary to admit or refer women with a Hb level persistently lower than 7g/dl for closer clinical monitoring and treatment.
- ◆ Blood transfusion should be considered for pregnant women with Hb level less than 5g/dl who become symptomatic with dyspnoea, shock, or orthostatic hypotension.
- ◆ Blood should be ordered and made available in the delivery room for immediate transfusion in case of haemorrhage at the time of delivery for pregnant women with a Hb level less than 7g/dl. Pregnant women with a Hb less than 7g/dl should be referred for delivery at facilities where blood transfusion is available.
- ◆ Blood transfusion is not indicated in anaemic women who are clinically stable after delivery.
- ◆ In the case of postpartum haemorrhage, the source of bleeding must be identified and corrected. The first therapy of acute blood loss is volume replacement.

Treatment and Management of Anemia in pregnancy

- ◆ In the case of postpartum haemorrhage, the source of bleeding must be identified and corrected. The first therapy of acute blood loss is volume replacement.
- ◆ Oral iron should be the preferred first-line treatment for iron deficiency.

- ◆ Parenteral iron is indicated when oral iron is not tolerated or absorbed or patient compliance is in doubt or if the woman is approaching term and there is insufficient time for oral supplementation to be effective.
- ◆ Women should receive information on improvement of dietary iron intake and factors affecting absorption of dietary iron.
- ◆ The role of recombinant human erythropoietin (rHuEPO) for non-end-stage renal anemia is still to be established and it should only be used in the context of a controlled clinical trial or on the expert advice of the hematologist.
- ◆ Active management of the third stage of labor is recommended to minimize blood loss.
- ◆ Women at high risk of hemorrhage should be advised to deliver in hospital.
- ◆ Optimisation of hemoglobin in the antenatal period reduces the risk.
- ◆ Selected sickle cell pregnancy complications such as recurrent foetal loss.

58.3 Paediatric and Neonatal Transfusions

The following information is important for paediatric and neonatal blood transfusions:

Paediatric Transfusion

- ◆ If Hb is < 4g/dl, transfuse.
- ◆ If Hb is >4g/dl and <5g/dl, transfuse when signs of respiratory distress or cardiac failure are present. If patient is clinically stable, monitor closely and treat the cause of the anaemia.
- ◆ If Hb is >5g/dl, transfusion is usually not necessary unless in cases of shock or severe burns. Otherwise, treat the cause of the underlying anaemia.
- ◆ Transfuse with 10–15ml/kg of PRBCs or 20ml/kg of whole blood. In the presence of profound anaemia or very high malaria parasitaemia, a higher amount may be needed.

Management

Transfusion volume = bodyweight (kg) x Hb deficit (g/dl) x 3 (packed RBC) or 5 (whole blood)

Neonate Transfusion

The total blood volume of neonates is small, although the volume is higher per kg of body weight than that of older children or adults (85ml/kg for full-term and 100–105ml/kg for pre-term). Transfusions are generally given in very small increments, increasing the risk of infectious disease transmission through multiple donor exposures.

Blood transfusion in pre-term infants is often given for the anaemia of prematurity, associated with delayed renal production of erythropoietin due to decreased sensitivity

to lower haematocrit levels. This commonly develops in neonates after 2 weeks of life. Neonates, especially pre-term, may require multiple transfusions.

In neonates, a dose of 15ml/kg of packed red blood cells will increase the haemoglobin by approximately 3g/dl.

Transfuse with 10–15ml/kg PRBCs for:

- ◆ Acute blood loss of >10% of blood volume.
- ◆ Haemoglobin <7g/dl.
- ◆ Haemoglobin <8g/dl in a newborn with apnoea, bradycardia, tachycardia, tachypnoea, or decreased vigour.
- ◆ Haemoglobin of <12g/dl with moderate to severe respiratory distress or severe congenital heart disease and absence of weight gain for 7 days with no other explanation.

NOTE: Avoid using blood donated by blood relatives to transfuse neonates.

56.2.1 CONGENITAL ANAEMIAS

Children with congenital anaemias such as sickle cell diseases (Hb S/S, Hb S/C, Hb S-thalassaemia) like all other children, should only be transfused when they develop cardio-respiratory symptoms from severe anaemia, or the indications listed below.

- ◆ Indications for Red Blood Cell Transfusion in Sickle Cell Disease
 - Symptomatic anaemia due to:
 - Aplastic crisis
 - Splenic sequestration
 - Accelerated haemolysis (due to haemolytic anaemia or sickle cell crisis)
 - Preoperative preparation for most types of surgery
 - Chronic transfusion:
 - Prevention of recurrent occlusive stroke (< 30% HbS)
 - Selected sickle cell pregnancy complications such as recurrent fetal loss

58.4 Plasma Transfusions

The following is recommended for plasma transfusions:

- ◆ Correction of coagulation abnormalities with bleeding e.g. Hemophilias and coagulation factor deficiencies
- ◆ Massive transfusion
- ◆ Bleeding due to warfarin therapy refractory to vitamin K
- ◆ The dose is 10-20ml/kg of group specific plasma transfused over 2-4hrs.
- ◆ The amount of FFP to be given should be pegged on normalization of PT and aPTT.

58.5 Autologous Transfusions

The following is important for autologous transfusions:

- ◆ For elective surgery in patients with Hb level of 10g/dl or greater, 2–4 units of blood may be collected from the patient prior to surgery for the patient's own use during surgery (autologous transfusion). Collections should be at least 7 days apart, and the last donation should be at least 2-3 days before surgery.
- ◆ There is no indication for a single-unit autologous transfusion in an adult.

Unused autologous units can be released into the general donor pool, provided the patient meets all criteria for blood donation and the units are fully screened and tested.

- ◆ Preoperative isovolaemic haemodilution maybe performed prior to surgery. This can be accomplished by removal of 2 or more units of blood and replacement with an equal volume of crystalloid. This technique improves tissue perfusion during surgery and makes the units of blood available for autologous transfusion during and after surgery.

Contra indications

- ◆ Pre-existing anemia
- ◆ Heart disease
- ◆ Uncontrolled hypertension
- ◆ Extremes of age

58.6 Autologous Transfusions

The following is important for autologous transfusions:

- ◆ For elective surgery in patients with Hb level of 10g/dl or greater, 2–4 units of blood may be collected from the patient prior to surgery for the patient's own use during surgery (autologous transfusion). Collections should be at least 7 days apart, and the last donation should be at least 4 days before surgery. There is no indication for a single-unit autologous transfusion in an adult.

~ Unused autologous units can be released into the general donor pool, provided the patient meets all criteria for blood donation and the units are fully screened and tested.

- ◆ Preoperative isovolaemic haemodilution maybe performed prior to surgery. This can be accomplished by removal of 2 or more units of blood and replacement with an equal volume of crystalloid. This technique improves tissue perfusion during surgery and makes the units of blood available for autologous transfusion during and after surgery.

59. Transfusion Reactions

- ◆ Although transfusion can be a lifesaving therapy, it can result in many adverse effects. Approximately 1% of all transfusions lead to some type of adverse reaction. Many measures have been taken to reduce transfusion related risks, including donor risk screening and laboratory testing of blood products, but it is not possible to provide a blood supply with zero risk. Therefore, physicians must carefully weigh the benefits of transfusion against the risks.
- ◆ Transfusion reactions can be caused by immunological or non-immunological mechanisms, and may be immediate or delayed for some time after the transfusion. The majority of immediate serious reactions are immunological and are caused by clerical errors, including incorrect recording of blood type.
- ◆ Cross-match results, or patient name resulting in transfusion of the wrong unit or the wrong patient. The importance of proper patient identification and specimen labelling cannot be overemphasized. Other common serious complications of blood transfusion are related to infectious disease transmission. The most serious of the transmitted agents are HIV and Hepatitis B and C.
- ◆ All transfusions should be given under the supervision of a clinician. The patient should be monitored closely for the first 15 minutes of the transfusion since it is during this period that serious haemolytic transfusion reactions can first be detected. The transfusion should be regulated to infuse for a maximum of 4 hours, with monitoring of the vital signs by the nursing staff every 30 minutes. Any change in vital signs (temperature, pulse, respiratory rate, blood pressure) or level of consciousness may be an indication of a transfusion reaction. The symptoms and signs of a transfusion reaction include pruritus, palpitations, lumbar pain, pain along the entry vein, fever, hypotension, tachypnoea, tachycardia, and altered level of consciousness.
- ◆ Blood should be setup for transfusion within 30 minutes of leaving the laboratory. Unused blood from the theatre or wards should be returned immediately (within 30 minutes) to the laboratory.

59.1 Types of Transfusion Reactions

The following flow chart lists common types of transfusion reactions:

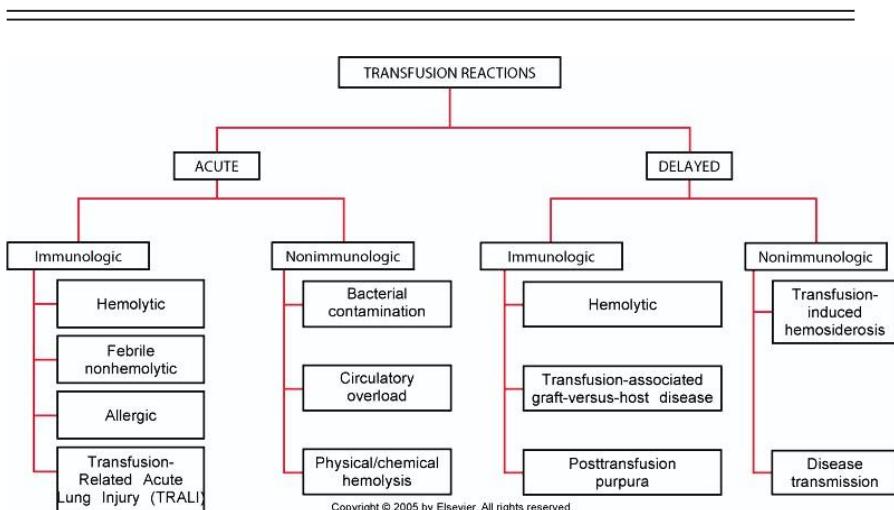


Figure 59:1 Common types of transfusion reactions

The majority of transfusion reactions are febrile reactions, characterized by a mild temperature elevation without other clinical signs or symptoms. These can be managed with antipyretics, without having to stop the transfusion. The most common cause of serious haemolytic transfusion reaction is the administration of ABO incompatible blood. If serious transfusion reaction is suspected, the transfusion should be stopped immediately. The patient should have an IV line kept open with saline and vital signs should be monitored. The laboratory should be notified of the suspected transfusion reaction, and a transfusion reaction work-up immediately initiated. The laboratory should report all suspected transfusion reactions to the Hospital Transfusion Committee.

Table 58.2: Signs and symptoms of acute haemolytic transfusion reactions

General	Cardiac/respiratory	Renal	Haematological
-Fever, chills, flushing -Nausea, vomiting -Headache -Pain at infusion site -Back or loin pain -Pruritis -Altered levels of consciousness	-Chest pain -Dyspnoea and tachypnoea -Hypotension -Tachycardia	-Haemoglobinuria -Oliguria -Anuria	-Anemia -Unexplained bleeding (disseminated intravascular coagulation) -Thrombocytopenia

Management of transfusion reaction

- ◆ Stop the transfusion but keep the IV line open with normal saline
- ◆ Monitor the vital signs of the patient
- ◆ Inform the laboratory about a possible transfusion reaction
- ◆ Check the clerical information to ensure that the patient is receiving the correct blood
- ◆ Take the following blood samples from the patient (from the opposite arm):
 - 10 ml of blood into a plain tube. Check the colour of the plasma for haemolysis.
 - 2ml of blood into an EDTA tube
- ◆ Collect a sample of the first voided urine.

Send to the laboratory

- ◆ All samples correctly labelled
- ◆ The blood that reacted, together with the attached transfusion set
- ◆ All empty blood bags of already transfused units
- ◆ Laboratory request form filled in
- ◆ Report all investigations to the Hospital Transfusion Committee.

PART VI: Referral Framework

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60. The Referral Framework

The Government of Kenya is actively promoting the concept of comprehensive care for all people at the community level. The elements of comprehensive care include clinical, nursing, psychological, and social support. Maintaining the continuum of care is essential, and requires a strong linkage between the community and the health system. This occurs through an effective and efficient referral system.

A referral system is a network of service providers and facilities that link together to provide a continuum of care for acute and chronic illnesses. It includes individuals and organizations working to provide care and support to those who need it. There are typically 4 levels to a referral network in the health system: the community, primary, secondary, and tertiary levels.

As defined by the Kenya Essential Package for Health (KEPH), these 4 levels of the referral network incorporate the community level (level 1), with its households, community health workers (CHWs), traditional birth attendants (TBAs), traditional herbalists, and community health extension workers (CHEWs). At the primary care level, dispensaries and health centres (KEPH levels 2 and 3) are the first point of linkage between the community and the formal health system. They are strengthened by the CHEWs and health management committees. The county hospitals (level 4), the regional referral hospitals (level 5), and the national referral hospital (level 6) provide levels of increasing specialization of care to support the community level. Providers at all of these levels should be able to recognize complications, gauge their severity, provide prompt treatment based on their capacity as defined by the norms and standards for each level of care, and refer any clients they are unable to treat to a facility where they know adequate treatment is available.

The objective of a referral system is to improve clients' access to services, reduce the time it takes for them to receive required care, and avoid unnecessary delays. Meeting the needs of clients entails a collective effort of many providers, both formal and informal. In order to strengthen access to existing services and enhance linkages between and among the providers, formal referral arrangements, proper communication, and standard tools must be in place.

The service provider initiating referral at any level of the referral system has the responsibility to document the referral activity and follow up with clients to ensure they received the necessary care. An effective system ensures continuity and high quality of care to patients, enhancing the utilization of available resources and encouraging clients to participate actively in making decisions that directly affect their lives.

Coordinated service delivery and strong communication among health care providers is necessary to ensure that access to required services is as quick as possible,

Level 2-3 Primary Care

referrals can be easily traced and followed up, referral outcomes can be documented, feedback from clients on the services they received can be noted, gaps in the system

can be identified, and steps taken to improve service provision. For this, effective communication and transport arrangements are crucial.

The following elements are essential:

- ◆ **Availability, accessibility, and affordability:** Services must be based on prevailing local health problems, and provided in a way that local needs can be addressed.
- ◆ **Coordination, coordination, coordination:** Referral activities within and between different service providers with different resources and different mandates demand focused attention. This is best facilitated by having a team or specific individuals designated to coordinate these referral activities.
- ◆ **Relationships:** Higher level health facility providers should take the lead in establishing and maintaining referrals by supporting lower level providers, with both the clients and the providers working as partners.
- ◆ **Effective communication and transport arrangements:** Identification of the most cost-effective means of transport should be done. One way is to choose a member of the community with a vehicle to assist other community members with transport during referrals in such a manner that the costs incurred can be covered and taken care of within such an arrangement.
- ◆ **Feedback:** Mechanisms should be established to help with the tracking of referrals from the point of initiation to the point of delivery. This will provide evidence that the client completed the referral process.
- ◆ **Monitoring and quality control:** Monitoring and evaluation mechanisms for the continuous assessment and improvement of the referral process and outcomes are crucial and need to be initiated and maintained.

60.1 General Guidelines

An efficient and effective pyramidal referral system is essential for effective management of surgical patients and is especially important in the emergency situation so as to provide rapid and effective treatment to the patients. A referral system can function either upwards or downwards with respect to the levels of health care. Upward referral seeks specific medical care from specialists and subspecialist found at the higher levels of health care or even outside the country. Downward referral engages the local facility nearest a patient's home environment because they no longer need the more specialized health care at the higher level. Instead, they require ongoing medical care that is best able to cope with the patient's needs and this often happens to be at locations nearest to the patient's home.

Level 2-3 Primary Care

An efficient referral system ensures an appropriate mix of patients with different types of needs, admitted in different health facilities countrywide. This means that all referrals must be directed at the correct facility while maintaining the normal pyramidal referral system off low within the health system as much as possible.

Besides referrals between facilities, there are also referrals within institutions. Such referrals are necessary and important for patient's wellbeing. Hospitals should only manage cases they are able to handle, and in situations where they cannot adequately take care of them they must refer them to the next appropriate facility. All referrals must be carefully evaluated and the risks and benefits assessed critically before the decision to refer is made. The basic guidelines for upward referral are shown below and will vary a little depending on the level in question.

60.2 Procedure for Upward Referral

The upward referral consists of the following components:

1. Critical evaluation and decision to refer is made by:
 - a) Individual doctor or health care provider.
 - b) Management Team taking care of the patient.
 - c) Ministry or other administrative body in charge of the welfare of the patient.
 2. Documentation is prepared that includes the following:
 - a) Admission details.
 - b) Diagnostic details and investigations carried out.
 - c) Medications and treatments given to the patient.
 - d) The reason for the transfer of the patient.
- ~ **This documentation MUST accompany the patient being referred.**
3. Appropriate communication with respect to the referral is made:
 - a) With the receiving unit or health facility.
 - b) With the relatives
 4. Preparation of appropriate transportation is made:
 - a) Efficient and reliable means of transport to effect the referral is secured.
 - b) The means of transport secured is exclusively allocated for transportation of the referred patient.
 5. An appropriately qualified escort is appointed.
 6. A systematic check to ensure that the resuscitation equipment to accompany the patient is available and functioning well.

60.3 Procedure for Downward Referral

On completion of treatment at the higher centre there will be a need to refer the patient back to the initial facility for purposes of feedback to the facility and for ongoing rehabilitation or palliative care of the patient.

The downward referral is a mirror of the upward referral, except that in this situation the patient has already received specialized care and is now being sent to the lower health facilities for continuing care or for feedback or for rehabilitation or palliative care.

The downward referral consequently consists of the following components:

1. Decision to refer the patient downwards.
2. Documentation detailing the following aspects with respect to the patient being referred:
 - a) Admission/identification details.
 - b) The final diagnosis for the patient.
 - c) Procedures carried out during hospitalization in the referring facility or unit.
 - d) Medications provided while the patient was hospitalized in the referring health facility.
 - e) Follow-up details and any rehabilitation requirements.
 - f) In case of terminal disease the hospice needs to be involved in the referral process and the follow up of the patient.

~There must be 3 legible copies of the referral note or letter: one for the patient, another for the unit receiving the patient, and a third for the file.

3. Communication is made with receiving unit or facility as appropriate and feedback obtained as appropriate. Such communication enhances the efficiency of the referral system.
4. Communication is made with the relatives with regard to the planned downward referral and the need for the referral for the patient.
5. Preparation is made for the appropriate transportation for the intended referral.
6. An appropriately qualified escort is appointed, although in many situations the relatives would be sufficient to provide such an escort.
7. Booking is made for the patient to be reviewed in the outpatient clinic in the referring facility, unless arrangements are made for the patient to be reviewed in the receiving unit or health facility.

60.4 Guidelines for an Institutional Referral System

Just as important to patient care is the institutional referral systems that need to be clear and functional. Each facility needs to have a system for both the upward and downward flow of patients to mirror that at the national level.

A simple institutional referral system should have the following features:

1. Casualty department review:
 - a) Make a correct diagnosis.
 - b) Call appropriate unit.
 - c) Ensure patient is reviewed.
 - d) Ensure patient is handed over to the unit on-call doctor.
 - e) Ensure documentation is accurate.
2. Making unit referrals and admission decisions:
 - a) Decision on whether treatment should be provided to the patient on an outpatient basis or after admission as an inpatient.
 - b) If patient is admitted, ensure the patient is handed over to the admitting ward doctor.
 - c) If the decision is made to provide care to the patient on an outpatient basis, then correct referral should be made.
 - d) In the event of incorrect clinic referral, the doctor rather than the patient should be responsible for correcting this error.
3. If the patient referred is not admitted, they should be referred to specialized clinics at the facility. Referrals should be made to the National Referral Centre.

60.5 Dangers and Barriers to a Coordinated Referral System

All team members at all levels need to be conscious of the dangers that face a coordinated referral system. Efforts need to be made to avoid these dangers to the referral system. These dangers and barriers involve the following:

- ◆ Lack of confidence in the facility by the community and the tendency by the community to bypass the facility to go to the next nearest facility they consider more suitable for them. Such a situation could be due to:
 - Poor community relationships.
 - Poor manpower utilization.

- ◆ An infrastructure that is nonfunctional:
 - Broken down, understaffed and under supplied middle level facilities.
 - Inadequate or inappropriate communication infrastructure at the various levels of care. This is exacerbated by poor management practices at the health facilities and failure to involve the community in the process.
 - Treating patients with specified conditions at in appropriate levels.
 - Inadequate funding and supplies for higher levels of health care, so that they are unable to provide expected services.
- ◆ Lack of or poor utilization of human resources, due to the following:
 - Brain drain because of perceived low wages, inadequate infrastructure, and non-conducive working environments in the public health services, to NGOs or private health facilities with better remuneration, or even out of the country.
 - Poor distribution of staff.
 - Frustration in the workplace.
 - Poor working relationships.
- ◆ Lack of drugs and other equipment, which is to an extent related to issues of poor planning and inadequate financing.
- ◆ Inaccurate diagnosis and treatment plans for facilities because of inadequate training for personnel at the facilities.
- ◆ Lack of working quality control and M&E (monitoring and evaluation) measures.

PART VII: FORENSIC MEDICINE

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61. Fundamental Principles of Forensic Medicine

Forensic medicine is the application of medical knowledge to the investigation of crime, particularly in establishing the causes of injury or death. Forensic medicine includes examination and management of the living injured as well as persons dying under unnatural circumstances. It requires accurate documentation and preservation of forensic medical evidence. Standardization of care, reports, improving consistency and quality of opinions prepared by experts will facilitate better delivery of justice.

61.1 Legal frameworks

Criminal law deals with relationships between the state and the individual and as such is probably the area in which forensic medical expertise is most commonly required. Criminal trials involve offences that are 'against public interest'; these include offences against the person (e.g. murder, assault, grievous bodily harm, rape), property (e.g. burglary, theft, robbery), and public safety and security of the state (terrorism). On the other hand, civil law is concerned with the resolution of disputes between individuals.

61.2 Medical practitioner and the law

Medical practitioners may encounter the law like any other citizen or in their day to day professional practice where they may manage a patient whose medical condition is of forensic interest. A medical practitioner is expected to conduct a full medical-forensic examination on the patient (and prescribe the appropriate medical treatment); collect and preserve the necessary medical forensic samples and inform and forward to the investigating officer or his or her representative, the samples collected, while maintaining a record of the chain of custody; and Initiate appropriate referral to the relevant areas for the necessary subsequent care.

The medical practitioner may then be required to give evidence at a court of law regarding the patient, in which case the she/he may be a professional (gives an account of the events) or expert witness (gives an opinion based on medical facts).

When required to give evidence at a court of law, the medical practitioner is expected to prepare a statement in advance. This statement will take the form of a medical report and will be based on the notes made at the time of encounter with the patient, which may be many months or many years later.

Preparation of medical reports

General considerations

- ◆ The diversity of uses of a report is reflected in the individuals or groups that may request one: a report may be requested by the police, prosecutors, coroners, judges, medical administrators, government departments or regulatory bodies.

- ◆ The most important question that medical practitioners must ask themselves before agreeing to write a report is whether they (1) have the expertise to write such a report and (2) have the authority to write such a report.
- ◆ Generally, when medical records need to be reviewed, written permission to access and use those records has to be given, either by the individual themselves, or by an individual or body with the power to give that consent. If consent has not been sought, advice should be sought from the relevant court or body for permission to proceed.
- ◆ An order from a court, if valid, should be obeyed.
- ◆ For medical confidentiality, the consent of a living patient is required and, if at all possible, this should be given in writing to the medical practitioner. Exceptions may exist, particularly where serious crime is involved in which case the medical practitioners have a public duty to assist the law-enforcement agencies.
- ◆ If no consent was provided, this should be stated in the report, as should the basis on which the report was written.
- ◆ It is also important to remember that consent to disclose the effects of an alleged assault does not imply consent to disclose all the medical details of the victim, and a medical practitioner must limit her/his report to relevant details only.
- ◆ Issues that relate to terrorism, child abuse, use of a weapon and other violent crime must be reported.
- ◆ The basis of most reports and statements lies in the contemporaneous notes made at the time of an examination and it is essential to remember that copies of these notes may be required in court as part of evidence.
- ◆ The medical practitioner should ensure clarity and simplicity of expression to make the whole process simpler. A clear, concise and complete report or statement may prevent the need for court attendance at all, and if you do have to give evidence, it is much easier to do so from a report that is legible.
- ◆ Medical reports can be constructed along the same lines as the clinical notes – they should be structured, detailed (but not over-elaborate) and accurate. A good report will give the relevant facts clearly, concisely and completely, and in a way that an intelligent person without medical training can understand.
- ◆ Medical abbreviations should be used with care and highly technical terms, especially those relating to complex pieces of equipment or techniques, should be explained in simple, but not condescending, terms.
- ◆ Abbreviations in common usage such as ECG can generally be used without explanation although occasionally further explanation is required.
- ◆ It is preferable not to submit handwritten or proforma type statements unless absolutely unavoidable.
- ◆ A simple professional witness statement (one that simply reports facts found at examination) may be headed by specific legal wording.

Autopsy reports

- ◆ Are a specialist type of report and may be commissioned by the Coroner, the police or any other legally competent person or body, there may be standardized protocols or proforma.
- ◆ The authority to perform the examination will replace the consent given by a live patient, and is equally important.

- ◆ The history and background to the death will be obtained by the police or the Coroner's officer, but the doctor should seek any additional details that appear to be relevant, including speaking to any clinicians involved in the care of the deceased and reviewing the hospital notes.
- ◆ A visit to the scene of death in non-suspicious deaths, especially if there are any unusual or unexplained aspects, is to be encouraged.
- ◆ An autopsy report is confidential and should only be disclosed to the legal authority who commissioned the examination.
- ◆ Disclosure to others, who must be interested parties, may only be made with the specific permission of the commissioning authority and, in general terms, it would be sensible to allow that authority to deal with any requests for copies of the report.

Structure of a statement or report

When instructed to prepare an expert report always clarify whether or not a specific structure is required and if so, follow it assiduously. An example is a P3 form or a police autopsy request form. But generally:

- ◆ The name, address and contacts of the health facility should be captured in the letter head. This could be that of the medical practitioner in the event of a private practice.
- ◆ The medical practitioner's professional address and qualifications should follow.
- ◆ Indicate who requested the statement, and when.
- ◆ The date of the report is essential.
- ◆ A summary of the medical history (as given by the patient or any other relevant persons) touching only on the relevant details should be provided.
- ◆ The time(s), date(s) and place(s) of any examination(s) should be listed, as should the details of any other person who was present during the examination(s).
- ◆ The medical practitioner should confirm their understanding of their role at the time (e.g. 'I was called by the police to examine an alleged victim of assault to document his injuries').
- ◆ Confirm that the patient has given consent for the release of the medical information (if no consent is available it must be sought).
- ◆ By referral to contemporaneous notes outline the history that you were aware of (... 'Mr X told me that...').
- ◆ In simple terms summarize medical findings. If information other than observation during a physical examination (e.g. medical records, laboratory or imaging) formed part of the basis of management of the patient, these too must be recorded.
- ◆ If opinions of consultants and any other persons were sought, these too will need to be documented.
- ◆ The treatments offered to the patient (including surgical procedures) should be provided in summary form.
- ◆ Any significant complications should also be documented, as well as a summary of the overall clinical course and outcome of the disease/injury process.
- ◆ Conclusions and recommendations relevant to the particular case may be added.
- ◆ The medical practitioner should sign off the report with their unique mark and forward it to the requesting authority via the chain of custody.

61.3 Ethics of forensic medical practice

The laws governing the practice of medicine vary from country to country, but the broad principles of medical ethics are universal and include;

- Compassion - understanding and concern for another person's distress
- Informed consent - The right of patients to make decisions about their healthcare with adequate information provided by the medical team.
- Confidentiality - ability of a medical practitioner to keep secret information obtained from a patient in the course of a professional relationship
- Competence - Skills required to carry out a task successfully
- autonomy - self-determination and the right to decline or choose treatment
- non-maleficence – do no harm
- beneficence – acting in the patient's best interests
- Dignity - the state or quality of being worthy of honour or respect
- honesty – providing informed consent
- justice – honor or standards to support fair treatment and due reward.

62. Forensic Medical Evidence

62.1 Definition

Forensic evidence is any item or information gathered at the scene of a crime, or at related locations, which is found to be relevant to an investigation and that is analyzed using scientific methods to aid in solving a crime or administration of justice.

Maintaining evidence is paramount and strict procedures must be observed by all involved in the investigation when it comes to collecting, labeling, and analyzing it. Above all, every effort must be made to ensure that evidence is not lost, damaged, or contaminated.

62.2 Types of forensic evidence

Evidence can be classified into:

- a) Direct and indirect (circumstantial) evidence
- b) Physical or biological evidence
- c) Reconstructive evidence
- d) Associative evidence (class or individual)
- e) Trace evidence

62.3 Collection, packaging, transport and analysis of forensic evidence

62.3.1 COLLECTION

The first items to be collected are those which are fragile and could easily be damaged such as fingerprints, shoe prints, fibers, and hair. A systematic approach must be taken to ensure that the collection of one item of evidence will not destroy another.

Control samples for use back in the laboratory to distinguish relevant from irrelevant evidence. Control samples for use back in the laboratory to distinguish relevant from irrelevant evidence

62.3.2 PACKAGING

Each item of evidence is packaged separately to avoid contamination and damage.

62.3.3 TRANSPORT

The evidence is handled through a strict chain of custody. Every time an item is transferred from one person to another, it is signed and accounted for. Forensic medical specimens (and reports) should be handed over to the investigating/escorting police officer upon collection for onward transmission to the forensic laboratory. Break in the chain of custody may render the evidence inadmissible in a court of law.

62.3.4 ANALYSIS

Analysis of forensic evidence is typically carried out by the forensic laboratory (government analyst) for all specimens except histology which is handled by the cancer diagnostic laboratory. In some cases specimens analyzed in clinical/pathology laboratories may too constitute forensic medical reports, these include infectious disease diagnostics, biochemistry, hematology, immunological, histopathological and other relevant tests required. The aim of analysis of forensic evidence is to ascertain identity of the forensic evidence and carry out comparison studies with the control samples with the aim to to establish links through evidence.

62.3.5 CHAIN OF CUSTODY

Chain of custody refers to the chronological documentation of the processes through which forensic evidence is taken including any persons who handle it. It is an important process for the following reasons:

- ◆ Ensures admissibility of evidence in court
- ◆ Ensures evidence is not lost
- ◆ Ensures the integrity of the evidence
- ◆ Ensures traceability of the evidence
- ◆ Ensures evidence is not tampered with or switched
- ◆ Ensures availability of the evidence for look back purposes when needed
- ◆ Reduces the number of people who handle the evidence
- ◆ Ensures the evidence presented to court is actually the evidence that was collected at the scene.

62.3.6 DOCUMENTATION OF FORENSIC EVIDENCE

Documentation creates a permanent record of events, lesions, processes and activities. It is particularly important in ensuring important facts are available for future reference. This is more so in forensic medical practice where a medical practitioner may be called upon to give evidence in a court of law or a board many months years after the examination when some of the facts have been forgotten.

62.3.7 METHODS OF DOCUMENTATION OF FORENSIC MEDICAL EVIDENCE

MEDICAL/CLINICAL NOTES

Clinical notes must be thorough and include history, findings in general examination, systemic examination, tests ordered (laboratory and imaging) and their findings, treatment plans (including medical and surgical procedures), opinions of any consultations and follow up review of the patient including any significant complication(s).

SKETCHES AND CHARTS

They give a visual representation of location of lesions and are particularly important in documentation of injuries.

STILL PHOTOGRAPHS

Still photographs are particularly important in documentation of complex situations, lesions or injuries where narrative description may fail to capture some details such as differences in colour or complex relationships. Colour photographs are particularly helpful. Medical practitioners should avoid using personal cameras for forensic evidence documentation. Centres offering forensic medical services should provide still cameras.

VIDEO

Video recording is quite helpful in documenting procedures and processes and is able to capture a variety of activities and information at the same time. This service is mainly provided by the police.

MEDICAL IMAGING

This is required for specific types of forensic cases such as gunshot injuries, child abuse, sexual offences etc. where available.

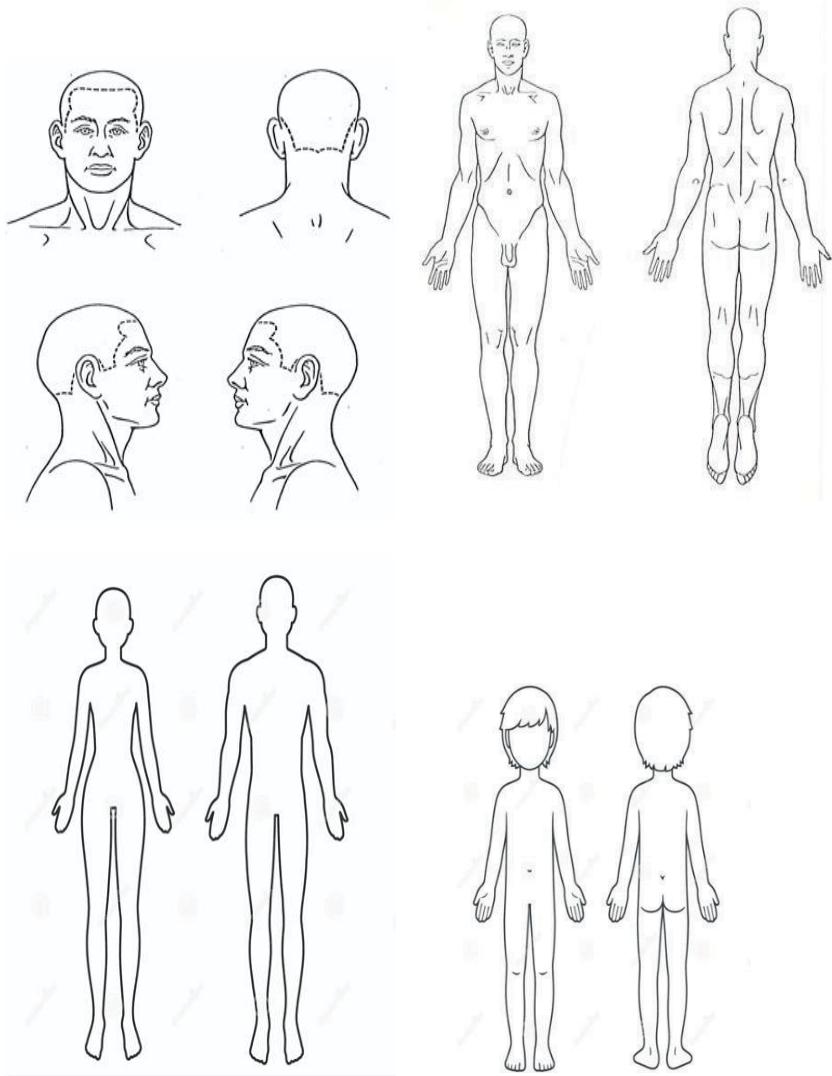


Figure 62:1 Body charts for documenting forensic evidence

63. Clinical Forensic Medicine

Clinical forensic medicine includes a wide range of procedures from examination of victims of injuries, sexual assault victim/ accused examination, custodial torture victims to much more. Forensic medical aspects of clinical practice traverse all levels of practice, right from the very basics to community level to sophisticated care in level six facilities. It is worth noting that the medicolegal aspects of any case must always be secondary to life saving treatment of the patient.

63.1 Crowd control agents

Chemical restraints can be used for various reasons for control of a violent or agitated patient, to disperse crowds, or to limit access to some areas.

The agents include but are not limited to

- ◆ Capsaicin oleum (OC) also known as pepper spray,
- ◆ Chloracetothenon (CN) also known as mace,
- ◆ Chlorobenzylidenemalononitrile (CS) also known as tear gas

Clinical features

- ◆ Skin-rashes, burns
- ◆ Eyes: excessive tearing, burning, blurred vision, redness
- ◆ Nose: runny nose, swelling, burning
- ◆ Mouth: burning, irritation, difficulty swallowing, drooling
- ◆ Lungs-cough, chest tightness, shortness of breath choking sensation, wheezing
- ◆ nausea and vomiting

Management

- ◆ Ensure you wear a mask and gloves before touching the patient.
- ◆ Remove and dispose contaminated clothes.
- ◆ Decontaminate exposed skin with soap and water.
- ◆ Topical antibiotics for corneal abrasion
- ◆ Analgesics for pain
- ◆ Systemic antihistamines for dermatitis
- ◆ Systemic steroids for severe form of contact dermatitis

63.2 Forensic issues relevant to restraint

Most law enforcement agencies and government-sanctioned caregivers have policies that guide on their use of force. However, during an encounter, use of the various means of control may be escalated. Restraint injuries include:

63.2.1 WRIST RESTRAINTS

These include handcuff or rope injuries.

Watch out for the following signs and symptoms;

- ◆ Wrist scarring at bony prominences. Are mostly circumferential or form part of the circumference.
- ◆ Features of ulnar or median nerve neuropathy.
- ◆ Scaphoid or radial styloid fractures.

Management

- ◆ Analgesics
- ◆ Wound cleaning with an antiseptic
- ◆ Wrist radiographs to rule out fractures
- ◆ Nerve conduction tests to check for nerve damage
- ◆ Antibiotics to treat infected skin lesions
- ◆ Document history, examination findings and treatment given in official medical forms or P3 if provided
- ◆ Photograph the injuries.

63.2.2 NECK HOLDS

Involves pressure on or around the neck. It can be fatal.

They can be chokeholds or carotid holds. Choke holds can cause airway collapse. Carotid holds can cause loss of consciousness. The elderly, people with Down's syndrome, pregnant women are at higher risk of severe injuries and even death.

Clinical features

- ◆ Neck pains
- ◆ Asphyxiation
- ◆ Altered mental status
- ◆ Fractured hyoid
- ◆ Bruises in the neck region. Describe the bruises in terms of shape, size, location and colour.

Management

- ◆ Take a detailed history and carry out a thorough medical examination.
- ◆ Stabilize the neck and provide oxygen if required.
- ◆ Refer for specialized care if needed.
 - ◆ Antibiotics to treat infected skin lesion
 - ◆ Document history, examination findings and treatment given in official medical forms or P3 if provided
 - ◆ Photograph the injuries

63.2.3 TASER

It's a handheld conducted electrical weapon, powered by two 3 V batteries, that induces neuromuscular incapacitation and pain by the application of a small electrical current.

It causes neuromuscular incapacitation. A detailed history should be documented which should include; the date, place and specific time of the incident, any available witnesses, what was the victim doing at time of the incident, any symptoms associated with the application of electric current and mode of delivery of the electric current.

Clinical features

- ♦ Localized superficial burns and erythema.
- ♦ Musculoskeletal injury from the intense muscle contraction.
- ♦ Ethmoid bone fracture.
- ♦ Spinal vertebral compression fractures.
- ♦ Bony injuries from falls (including non-fatal and fatal head injury).
- ♦ Triggering of epileptic seizures.
- ♦ Cardiac effects-affects cardiac rhythm (ventricular fibrillation)

Management

- ♦ Remove darts penetrating skin by stabilizing the skin surrounding the taser dart and while firmly grasping the probe, remove it with rapid traction.
- ♦ Clean the skin with antiseptic.
- ♦ A complete general and system-specific examination to document visible injury should be undertaken to identify any taser- associated complications.
- ♦ ECG, X-ray, ultrasound, CT or MRI scans may be indicated depending on examination findings.
- ♦ Refer to specialist if extensive injuries are found.

63.3 Sexual offences

The services required include screening and early identification of victims, comprehensive history taking, examination and documentation, collection, preservation and linkage of evidential material, appropriate referral, presentation of evidence as expert witness, maintenance of chain of custody.

Patients seen at these lower levels can receive the minimum package of care as listed. However, it is good to note that cases requiring referral should have warm referrals made to avoid retraumatization. This involves contacting the facility that the patients are being referred to and provision of a comprehensive referral form.

63.3.1 MANAGEMENT OF A SEXUAL VIOLENCE VICTIM (ADULT)

- ♦ Make sure that the consultation room has adequate lighting and it's private.
- ♦ Before a health worker sees a patient, they should ensure that the necessary furniture, equipment, medication and supplies are available.
- ♦ It is advisable for the health care provider to be of the gender that the patient is comfortable.
- ♦ The consultation room should be clean, private, disability-accessible, clean and with all the requirements needed e.g. Post rape care (PRC) forms etc.
- ♦ Survivors of sexual violence can be managed at any level of care from level 2-6.

History taking in sexual offences

A comprehensive history taking is necessary.

- ♦ Ensure that you acquire informed consent and ensure confidentiality. The consent should be documented.
- ♦ Examination of a person without their consent is detrimental and the health practitioner (medical officer or specialized consultant) or designated person (nurse or clinical officer) can be liable for breach of patient autonomy.
- ♦ Consent for the unconscious and mentally ill survivors can be given by their caregiver or an authorized person.
- ♦ Ensure confidentiality and explain to the patient the instances where this can be breached e.g. under court order, shared confidentiality.
- ♦ For victims with extensive injuries, first aid is prioritized before comprehensive history and examination can be done.
- ♦ The history is taken in three parts:
 - General history including history of the incident and any significant medical history
 - Gynecology history
 - Psychological history

General history

The history should include;

- ♦ Date, time, place, number of person involved
- ♦ A detailed history of the incident
- ♦ Is the perpetrator known or unknown
- ♦ Details of physical injuries
- ♦ Has the victim changed clothes, urinated, defecated, or douched after the incident
- ♦ Any history on use of alcohol, medication or drugs for both the perpetrator and the survivor
- ♦ History on use of condoms, lubricants, foreign objects or any sex devices
- ♦ Any history on use of restraints
- ♦ Any history on use of weapons

- ◆ Any symptoms after the incident- pain in urinating, defecation, urethral discharge, vaginal discharge, anal discharge, scrotal/anal discomfort.

Gynecology history

This history is important and should include;

- ◆ Menstrual history- age of menarche, details of menstrual cycle, last normal menstrual period
- ◆ Marital history, history pertaining to pregnancy, vaginal delivery and lactation.
- ◆ Current sexual partner/
- ◆ Last consensual sexual intercourse
- ◆ Sexual history prior to the incident.

Psychological history

This assesses mental health status of the survivor.

The psychological assessment includes: general appearance, rapport, behavior, mood, affect, speech, insight, thought content and process, perception, orientation, judgement, memory, attention, alertness.

Physical examination

- ◆ Ensure privacy and dignity as you examine the patient. Avoid unnecessary exposure.
- ◆ Be sure to explain to the patient the whole examination procedure before and during the process. Inform them that they have the right to stop the process anytime during the process.
- ◆ Before the examination begins, the survivor should stand and undress on a white paper or bed sheet. This is to ensure any evidential material on them is collected in the white sheet.
- ◆ Conduct a **head to toe** physical examination.
- ◆ General examination- appearance, height, weight, gait, demeanor, mental status, vital signs.
- ◆ Examine the face, ears, nose and mouth- check for periorbital edema, conjunctival hemorrhage, shadow bruising behind the ear, oral examination in case of physical injuries or suspected oral penetration.
- ◆ Examine the neck for any bruising which could be a sign of life threatening injuries like strangulation.
- ◆ Examine the trunk for any injuries. Don't forget the back
- ◆ Check for any abrasions and bruises over arms indicating struggle.
- ◆ With the victim lying down palpate the abdomen for any tenderness or masses like pregnancy.
- ◆ Check for bruises or any fluids e.g. semen on the inner thighs.

Genital examination

Inspect the external genitalia for any visible discharge like vaginal bleeding, matted pubic hair, signs of healed tears, bruises or lacerations in the labias, clitoris, perineum, hymen or hymenal remnants. Take any swabs before attempting any digital or speculum examination.

Speculum examination

With or without sedation as per guidelines. Check for vaginal, cervical, fourchette tears as you collect any evidential material.

- ◆ Document genital structure assessment using the clock face analogy.
- ◆ **Per rectal examination:** in cases of suspected anal penetration for tears, bleeding.
- ◆ While the patient is standing, examine the legs and buttocks for any abrasions, lacerations, bruising, tram line injuries and evidential material like dirt, semen, vaginal discharge etc.

Age estimation when needed.

Evidence collection, preservation and linkage

The principles to follow while collecting evidence include:

- ◆ Wear gloves during the whole examination process and change gloves with every different specimen collected. This is to avoid contamination.
- ◆ Collect the evidence early, ideally within 72 hours. However, this does not negate need to examine the survivor if they present to the facility after 72 hours.
- ◆ Handle all the specimens appropriately. Store fluids in appropriate temperatures e.g. urine and blood between 2° C to 8° C for short term storage (frozen at -20 ° C for longer storage). Air dry the biological evidential material like stained clothes and swabs under a shade, avoiding direct sunlight.
- ◆ All samples should be labelled using the survivor's or suspect's name and date of birth; type of specimen; date and time of collection and health care provider's name.
- ◆ Ensure security by keeping the collected samples in places that guarantee safety e.g. locked rooms/cupboards with authorized entry. Sign across the label to make it tamper proof.
- ◆ Maintain chain of custody by ensuring that for every collected sample, any subsequent handling is recorded. This can be through maintenance of a chain of custody book and documentation of SGBV samples in a different sample documentation book in the laboratory
- ◆ Ensure all the samples are collected in threes; two for the government chemist and one for the facility.

Investigations

- ◆ The health care provider collects evidential material for preservation as well as onward transmission to the testing laboratory (commonly the government chemist).
- ◆ Blood samples are required for toxicology and DNA (deoxyribonucleic acid) analysis.
- ◆ Clothes for detection of blood, semen, foreign material. DNA analysis done on the samples collected.
- ◆ Sanitary pads, used condoms, panty liners, tampons and diapers for detection of semen and spermatozoa, DNA analysis.
- ◆ Foreign material e.g. soil, grass for transfer evidence analysis.
- ◆ Swabs from buccal cavity, inner thighs, vulvar, vaginal walls, introitus, cervical, anal opening, anal canal, rectal area may be required depending on the type of case, for DNA analysis, pathological organisms, semen and spermatozoa detection.

- ♦ Blood samples should be collected for HIV test, liver function test, Hepatitis B test, VDRL, toxicology and DNA analysis. Collect 10mls in two purple vacutainers and 10mls in two red vacutainers.
- ♦ Tool marks such as those caused by knife, hot iron, fire arm among others will require photography for possible identification of the tools causing the injuries and documentation of the injuries.
- ♦ Nail scrapings and clippings for DNA analysis.
- ♦ Urine samples are required for microscopy for detection of spermatozoa, culture and sensitivity for pathological organisms, pregnancy testing and toxicology. Collect about 100mls by aseptic techniques.
- ♦ Hair samples such as pubic hairs for DNA analysis.

Note: All samples should be handled by following a strict chain of custody.

Treatment

The basic management of sexual offences victims involves;

- ♦ General wound care:
 - Clean the lacerations and abrasions with antiseptic.
 - Primary suturing is done for minor, clean wounds under local anaesthesia. Consider general anaesthesia incases of extensive wounds.
 - Delayed suturing or healing by secondary intention is done for dirty wounds.
- ♦ Sexually transmitted infections.
 - Offer STI treatment to survivors of penetration.
- ♦ PEP for HIV.
 - Provide PEP as per treatment guidelines. (Refer to the latest PEP guidelines) within 72 hours of exposure.
- ♦ Pregnancy Prevention
 - For penetrative sexual violence, provide emergency contraception within 120 hours.
 - One 750 mcg Levonorgestrel pill to be taken as soon as possible within 120 hours. Repeat the same dose in 12 hours. Can also be given two pills as a single dose given immediately.
 - IUCD inserted within 120 hours.
 - Estrogen pills such as Microgynon given as four tablets to be taken as soon as possible within 120 hours. Repeat the same dose in 12 hours.
 - Estrogen pills such as Eugynon given as two tablets to be taken as soon as possible within 120 hours. Repeat the same dose in 12 hours.
 - Ulipristal Acetate (UPA) given as a 30mg single dose within 120 hours.
- ♦ Hepatitis B Vaccination
 - For patients who have never been vaccinated against Hepatitis B, give 1st dose at initial visit, second dose at 1-2 months after 1st dose and third dose 4-6 months after 1st dose.
 - For patients who have at least one dose, finish the vaccination schedule.
 - For fully vaccinated patients, do not vaccinate.
- ♦ Psychosocial support
 - The healthcare provider should offer first line support.
 - Refer to a psychologist or psychiatrist for trauma counselling.

- ♦ Follow up visits
 - Follow up visits are done as per the schedule.
 - A minimum of 5 visits are scheduled at 2 weeks, 4 weeks, 6 weeks and 3 months respectively.
 - Refer to the annexed algorithm for services offered on each visit.

Documentation

According to medical regulation Act of 2012, the post rape care form has to be filled for the sexual violence survivor. History and examination findings are documented in the PRC (Post Rape Care) forms.

P3 Forms are police issued documents that are filled in the facility. Do not fill a P3 that does not have Part 1 filled.

Fill the P3 with clinical findings at the time of the examination. You can also add the findings during the first visit but stating the date of that initial examination and the document from which the information is acquired such as PRC. Ensure clarity and completeness while documenting findings.

Examination of perpetrators

The examination principles applied are the same as for the victims.

63.4 Violence against children

Health care providers have a mandate to ensure privacy, confidentiality, safety, non-discrimination, non-maleficence and all rights to ongoing development are upheld. They should obtain informed consent or assent.

- ♦ Ensure that the health care provider examining the child is trained. The safety and wellbeing of the child supersedes evidence collection. Manage life-threatening injuries first.
- ♦ Provide first aid and **refer if not adequately trained to examine the child.** (Provide comprehensive information in the referral note and notify the facility you refer to).
- ♦ Inform the children's services for the purposes of ensuring safety to the child. Please note that the guardian can also be the perpetrator so watch out for the signs which include witness reports, overprotective guardians, repeat unexplainable injuries or medical conditions from the medical history, fear in the child, or from history given by the child.
- ♦ The history taken is the same as the adult history. Additionally, take note of history of repeated violence and gynecological history for adolescents
- ♦ Special considerations in history include age and disability. For children below 5 years, history is given by the non-offending caregiver or adult accompanying the child. For children between 5-10 years, history is obtained from the child and supplemental history is given by the adult. For older children, history is from the child. In this older age group it's advisable to exclude the guardian from the history taking process.

- ◆ Child-friendly techniques like use of toys, role play, drawing, drama etc. should be used for the younger children (below 10 years).

Examination

The examination principles applied are the same as for the adult. Special circumstances for the child include doing a tanner staging for developmental assessment.

Describe the injuries as described in section 63.3.1.

- ◆ While doing anogenital examination for cases of sexual violence, place the child in supine frog leg, supine knee chest, lateral or prone knee chest position. Labial traction and separation is done to visualize the introitus in girls. Anal examination is best done using supine or prone knee chest position.
- ◆ Determine any injuries and document.
- ◆ Of importance in female patient examination, while documenting the hymenal changes, describe the size, patency, shape and margins of the orifice; thickness of the hymen tissue. To visualize the hymen better, use a moistened cotton-tipped swab to sweep around the hymenal edge.
- ◆ Avoid speculum, digital and bimanual examination in pre-pubertal girls unless medically indicated.
- ◆ Do not conduct virginity testing.
- ◆ In the male patient: check for injuries on the foreskin, penis, prostate and anus, urethral discharge, anal sphincter tone. In an older child, the foreskin should be gently pulled back to examine the penis.
- ◆ Psychological assessment is done by a qualified health care professional.

Investigations

- ◆ Collect samples as per the adult guidelines.
- ◆ Urine samples are relied on heavily for spermatozoa detection and DNA analysis in cases where cervical, high vaginal swabs are not available. However, the external genitalia samples e.g. vulvar swabs should still be collected.

Treatment

- ◆ Physical injuries are treated as per guidelines.
- ◆ The basic treatment for sexual violence child is employed. Medication is given based on the weight.
- ◆ In pregnancy prevention, emergency contraceptive pills (ECPs) can be offered to girls who have attained menarche and those in the beginning stages of puberty (Tanner stage 2 or 3).
- ◆ HPV vaccination should be given to girls over 9 years using the national vaccination guidelines.

63.5 Traffic medicine

Traffic medicine embraces all those disciplines, techniques, and methods aimed at reducing the harm traffic crashes inflict on human beings. A majority of harm results from road vehicles however traffic medicine also includes injuries from all vehicles traveling over land, sea, air, and under-water and in space. The health worker treating the victim of a crash, the people transporting the victim from the crash site to a health, those in the institutions dispatching help to the crash site are all involved in traffic medicine.

63.5.1 EXAMINATION OF VICTIMS OF ROAD TRAFFIC ACCIDENT

Important consideration in history taking

- ♦ Should take place in the casualty department for the referred clients.
- ♦ All referral medical notes investigations and evidence should be safely and securely stored.
- ♦ Emergency care services should be provided as per the guidelines
- ♦ Linkage to specialized care centers like ICU should be considered.
- ♦ Accurate documentation of all medical and surgical procedures is required, photographs may be used to illustrate injuries.
- ♦ Documentation should include date, time, place of accident and any other information relevant to the accident.
- ♦ Whenever possible, the healthcare worker should find out if the victim was a pedestrian and if so what kind of vehicle hit her/him, the direction from which she/he was hit, if the pedestrian lifted from the ground or even if he/she was run over following by a hit.
- ♦ For pillion riders, the healthcare worker should find out if the person injured was wearing a helmet and if she/he thrown off the vehicle.
- ♦ Details of what structures or objects (including other vehicles) the survivor impacted after the crash will aid in evaluation of secondary injuries.
- ♦ The position of the survivor in the vehicle as well as details on use of seat belts should be elicited and documented.
- ♦ Presence and deployment of airbags is an important consideration as well as the possibility of the survivor having been injected from the vehicle.
- ♦ First aid services offered at the crash site and details of the persons who took the survivor to hospital should be sought and documented.
- ♦ Any other medical/surgical conditions in the survivors should be sought.
- ♦ Survivors of road crashes should be assessed and tested for alcohol, medical or recreational drugs. This is especially important for drivers, pilots, captains or pillion riders
- ♦ The healthcare worker should find out if the crash was reported to the police and an OB number issued. The police station to which the matter was reported and the OB number should be recorded.

Forensic medical traffic accident examination

- ◆ General condition, vital signs
- ◆ Injuries- Describe the type, location, dimensions, pattern of distribution, nature of injuries, colour changes and age of injuries.
- ◆ Pattern injuries e.g. tire marking.
- ◆ Other systems for medical conditions e.g. vision.

Forensic investigations

- ◆ Radiography/ sonography as needed to assess severity of injury.
- ◆ Blood/ urine sample for alcohol/ drugs.
- ◆ Photographs of pattern injuries. (By use of a facility designated camera).

Management of accident victims

- ◆ Provide the emergency care services as needed.
- ◆ Refer for specialized care to the level four five and six facilities as needed.
- ◆ Health care provider should preserve the medical notes and any evidence for legal purposes.
- ◆ Filling of p3 form conclusively and clearly.
- ◆ Forensic clinician presentation of evidence before court of law.
- ◆ Forensic clinician to ensure chain of custody of all documents and evidence collected.

Checklist

- ◆ Procedure done
- ◆ History elicited
- ◆ Complete external examination
- ◆ Appropriate investigation
- ◆ Final opinion after investigation
- ◆ Referred to a higher centre when needed?
- ◆ Nature of injury
- ◆ Duration of injury
- ◆ Documentation
- ◆ Blood sample for alcohol and drugs
- ◆ Scene visited

63.6 Injury assessment, documentation and interpretation

The accurate description of injuries should fall within the capabilities of most health workers. Interpretation requires considerable skill and expertise and often is best left to a forensic physician or pathologist. Nevertheless, other health workers should be able to offer some advice and comment, albeit of a general nature, on how a particular injury or group of injuries was caused. Indeed, in some circumstances it is the ordinary

practitioner who draws attention to the possible medico legal significance of some injuries and initiates an investigation into their cause, e.g., pediatricians in cases of non-accidental injury in children.

63.6.1 DESCRIPTION OF FORENSIC INJURIES

When describing an injury, it is essential to comment on the nature of the wound, its size and shape, and its location. The age of the injury also needs to be considered. It is extremely useful to record injuries on body charts or anatomic line drawings, which can be used in court if the health worker is called to give evidence.

In cases of serious assault or when injuries have distinctive characteristics or patterning, it is essential that the wounds be photographed with a suitable metric scale alongside.

63.6.2 NATURE OF THE INJURY

In legal terms a "wound" requires the integrity of the skin surface to be breached and theoretically at least would exclude bruising and indeed abrasions. It is therefore essential that for medico legal purposes a standard nomenclature be adopted when describing injuries. The following classification is adopted by forensic physicians and pathologists.

- ◆ **Bruises:** often called contusions due to the application of blunt force. The blow ruptures small blood vessels beneath the intact skin, and blood then escapes to infiltrate the surrounding subcutaneous tissues under the pumping action of the heart.
- ◆ **Abrasions:** also known as scratches superficial injury involving only the outer layers of the skin and not penetrating the full thickness of the epidermis. Some abrasions may be contaminated with foreign material such as dirt or glass, which have important medico legal significance. Such material should be carefully preserved for subsequent forensic analysis.
- ◆ **Lacerations:** sometimes known as cuts and tears
- ◆ **Incisions:** colloquially called slashes
- ◆ **Stab wounds**—sometimes known as penetrating wounds

Note: A variety of wound types may coexist following trauma. Furthermore, a single wound may show features of different types..

DESCRIBING SIZE AND SHAPE OF FORENSIC INJURIES

Ascertained using a ruler or a pair of calipers and recorded in centimeters or millimeters. The shape of the wound should also be noted; simple terms such as circular, triangular, V-shaped, or crescentic best express this characteristic, but if the wound shape is irregular or complex then it is possibly easier to record this feature on a body chart. Wounds also may have depth, but it is often not possible to determine this accurately in the living.

DESCRIBING POSITION OF FORENSIC INJURIES

The best method of pinpointing the location of an injury is to use fixed anatomic landmarks. On the head, one can use the eyes, ears, nose etc. The advantages of using simple anatomical diagrams and body charts for locating the injury are self-evident. See annex for body charts and anatomic diagrams.

DOCUMENTING TRANSIENT LESIONS

Swelling, redness, and tenderness, although frequently caused by trauma, are not specific signs of injury but are rather an indication of the effects of the injury. It is however important to examine for and record these features, an example would be red marks outlining an injury such as the imprint of a hand on the slapped face or buttock of a child. These features should be photographed at the earliest opportunity as such changes may fade or change colour with time. The colour and appearance of these transient lesions is of value in dating the injury.

63.6.3 EXAMINATION OF VICTIMS OF ASSAULT

SHARP OBJECT TRAUMA

Place of examination should provide privacy and safety to the victim availing all necessary equipment.

♦ History

- Biodata-name (at least two names), age (in children under 2 years, indicate age to the month) gender, address.
- Indicate whether the matter was reported to the police and an OB.NO issued.
- Indicate whether the victim was assaulted by a single person or a group of persons. Enquire if the assault was anticipated and defensive or unanticipated.
- Enquire what weapon was used.
- Indicate who accompanied the victim (if it is relatives, police or any other person).
- Enquire if the suspect is a known/unknown person.
- Enquire whether the victim was taken to any other hospital before and what intervention(s) were done.
- Indicate if there was a report prepared anywhere else. It's important to note which hand the victim and suspect commonly use, whether right or left handed.
- Enquire about consumption of alcohol or recreational drugs and this should be documented.

♦ Examination

- Place of examination: should offer privacy availing all necessary equipment.
- Infection prevention protocols should be adhered to.
- Examine clothes for tears corresponding to injuries over the body.
- Document the site, dimensions, depth and orientation of injuries.

- Examine the wound margins/edges and surrounding tissues.
 - Document any active bleeding, underlying neurovascular bundle damage.
 - Check whether underlying tissues are protruding or not and if there is undermining or beveling of the wound.
 - Indicate whether it is a single entry wound (penetrating) or whether there is an entry and exit wound (perforating).
 - Document shape of injury and orientation in reference to the axis of the body.
-
- Document the distance from anatomical landmarks as well as distance from other injuries (in case of multiple injuries).
 - Examine for defense injuries in the extremities such as incised wounds/stabs over forearm, arm, wrists, and hands.
 - Diagrammatic representation in all cases is fundamental.

FORENSIC IMAGING AND DOCUMENTATION

- ♦ The request forms must be completely filled and should indicate date and time. A clear history should be provided to aid the radiologist/radiographer characterize the injury and any possible foreign material.
- ♦ Radiography is important to rule out underlying fractures, dislocations, haemo/pneumothorax, air under the diaphragm, foreign bodies, among others.
- ♦ CT scan and/or MRI may be important to identify injuries and their effects in structures such as the brain or abdomen.
- ♦ Ultrasound imaging may be required for characterization of injuries to areas such as the abdomen and pelvis.
- ♦ Doppler/ vascular studies may be required to assess for vascular injuries and possible sequelae.

These tests should be subjected to a radiologist or any other consultant for interpretation and expert opinion whenever required. The expert opinions provided should be accurately documented and incorporated in the patient's medical reports.

MANAGEMENT OF INJURED VICTIMS

- ♦ Provide emergency care services as needed as per protocols.
- ♦ Refer for specialized care appropriately.
- ♦ Ensure the medical notes are complete, accurate and preserved for future reference.
- ♦ Handle all forensic evidence obtained through appropriate chain of custody.
- ♦ P3 forms should be filled accurately and conclusively.
- ♦ The health care worker should be available to present evidence at a court of law.

CHECKLIST

It's best practice to maintain an audit sheet to ensure all the necessary measures have been adhered to, including documentation and preservation of all forensic evidence.

- ♦ Correct procedure followed
- ♦ History elicited
- ♦ Complete external examination carried out
- ♦ Appropriate investigation ordered and done
- ♦ Final opinion after investigation offered
- ♦ Other expert opinion sought as needed
- ♦ Referral to a higher level of care done as required
- ♦ Nature of injury documented
- ♦ Type of weapon documented, if possible
- ♦ Age of injury assessed
- ♦ Tract of the injury assessed where relevant
- ♦ Opinion on injury compatibility with suspected weapon offered, where possible
- ♦ Blood samples collected for alcohol, drugs and any other tests as required
- ♦ Clothes examined and preserved
- ♦ Clothes forwarded to the police as part of evidence.

63.7 Thermal injuries

Thermal injuries may be broadly classified into two:

- ♦ Thermal injuries due to heat
- ♦ Thermal injuries due to cold

Injuries due to heat

Injuries due to heat may be caused by moist or dry heat.

Injuries due to moist heat are mainly scalds. Scalds are caused by contact with hot liquid such as may occur in immersion, pouring or throwing of the hot liquid at a person. The affected skin is soggy, blanched, and blistered. The shape of the injury is contoured. The depth of the burn is variable. Forensic examination of scalds involves determining an upper fluid level for immersion cases or a drip pattern in cases where fluid is thrown at a person.

- ♦ Injuries due to dry heat are caused by contact of the skin with open flames. Common patterns of injuries due to dry heat include:
 - **Contact burns:** direct contact with a hot object. Characteristically, the burn is shaped like the hot object with sharply defined edges and usually of uniform depth. The burn may blister.
 - **Flame burns:** caused by flames from fires such as matches and lighters that come into close or direct contact with the skin, causing charring and skin loss with singeing of hairs.
 - **Cigarette burns:** inflicted direct contact leaves a characteristically well-demarcated circular or oval mark with rolled edges and a cratered center, which may blister and tends to scar. Accidental contact with a

cigarette tends to leave a more superficial, irregular area of erythema with a tail.

- **Friction burns** dragging or rubbing injury causing superficial skin loss, with broken blisters, usually on bony prominences.

Electrical Injuries

- ♦ **Electrical burns:** small, deeply penetrating burns with an entry and exit wound with possible necrosis of underlying tissues.
- ♦ **Chemical burns:** the chemical in liquid form is drunk, poured, or splashed onto the skin, or in solid form is rubbed on the skin. The skin may stain, may have the appearance of a scald, and may scar.
- ♦ **Radiant burns:** more extensive areas of erythema and blistering on exposed body parts.

63.7.1 DIFFERENTIAL DIAGNOSIS OF THERMAL INJURIES

- ♦ Infections such as Staphylococcal, streptococcal (impetigo, scalded skin syndrome).
- ♦ Allergy – urticaria, contact dermatitis.
- ♦ Insect bites.
- ♦ Bullous diseases such as Porphyria, Erythema Multiforme

63.7.2 MEDICAL EXAMINATION OF VICTIMS OF FLAME BURNS

Factors to observe in history taking.

- ♦ Find and document the date, place of incident, possible of exposure.
- ♦ Enquire about the possible causative agent of the fire.
- ♦ Enquire whether the matter was reported, and an OB number issued.
- ♦ Enquire and document about the type of clothing worn by the victim at the time of the incident.
- ♦ Find out any history of damage to structures, vehicles and other objects in the vicinity of the fire that may cause other injuries other than those due to fire.

Factors to consider during examination of thermal injuries

- ♦ Document vital signs
- ♦ Examine the location, depth of burns, percentage of burns (total burn surface area, TBSA).
- ♦ Sketch the area involved.
- ♦ Examine for facial burns that may indicate possibility of inhalational burns
- ♦ Examine for signs of infection
- ♦ Examine for associated injuries caused by damage to structures in the vicinity of the fire.

Associated injuries due to trapping in masonry. Respiratory disturbances due to CO inhalation.

Investigation of thermal burns

- ◆ Clothes, Burnt hair and cuticles for detection of combustible substances.
- ◆ Photography of burns.
- ◆ Scene of crime visit notes; illustrated diagrams and photographs by a clinical forensic physician.

Checklist

Its best practice to maintain an audit sheet to ensure all the necessary measures has been adhered to and documentation done with preservation of all physical evidence.

- ◆ Correct procedure followed
- ◆ Detailed History
- ◆ Surface area involved/ sketch
- ◆ Depth of burns
- ◆ Injuries over body
- ◆ Clothes/ hair/ skin preserved

Examination of Victims of Scald Burns

Key findings on Forensic History

- ◆ Day, time, place of incident.
- ◆ Substance causing burns: water/oil/other chemicals.
- ◆ Duration of contact with skin.
- ◆ Type of cloth worn by victim at the time of incident.

Factors to consider on examination

This must involve mental status of the patient, vital signs. Clothing, area of distribution, depth of burns, percentage of burns, sketch of area involved, signs of dribbling. Examination of scalp, face and body hair. Inflammation in old burns and signs of secondary infection.

Investigation

- ◆ Clothes and cuticle for detection of chemicals.
- ◆ Saline swab for detection of chemical substances.
- ◆ Photography of burns lesions.
- ◆ Scene of crime visit notes sketch maps and photographs
- ◆

Audit sheet

- ◆ Correct procedure followed
- ◆ Detailed History
- ◆ Surface area involved/ sketch
- ◆ Depth of burns
- ◆ Clothes/ hair/ skin preserved
- ◆ Scene of crime documentation

63.7.3 EXAMINATION OF VICTIMS OF ELECTROCUTION

History taking

- ◆ Day, time, place of incident.
- ◆ Source of current: domestic/ occupational/ others
- ◆ Type, strength, tension, resistance of current.
- ◆ Was there a contact? If yes Duration of contact?
- ◆ Was the scene wet or dry?
- ◆ Type of cloth worn by victim at the time of incident

Examination of electrocution victims

- ◆ Mental status of the patient, vital signs.
- ◆ Entry wound, exit wound of electrocution (if any).
- ◆ Number, site, size, location, surrounding area.
- ◆ Associated flash/ flame burns.

Investigation of victims of electrocution

- ◆ Photography of burns
- ◆ Scene of crime visit notes and sketch maps

Management burns victims

- ◆ Provide the emergency care services to the needy as per protocols.
- ◆ Refer for specialized care.
- ◆ Forensic clinician maintain the forensic medical notes and preserve evidence for legal purposes.
- ◆ Filling of p3 form conclusively and clearly.
- ◆ Forensic clinician presentation of evidence before court of law.
- ◆ Forensic clinician to ensure chain of custody of all documents and evidence collected.

Audit sheet

Its best practice to maintain an audit sheet to ensure all the necessary measures has been adhered to and documentation done with preservation of all physical evidence

- ◆ Correct procedure followed
- ◆ History
- ◆ Surface area involved/ sketch
- ◆ Depth of burns

63.8 Care of detainee and custodial medicine

A health worker will often be asked to assess the fitness for detention in police custody of adults and juveniles arrested in connection with an offense, detained by immigration, or requiring a place of safety (children and the mentally ill), or remanded or sentenced (convicted) prisoners. A person in police custody is referred to as a detainee and guidance may therefore have to be given to the custodians regarding their care. If an individual detained in police custody appears to be suffering from a mental or physical illness and needs medical attention or has sustained any injuries whether at arrest or prior to arrest, such attention should be sought as soon as possible. Increasingly the police have to deal with individuals who misuse alcohol and

drugs or are mentally disordered. When the detainee's behavior gives rise to concern, medical advice should be sought. Custody staff should also seek medical advice if a detainee requests a doctor or requires medication or if the custody staff suspect that the detainee is suffering from an infectious disease and need advice. In some areas, when a person under arrest is discharged from the hospital and taken to a police station, a doctor will be called to review the detainee and assess whether he or she is fit to be detained and fit for trial.

63.8.1 ADMINISTRATION OF MEDICATION

- ♦ Ensure clear and detailed instructions regarding any medication to be administered while the detainee is in police custody.i.e times of administration, and special instructions) are given to custodians with confirmation that these instructions are understood.
- ♦ Sufficient quantity of medication should be prescribed to cover the time in detention.
- ♦ The medication should be given to the police in appropriately labeled individual containers or sachets.
- ♦ Records should be kept showing that prescribed medication is given correctly and timely and that unused medicines are accounted for.
- ♦ Medication should be stored in a locked cupboard.
- ♦ Police should ensure that when administering medication, they are accompanied by a witness and detainee to be observed taking medication to prevent hoarding.
- ♦ Detainees arrested with medications on their persons, medical advice should be sought as to whether they should be allowed to self-administer them.
- ♦ Medication brought with the prisoner or collected from home should be checked to ensure that it has the correct name and dosage and that the quantity left is consistent with date of issue.
- ♦ If the medicine is unlabeled it is preferable to issue a new prescription.

63.8.2 CONDITIONS OF DETENTION

- ♦ Medical examiner should ensure that the conditions of detention are satisfactory with regard to:
 - The temperature and ventilation of the detention cells,
 - Cleanliness of the cell,
 - Bedding and personal hygiene,
 - Access to dietary needs, and fluids as appropriate,
 - Period of rest of 8 hours during each 24 hours.

63.8.3 INFECTIOUS DISEASES IN DETENTION AREAS

- ♦ The clinician may be called to advise the police/custodial homes regarding infectious diseases.
- ♦ These populations are indeed at high risk for blood-borne viruses such as **Hepatitis and HIV/AIDS**, all individuals should be considered a potential risk, and observation of good clinical practice relating to body fluids to avoid contamination risks is fundamental.
- ♦ Concerns regarding untreated acute infections such as open **Tuberculosis** should warrant transfer to the nearest Health units for assessment regarding treatment.

- ♦ Scabies may be treated in the custodial setting; however, bedding and cells should be professionally cleaned.

63.8.4 PERSONAL SAFETY ISSUES

Certain health care groups are at increased risk of violence in the work-place e.g. those working in clinical forensic medicine and accident and emergency services.

Strategies for interviewing a difficult patient

- ♦ Being fully aware of the person's history (be prepared!), and considering how the person sees you (as uninterested or hostile?)
- ♦ Being polite and respectful.
- ♦ Avoiding confrontation.
- ♦ Using appropriate eye contact.
- ♦ Keeping calm, and showing interest.
- ♦ Look for signs of tension and find out why tension may be increasing.
- ♦ Being ready to leave if necessary and consider the need to have a chaperone.

63.9 Drug Searches

Individuals unlawfully in possession of illicit drugs for personal use or involved in drug trafficking may ingest drugs or pack them into certain body cavities ("body packers" or "mules"). A person who is about to be arrested by the police may swallow drugs

Forensic Clinicians may be called by the police to carry out intimate searches of those arrested. Thus discussion of possible implications of the ingestion of the drugs and obtaining fully informed consent is paramount before carrying out any search that may involve examination of the mouth, nostrils, ears, foreskin, rectum, or vagina.

63.9.1 HOW TO CARRY OUT DRUG SEARCHES

All searches for drugs should be carried out in premises where there are full facilities for resuscitation in case significant quantities of the drugs leak into the bloodstream, resulting in acute intoxication and death from overdose medical problems such as bowel obstruction may also occur.

In a genuine emergency, when there is no possibility of obtaining consent, the doctor has a duty to carry out treatment to safeguard the life and health of a patient in accordance with what would be accepted as appropriate treatment in the patient's best interest'.

63.9.2 COLLECTION OF FORENSIC SAMPLES

Samples from a detainee such as dental impressions, blood, saliva, urine, hair, fingernail scrapings and cuttings, swabs (e.g., mouth, penile) may be requested by police authorities in connection with the investigation of an offense.

These samples should only be taken by a clinician or nurse for evidential purposes with the detainee's fully informed consent and should be packaged in accordance with local procedures to ensure the chain of evidence.

A police officer in the rank of inspector of police and above may give consent if it's not possible from the victim. This must be signed in the presence of a health worker as a witness.

63.10 Identification of the living

Clinician should document the available biodata of each client if available including; Name age sex physical address local chief etc. If unknown person, the following criteria should apply

63.10.1 IDENTIFICATION CRITERIA

These could be Primary, Secondary, Tertiary

Primary identification criteria

- ♦ Fingerprints lifted by the police officers only at any safe and secure location with necessary equipment.
- ♦ DNA samples collected by clinician and packed accordingly ie. Blood. Hair strands for submission to the government chemists.
- ♦ Unique medical characteristics eg Use of prosthesis. should be documented.

Secondary criteria

Features such as deformity, marks and scars, X-rays, personal effects and distinctive clothing.

Tertiary criteria

Features that provide some assistance in identification include clothing, photographs location.

Additional techniques

Techniques such as gait analysis from CCTV can be useful when other features cannot be used These must be sent to the police for analysis and documentation.

All unidentified person's cases must be reported to the police station for further investigation action and linkage to other necessary institutions.

63.11 Fitness for trial

The custodial interrogation of suspects is an essential component of all systems of criminal investigation. The confessions and other incriminating statements that are obtained during these interrogations have always played an important role in prosecutions and continue to be relied on as evidence of guilt in a substantial number of trials.

A forensic physician should hence perform a thorough examination to detainee to ascertain fitness of trial.

63.11.1 A DETAINED PERSON MAY BE UNFIT FOR INTERVIEW WHEN:

Conducting an interview could worsen any existing physical or mental illness to a significant degree.

Anything said or done by the detained person at the time of detention may be considered unreliable in subsequent court proceedings because of the physical or mental state of the detained person."

63.11.2 QUANTIFYING RISK OF UNRELIABILITY

In making an assessment, the clinician should quantify the risk of unreliability into one of the following categories:

- ♦ **Definite Unlikely** to be fit for interview at any stage (e.g., severe dementia, severe mental handicap).
- ♦ **Major risk Unfit for interview at present.** Reassessment or further review is considered necessary to establish fitness at a later stage (e.g., drunkenness, intoxication with drugs, severe drug withdrawal, severe physical illness, major mental disorders that may be amenable to treatment such as mania and acute confusion states).
- ♦ **Some risk Precautions are advised,** such as the presence of an appropriate adult or referral for other medical or psychiatric advice (e.g., mental illness such as hypomania, schizophrenia and depression, mild dementia or mental handicap, significant anxiety).
- ♦ **No discernible risk** Fit for interview, in so far as the interview can proceed without any special precautions

63.11.3 SCHEME OF EXAMINATION

When assessing a detainee's fitness for an interview, the traditional medical model of taking a history and then conducting an examination should be employed. As always, informed consent should be obtained and detailed and contemporaneous notes should be taken.

History taking

Location

- ♦ Private safe clean environment with an examination couch, good lighting and ventilation with basic equipment.
- ♦ Much background information should be obtained and, when possible, an indication of how long any interview is likely to take

General medical history

- ♦ Enquiry made about any significant illness and any prescribed medication.
- ♦ Ask about history of psychiatric illness, past or present,
- ♦ Enquire about alcohol and drug misuse.
- ♦ Questions about the person's educational background.
- ♦ Ensures the detainee has not been deprived of food or sleep
- ♦ Enquire about significant social distractions (for example, a single parent may make a false confession in order to obtain early release from custody).
- ♦ Detainees should be asked whether they have been detained before and any unpleasant experiences in custody

The Examination

- ♦ Should include observations on the general appearance, physical examination as appropriate, and mental state examination.
- ♦ A functional assessment should be performed as to whether the detainee is aware of the reason for arrest, is aware of legal rights, and is capable of making a rational decision.

63.12 Forensic Pathology

Forensic pathology is a subspecialty in pathology that deals with forensic investigation of deaths for persons who die suddenly, unexpectedly or violently to determine cause and manner of death. It involves performing post mortem examinations, attending death scenes, carrying out forensic exhumations and testifying at a court of law.

63.12.1 DEATH IN A LEVEL 2 FACILITY

This section applies to persons who die at the facility, persons brought in dead or persons who die on arrival to the facility. Death refers to the irreversible cessation of all vital functions of life especially as indicated by permanent stoppage of the heart, respiration, and brain activity. Forensic deaths are those deaths that are sudden, unexpected or due to violence arising from unnatural causes such as accident, murder, suicide, among others.

Non forensic deaths are those that arise from disease processes whose pathophysiological processes can be explained such as hypertension, tuberculosis, malignant diseases, among others.

The nursing officer refers the body to the nearest level 3 facility for confirmation and documentation of death.

63.12.2 DEATH IN A LEVEL 3 FACILITY

This section applies to persons who die at the facility, persons brought in dead, persons who die on arrival to the facility or persons referred from level 2 facilities for confirmation of death.

The clinical/medical officer takes a clinical history and examines the body to confirm the person has died then prepares clinical notes to that effect and fills out the verbal autopsy form. The clinical/medical officer must determine if the death is of forensic importance from history and examination.

Confirmed deaths of no forensic interest are referred to the chief for issuance of a burial permit, D2, and transfer to the mortuary if required. The chief prepares and submits the register for death.

Confirmed deaths of forensic importance are referred to the police for forensic death investigation.

63.12.3 DEATH CONFIRMATION

PROCEDURE IN DEATH CONFIRMATION:

- ♦ Wash your hands and don personal protective equipment if appropriate.
- ♦ Confirm the identity of the patient by checking their wrist band.
- ♦ Inspect for obvious signs of life such as movement and respiratory effort.
- ♦ Assess the patient's response to verbal stimuli (e.g. "Hello, Mr Smith, can you hear me?")
- ♦ Assess the patient's response to pain using one of the following methods:
 - Apply pressure to the patient's fingernail.
 - Perform a trapezius squeeze.
 - Apply supraorbital pressure.
- ♦ Assess the patient's pupillary reflexes using a pen torch: after death, the pupils become fixed and dilated.
- ♦ Palpate the carotid artery for a pulse: after death, this will be absent.
- ♦ Perform auscultation in an attempt to identify any heart or respiratory sounds:
 - Listen for heart sounds for at least 2 minutes.
 - Listen for respiratory sounds for at least 3 minutes.
- ♦ The recommended amount of time to listen for heart and respiratory sounds can vary, but it is generally accepted that a minimum of five minutes of auscultation is required to establish that irreversible cardiorespiratory arrest has occurred.
 - Wash your hands, dispose of personal protective equipment appropriately and exit the room, making sure the relevant doors and/or curtains are closed/drawn behind you.

63.13 Pediatric pathology

This is concerned with intrauterine fetal deaths of the viable fetus (stillbirths), Neonatal Deaths and Child death. These deaths occur within health facilities or the community. World Health Organizations' International Classification of Disease, version 11 (WHO ICD 11) – Perinatal Mortality, is applied to assign cause and manner of death. All stillbirths must have an independent death investigation and a verbal autopsy form completed. The birth notification alone is insufficient because it does not assign a cause of death and therefore does not input into prevention of such deaths occurring in the future.

Cause of death is assigned following a verbal autopsy, where the best diagnostic category is documented as immediate cause. As a general rule, for perinatal deaths (still births and neonates) the underlying cause of death is always the maternal diagnosis. Among older children (post-neonatal age group, under 5's), the conventional approach to death notification, using WHO ICD 11, is sufficient.

The WHO ICD 11 standards require that all deaths are certified by a registered medical practitioner. Cause of death documented in the prescribed form, must include proper diagnostic coding and documentation of the duration of onset of disease, prior to death. The universal cause of death certificate also provides for opinion on manner of death.

Verbal autopsies should be performed for investigation of all pediatric deaths, and the cause of death as determined by assigned verbal autopsy diagnosis. Pathology informed cause of death should be performed in at least 30% of all deaths, using minimally invasive tissue sampling (MITS), or where available, complete diagnostic autopsies (CDA). Where external causes of death are suspected or encountered during the verbal autopsy process, then complete diagnostic autopsies are an absolute indication. The placenta should be available for evaluation, where MITS or CDA are performed, for all stillbirths, and newborns.

63.14 Verbal Autopsy

Verbal autopsies should be performed for all deaths occurring in the community and level 1 health facilities. Death certification should be done by a medical practitioner providing overall coverage of these facilities. Where external causes are suspected, or where MITS or CDA are indicated, these are referred to higher level facilities (level IV to level VI).

63.15 Human remains management and mortuary practice

63.15.1 HUMAN REMAINS MANAGEMENT

General Considerations

- ♦ Wash your hands and don personal protective equipment if appropriate.
- ♦ Bodies and other human remains should be handled with respect and dignity, taking into account socio-cultural and religious considerations of the deceased person as well as their wishes and those of their family, subject to existing laws and regulation. Infection prevention and control practices must be adhered to at all times while handling human remains.
- ♦ Occupational health and safety, and personnel training and capacity development must be in tandem with the general expectations in care and service delivery.
- ♦ Physical infrastructure and waste management are areas of great importance in human remains management.
- ♦ All efforts must be made to identify the deceased persons before disposal of the body.
- ♦ Where efforts to identify a body before disposal have been unsuccessful and the decision to dispose of the body is made, all available information that may be useful in later identification of the body should be recorded and preserved by the mortuary and/or authorized persons. This information should be passed on to the relevant department dealing with inventory of unidentified bodies.
- ♦ Cremation and other forms of disposal that cause permanent destruction of the body shall not be done for bodies whose identity has not been established.
- ♦ Efforts should be made to establish the cause and manner of death before disposal of the body.
- ♦ A burial permit should be issued for all bodies before disposal. This may not apply to stillborn fetuses. Whereas a birth notification may be used in place of a burial permit for neonates, this is undesirable as it denies the health care workers and other agencies an opportunity to put in place measures to prevent such deaths in the future.

63.15.2 TRANSPORTATION OF BODIES

- ♦ The body should remain enclosed within the transport vehicle/gurney/trolley.

- ◆ A body transport vehicle/gurney/trolley must be designated solely for this purpose and be easy to decontaminate.
- ◆ Body bags may be used for body transport as required.
- ◆ Ambulances are not recommended for this purpose.

63.15.3 ADMITTING A BODY TO THE MORTUARY

- ◆ A mortuary may only admit a body if it has sufficient storage capacity that ensures proper preservation without interfering with any investigation that may be required on the said body.
- ◆ A mortuary shall not admit a body suspected of dying an unnatural death unless the death has been reported to the police and written proof availed.
- ◆ A mortuary admitting a body must ensure that the body has proper documentation including:
 - A burial permit issued and stamped by an authorized person (a chief -form D2, a registered medical doctor- form D1) or a health facility.
 - A letter signed and stamped by a police officer indicating the OB number and the police station requesting admission of the body.
- ◆ Identifying particulars, including name, age and gender of the deceased person should be documented, as well as name and contacts of next of kin, place, date, time and cause of death if known
- ◆ In the case of unidentified bodies, the mortuary shall only admit the bodies on the written authority of a police officer who shall be present in person.
- ◆ Where death has not been confirmed the body shall not be admitted into the mortuary.
- ◆ Each body or body part shall be assigned a unique admission number, provisionally identified where possible and correctly labeled with a non-degradable and engraved tag.
- ◆ In the case of unidentified bodies, photographs and fingerprints shall be taken at the earliest opportunity and forwarded to the relevant authorities for identification.
- ◆ Sampling for DNA and other forms of testing may be considered on a case to case basis as advised by the pathologist-in-charge.
- ◆ The mortuary shall be notified in advance of a body that highly infectious (such as ebola) before the said body is transported to the mortuary.
- ◆ Whenever possible, a clinical summary should accompany the bodies of all persons dying in health facility.
- ◆ All personal effects on the body shall be documented and released to an authorized person (family, guardian or investigating police officer) as appropriate.

63.15.4 BODY STORAGE AND PRESERVATION

- ◆ Bodies shall be stored in refrigerated compartments at 2-6°C.
- ◆ Chemical preservation (embalming or formalin fixation) should only be performed after postmortem examination'autopsy'.
- ◆ Temporary body storage may be used at the scene of death especially in mass disasters as arrangements are made to transport the bodies to a mortuary. This temporary storage may take the form of a field mortuary or temporary burial (see body disposal and interment).

63.15.5 POST MORTEM EXAMINATION AND AUTOPSY

- ♦ External examination (view and grant) may be carried out (at the time and location) of body retrieval depending on the circumstances of death, by a pathologist and/or medical officer. Bodies of forensic interest or where the cause of death cannot be determined by external examination only should be subjected to dissection and internal organ examination, if considered safe. All important external findings shall be document and filed for future reference.
- ♦ Verbal autopsies may be carried out to determine cause of death where the services of post-mortem examination or autopsy are not available. Bodies of forensic interest or where the cause of death cannot be determined by verbal autopsy should be subjected to post-mortem and/or dissection and internal organ examination. All important findings shall be document in the verbal autopsy form and filed for future reference.
- ♦ When indicated, autopsies should be performed within 24 hours of body reception. Any delays that affect the quality of results should be documented.

63.15.6 BODY DISPOSAL

- ♦ Common methods for body disposal include burial (interment) and cremation. Other less common methods include aquamation (dissolution), immurement (entombment) and composting.
- ♦ Body disposal can only be done after a burial or disposal permit has been issued.
- ♦ Burials are done at least 6 feet deep in rural areas and at least four feet deep in public cemeteries.
- ♦ Disposal of unclaimed and unidentified bodies:
 - An order for disposal of unclaimed bodies should be sought from a court of law.
 - After an order for disposal has been given, the hospital or mortuary administration shall issue a 30 days' notice to the police for the bodies to be claimed failure to which the mortuary shall be free to dispose them in accordance with cap 241
 - Before disposal autopsy must be performed and documented on all bodies.
 - Unidentified bodies should be buried in marked coded graves for future reference. The codes used to mark the grave shall correspond to the records and codes of the deceased held at the mortuary.

63.16 Mortuary practice

63.16.1 GENERAL CONSIDERATIONS IN MORTUARY PRACTICE

- ♦ A mortuary is a room or building in which bodies are kept, for safe and dignified storage or for examination awaiting disposal.
- ♦ Mortuaries, just like other health facilities, are classified in levels based on services offered.
- ♦ The mortuary physical infrastructure should be commensurate with services offered.
- ♦ The human resource should be well trained and experienced in offering services at the various levels.

- ♦ Safety measures including infection prevention and control, and occupational health and safety should be taken into account as well as mental well-being of staff and grieving families.

63.16.2 LEVELS OF MORTUARY SERVICES

LEVEL I

Description

This is a temporary body holding facility that holds bodies for a maximum of 24hrs awaiting transfer to a higher level facility.

Floor Plan

This is a single room whose size is determined by the anticipated workload

Services

To store bodies for a maximum of 24hrs waiting transfer to higher level mortuary. This mortuary should not release bodies for disposal

Staffing

The staff in this facility will include (but not be limited to)

- ♦ Nurses
- ♦ Police officers
- ♦ Security guards
- ♦ Disaster response team

Safety

The safety procedures to be included in this facility shall include

- ♦ Personal protective equipment use
- ♦ Decontamination
- ♦ Clinical waste management including disposal of used gloves, dressings among others (refer to clinical waste management guidelines)
- ♦ Other safety procedures will be determined by facility in which this mortuary is housed.
- ♦ Biosafety level

Equipment

- ♦ Gurneys
- ♦ Easy to clean tables, trays and trolleys
- ♦ Waste disposal bins

LEVEL II

Description

This is a mortuary found in a sub-county (level 4) hospital or a stand-alone mortuary. This also includes most privately run funeral homes. These mortuaries must be supervised by a forensic pathologist.

Floor Plan

The mortuary will have the following areas

- ◆ Security room at the gate
- ◆ Car park
- ◆ Clean area for the reception and offices
- ◆ Body receiving area
- ◆ Cold storage
- ◆ Embalming area
- ◆ Autopsy suite
- ◆ Body dispatch area
- ◆ Chapel
- ◆ Viewing bay
- ◆ Public toilets
- ◆ Staff changing rooms
- ◆ Staff washrooms
- ◆ Staff tea rooms
- ◆ Eye wash station and shower
- ◆ Skin decontamination areas
- ◆ Decomposed bodies handling area

Services

The following services shall be offered in level II mortuaries

- ◆ Body refrigeration
- ◆ Body embalming
- ◆ Body viewing
- ◆ Basic autopsies limited to road traffic accidents. And any other as may be authorized by the pathologist-in-charge
- ◆ Supervision of level I mortuaries
- ◆ Data analysis and reporting to level III mortuaries
- ◆ Referral services to level III mortuaries

Staffing

- ◆ Security guards
- ◆ Mortuary attendant (minimum certificate holder in mortuary sciences)
- ◆ Driver
- ◆ Data clerk (minimum certificate in health records)
- ◆ Photographer
- ◆ Medical officer with forensic training
- ◆ Safety officer, may be a mortuary attendant with bio-safety and general safety
- ◆ Biomedical engineer (diploma)

Safety Procedures

The safety procedures to be included in this facility shall include

- ◆ Personal protective equipment

- ♦ Decontamination
- ♦ Clinical waste management including disposal of used gloves, dressings among others (refer to clinical waste management guidelines)
- ♦ Eye wash stations
- ♦ Shower cubicles
- ♦ Skin decontamination
- ♦ Body washing services
- ♦ Embalming
- ♦ Air filtration system
- ♦ Assembly point (s)
- ♦ Fire fighting
- ♦ Biosafety level II/III

Equipment

- ♦ Gurneys
- ♦ Easy to clean tables, trays and trolleys
- ♦ Waste disposal bins
- ♦ Autopsy kit
- ♦ Oscillator saw
- ♦ Embalming machine
- ♦ Coolers/refrigerators
- ♦ Air conditioning system, in the clean area as required
- ♦ Cameras

LEVEL III

Description

This is a mortuary found in a county referral (level V) hospital or an equivalent facility

Floor plan

The mortuary will have the following areas

- ♦ Security room at the gate
- ♦ Clean area for the reception and offices
- ♦ Body receiving area
- ♦ Cold storage
- ♦ Embalming area
- ♦ Autopsy suite
- ♦ Body dispatch area
- ♦ Chapel
- ♦ Viewing bay
- ♦ Public toilets
- ♦ Staff changing rooms
- ♦ Staff washrooms
- ♦ Staff tea rooms
- ♦ Eye wash station
- ♦ Skin decontamination
- ♦ Decomposed bodies handling area
- ♦ Lecture /classrooms

- ◆ Cadaveric organ harvesting room

Services

The following services shall be offered in level III mortuaries

- ◆ Body refrigeration
- ◆ Body embalming
- ◆ Basic autopsies limited to road traffic accidents. And any other as may be authorized by the chief government pathologist
- ◆ Supervision of level II mortuaries
- ◆ Data analysis and reporting to level IV mortuaries
- ◆ Referral services to level IV mortuaries
- ◆ Other forensic autopsies except in death due to gunshots and explosives
- ◆ Cadaveric cornea harvesting
- ◆ Teaching at certificate level
- ◆ Clinical autopsies
- ◆ Biosafety level II/III

Staffing

- ◆ Security guards
- ◆ Mortuary attendant (minimum certificate holder in mortuary sciences)
- ◆ Driver
- ◆ Data clerk (minimum certificate in health records)
- ◆ Photographer
- ◆ Medical officer with forensic training
- ◆ Safety officer, may be a mortuary attendant with bio-safety and general safety
- ◆ Mortuary technologists with minimum diploma training

Safety

The safety procedures to be included in this facility shall include

- ◆ Personal protective equipment use
- ◆ Decontamination
- ◆ Clinical waste management including disposal of used gloves, dressings among others (refer to clinical waste management guidelines)
- ◆ Eye wash stations
- ◆ Shower cubicles
- ◆ Skin decontamination
- ◆ Body washing services
- ◆ Embalming
- ◆ Air filtration system
- ◆ Assembly point (s)
- ◆ Fire fighting

Equipment

- ◆ Gurneys
- ◆ Easy to clean tables, trays and trolleys
- ◆ Waste disposal bins
- ◆ Autopsy kit
- ◆ Oscillator saw
- ◆ Embalming machine
- ◆ Coolers/refrigerators
- ◆ Air conditioning system, in the clean area as required
- ◆ Cameras

LEVEL IV

Description

- ◆ Staff tea rooms
- ◆ Eye wash station
- ◆ Skin decontamination
- ◆ Decomposed bodies handling area
- ◆ Lecture /classrooms
- ◆ Cadaveric organ harvesting room
- ◆ Radiology room and radiology reporting area
- ◆ Entomology laboratory
- ◆ Histology lab
- ◆ Isolation room for bodies with confirmed or suspected highly infectious diseases

Services

The following services shall be offered in level III mortuaries

- ◆ Body refrigeration
- ◆ Body embalming
- ◆ Basic autopsies limited to road traffic accidents. And any other as may be authorized by the chief government pathologist
- ◆ Supervision of level I mortuaries
- ◆ Data analysis and reporting to level IV mortuaries
- ◆ Referral services to level IV mortuaries
- ◆ Other forensic autopsies except in death due to gunshots and explosives
- ◆ Cadaveric cornea harvesting
- ◆ Teaching at certificate level
- ◆ Clinical autopsies
- ◆ Forensic radiology
- ◆ Forensic entomology
- ◆ Teaching for certificate and diploma level
- ◆ Referral services to level V

Staffing

- ◆ Security guards
- ◆ Mortuary attendant (minimum certificate holder in mortuary sciences)

- ◆ Driver
- Data clerk (minimum certificate in health records This is a regional mortuary that provides referral services to several mortuaries in a specified region or an equivalent. This serves as a regional forensic center.

Floor Plan

The mortuary will have the following areas

- ◆ Security room at the gate
- ◆ Clean area for the reception and offices
- ◆ Body receiving area
- ◆ Cold rooms
- ◆ Embalming area
- ◆ Autopsy suite
- ◆ Body dispatch area
- ◆ Chapel
- ◆ Viewing bay
- ◆ Public toilets
- ◆ Staff changing rooms
- ◆ Staff washrooms
- ◆ Photographer
- ◆ Medical officer with forensic training
- ◆ Safety officer, may be a mortuary attendant with bio-safety and general safety
- ◆ Mortuary technologists with minimum diploma training
- ◆ Mortuary scientist, graduate
- ◆ Forensic pathologist
- ◆ Clinical pathologist
- ◆ Police officer(s)
- ◆ Quality manager, graduate
- ◆ Safety manager, graduate
- ◆ Forensic photographer, graduate

Safety

The safety procedures to be included in this facility shall include

- ◆ Personal protective equipment use
- ◆ Decontamination
- ◆ Clinical waste management including disposal of used gloves, dressings among others (refer to clinical waste management guidelines)
- ◆ Eye wash stations
- ◆ Shower cubicles
- ◆ Skin decontamination
- ◆ Body washing services
- ◆ Embalming
- ◆ Air filtration system
- ◆ Assembly point (s)
- ◆ Fire fighting
- ◆ Isolation for highly infectious diseases
- ◆ Bio-safety cabinets

- ♦ Biosafety level III

Equipment

- ♦ Gurneys
- ♦ Easy to clean tables, trays and trolleys
- ♦ Waste disposal bins
- ♦ Autopsy kit
- ♦ Oscillator saw
- ♦ Embalming machine
- ♦ Coolers/refrigerators
- ♦ Air conditioning system, in the clean area as required
- ♦ Radiology
- ♦ Cameras
- ♦ Bio safety cabinets

LEVEL V

Description

This is the National Forensic Referral, Teaching and Research Centre.

Floor Plan

The mortuary will have the following areas

- ♦ Security room at the gate
- ♦ Clean area for the reception and offices
- ♦ Body receiving area
- ♦ Cold rooms
- ♦ Embalming area
- ♦ Autopsy suite
- ♦ Body dispatch area
- ♦ Chapel
- ♦ Viewing bay
- ♦ Public toilets
- ♦ Staff changing rooms
- ♦ Staff washrooms
- ♦ Staff tea rooms
- ♦ Eye wash station
- ♦ Skin decontamination
- ♦ Decomposed bodies handling area
- ♦ Lecture /classrooms
- ♦ Cadaveric organ harvesting room
- ♦ Radiology room and radiology reporting area
- ♦ Entomology laboratory
- ♦ Isolation room for bodies with confirmed or suspected highly infectious diseases
- ♦ Cadaveric organ harvesting theatre
- ♦ Research laboratories
- ♦ Lecture rooms
- ♦ Teleconference centre
- ♦ Teaching laboratories
- ♦ Library

- ◆ Board room

Services

- ◆ Body refrigeration
- ◆ Body embalming
- ◆ Supervision of level IV mortuaries
- ◆ Data analysis and reporting to level IV mortuaries
- ◆ Referral services to level IV mortuaries
- ◆ Forensic autopsies
- ◆ Cadaveric cornea harvesting
- ◆ Teaching at certificate level
- ◆ Clinical autopsies
- ◆ Forensic radiology
- ◆ Forensic entomology
- ◆ Referral services from level IV
- ◆ Research in forensic sciences
- ◆ Cadaveric organ harvesting
- ◆ Library services
- ◆ Training
- ◆ Telemedicine and teleconferencing

Staffing

- ◆ Security guards
- ◆ Mortuary attendant (minimum certificate holder in mortuary sciences)
- ◆ Driver
- ◆ Data clerk (minimum certificate in health records)
- ◆ Photographer
- ◆ Medical officer with forensic training
- ◆ Safety officer, may be a mortuary attendant with bio-safety and general safety
- ◆ Mortuary technologists with minimum diploma training
- ◆ Mortuary scientist, graduate
- ◆ Forensic pathologist
- ◆ Forensic scientist
- ◆ Clinical pathologists
- ◆ Police officer(s)
- ◆ Quality manager, graduate
- ◆ Safety manager, graduate
- ◆ Forensic photographer, graduate
- ◆ Researchers
- ◆ It experts
- ◆ Statisticians
- ◆ Librarians
- ◆ Surgeons and other specialists in cadaveric organ harvesting

Safety

The safety procedures to be included in this facility shall include

- ◆ Personal protective equipment use
- ◆ Decontamination

- ♦ Clinical waste management including disposal of used gloves, dressings among others (refer to clinical waste management guidelines)
- ♦ Eye wash stations
- ♦ Shower cubicles
- ♦ Skin decontamination
- ♦ Body washing services
- ♦ Embalming
- ♦ Air filtration system
- ♦ Assembly point (s)
- ♦ Fire fighting
- ♦ Isolation for highly infectious diseases
- ♦ Bio-safety cabinets
- ♦ Biosafety level IV

Equipment

- ♦ Gurneys
- ♦ Easy to clean tables, trays and trolleys
- ♦ Waste disposal bins
- ♦ Autopsy kit
- ♦ Oscillator saw
- ♦ Embalming machine
- ♦ Coolers/refrigerators
- ♦ Air conditioning system, in the clean area as required
- ♦ Cameras
- ♦ Bio safety cabinets
- ♦ Specialized surgical equipment
- ♦ Radiology

63.17 Mortuary layout

63.17.1 LOCATION

- ◆ Adequate vehicular access from the service road
- ◆ Away from clinical, kitchen and dining areas if hospital based
- ◆ Located at ground level
- ◆ Near histopathology laboratory Services
- ◆ Separate access for staff, undertakers and visitors

LAY-OUT

For the purpose of infection control, facility should have clean area, transitional area and dirty area. Workflow should be planned to minimize movement from dirty to clean areas

Dirty area

- ◆ Post mortem room
- ◆ Utility room
- ◆ Instrument room
- ◆ Body store

Clean area

- ◆ Reception
- ◆ Waiting rooms
- ◆ Interview/counseling room
- ◆ Bier rooms
- ◆ Offices
- ◆ Observation area
- ◆ Staff changing area
- ◆ Specimen store

Transit area

- ◆ The body handling area
- ◆ The disposal room
- ◆ The PM transit area

Post mortem room should be connected to the body storage area, the dirty utility room/instrument store and PM transit area, through which access is gained to the staff changing area and from the circulation routes. It may also be connected to the disposal room.

The disposal area should be organized in such a way that clinical wastes, linen and domestic waste are not mixed together prior to collection.

Staff changing rooms

Staff and non-mortuary personnel must remove outer clothes before entering the PM room. This will take place in the staff changing area.

Boots and stocks of protective garments (as prescribed by local policy) should be stored in the PM transit area, leading off the staff changing area and from where access is gained to the PM room. Staff should change into boots and protective garments in the PM transit area before entering the PM room.

Staff and others should discard used protective clothing and boots within the PM suite, and change into slip-on footwear before moving into the connecting staff changing area. Reusable protective clothing should be bagged up as appropriate before transferring to the disposal room.

63.17.2 MORTUARY DESIGN REQUIREMENTS

ENTRANCES AND SIGNPOSTS

- ♦ The mortuary entrance should be easy to access and bear relevant signage.
- ♦ For hospital based mortuaries, the number of entrances depend on whether staff, relatives and the arrival of bodies from the hospital share a common approach and then follow separate traffic routes to the individual entrances to the relevant parts of the mortuary, or whether there is direct access from a hospital street to the different parts of the mortuary. In either case, an entrance will be needed for collection of bodies by undertakers and, if appropriate, bodies arriving from outside the hospital.

BODY STORAGE AND PROCEDURE ROOM

- ♦ Should be adjacent to the PM room and adjoin the bier room. Space is required in the body handling area for parking and maneuvering trolleys. Body weighing facilities are required. Space is also required for the reception of bodies on trolleys from the hospital, the labeling or identification of bodies and entering details in a record book or computer, , the transfer of bodies to the refrigerated body store, the removal and transfer of bodies from the body store to the PM room or to the bier room, the removal of bodies from the store, and confirmation of identity before handing over to undertakers or for police identifications. Consideration should be given to the use of mobile and fixed hoists, which will have implications on space requirements.
- ♦ The body store consists of a number of labeled compartment bays, (refrigerated at approximately 4°C), each containing between three and five racks for holding the body trays upon which bodies are stored. Individual compartment bays may either be physically separated from one another or may be open between one another in a continuous run. Compartment bays may either have a door at one end or may be double-ended in the case of pass-through fridges.
- ♦ All doors to the refrigeration compartment bay must open to give access to the body trays. All doors should be fitted with locks. High quality hinges and locks are an important consideration. All compartment bays should be capable of being drained.

Internal rollers and racking holding body trays should be removable to permit clear entry to the compartment bay for cleaning purposes. The refrigeration plant must be fully accessible for maintenance.

- ♦ Hand hygiene facilities and wash down points must be provided in the body handling area.
- ♦ Lockers for the storage of personal effects removed from bodies should be provided in a secure area.

Finishes

The floor of the body handling area must be hardwearing, non-slip and impervious to water and disinfectant. The walls should be capable of withstanding regular washing or hosing down and should meet the raised junction with the floor at a waterproof joint. Ceilings and, where relevant, ceiling suspension grids should be capable of withstanding frequent washing down.

Ventilation

Mechanical ventilation should be provided to the body handling area so that air flows from this area into the PM room. Where there is direct access from outside to the body handling area, it will be necessary to provide some form of lobby, with two sets of doors.

AUTOPSY ROOM

1. The autopsy room should place be direct from body storage area in order to allow transfer bodies to the autopsy table and have ample space for movements.
2. Autopsy table should be of adjustable height and have drainage and water supply. Consideration should be given for rotating tables. The table should have a hot and cold water supply and a waste outlet of about 75mm diameter fitted with a suitable, readily accessible tap and drain pipe.
3. There should be an organ dissection bench. The dissecting bench should have raised edges and slope to a sink(s), which should be deep enough for the washing of organs. There should be provision for running water over the bench itself. The drainage flow of water should be checked and confirmed. The positioning of sinks along the dissecting bench should suit the pattern of working agreed upon by the staff. A sluice is required for the opening of intestines and disposal of contents. A low pressure water pipe should be provided, preferably in the wall of the sink(s). A standing waste is required. A filter trap is necessary. The bench should be easily cleanable and have no traps for infected material and should preferably be wall mounted.
4. Most PM rooms will require a minimum of two PM tables to permit the pathologist to carry out several examinations at one attendance.
5. Post-mortem tables should be easily cleanable and free from traps for potentially infected material.
6. Walls and floors must be finished with hard and durable surfaces, easy to clean, impervious to liquids and resistant to disinfectants. Floors should be very hard wearing an non slip.

Lighting

Postmortem room should have ample daylight and distributing of and location of windows should take into account privacy and prevent glare and excess sunlight. Artificial lighting should provide good general illumination with higher levels for task lighting over the post mortem tables and dissecting benches.

Ventilation

Negative control ventilation system

DIRTY/ UTILITY/ INSTRUMENT ROOM

- ♦ Should open directly off the PM room and it serves as a dirty utility room and for storage of instruments.
- ♦ An automated washer-disinfector should be provided for the cleansing and disinfection of instruments after use.
- ♦ Where sterilization is required the equipment should be transported to the sterilization department.
- ♦ Sinks for washing and disinfecting bowls and instruments.
- ♦ Flash sluice.

POST MORTEM TRANSIT AREA

- ♦ Entry to the PM room will be via the PM transit area, which leads off the staff changing area and separates clean and dirty activity areas.
- ♦ Staff entering the PM room will need to change into protective clothing. Suitable shelving, racks and hooks should be provided within the PM transit area for the storage of protective clothing and boots.
- ♦ Staff should discard used protective clothing within the PM transit area or PM room. Separate bins for the disposal of single-use items and collection of re-usable items pending cleaning should be provided.
- ♦ Hand hygiene facilities with hands-free tap control should be provided for the washing of hands following the removal of protective clothing.
- ♦ Staff must pass through a boot wash before entering and upon leaving the PM room. Boots should be stored in the PM transit area.

STAFF CHANGING AREAS

Two identical sets of WCs/showers and lockable storage spaces should be provided in the staff changing area to allow for flexible use by either sexes or different staff groups (according to local policy). Hand washing facilities should be provided.

OBSERVATION AREA

Should be physically separate from the post mortem room

SPECIMEN STORE

- ♦ Shelves made from impervious material will be required for holding jars or containers of various sizes.
- ♦ Floor space, or space below high benching, may be required for formalin containers. The room must be continuously ventilated because of the hazard arising from formalin used in the specimen containers.

PATHOLOGIST'S OFFICE

The function of the pathologists' office is to provide space for consultations and writing reports. It should have a window for natural ventilation and light, and should be entered from the circulation route leading to the staff changing area and the body handling area.

TECHNICIANS' OFFICE/ REST ROOM

- ♦ Should have access to the body viewing facilities .It should be situated near the body handling area and the undertakers' entrance so that bodies may be registered and labeled before being deposited in the body store. It should be entered from the circulation route leading to other parts of the mortuary.
- ♦ The staff call bells for undertakers and visitors will need to be located here
- ♦ Apart from clerical functions, the office will be used for relaxation between work periods.
- ♦ It should be furnished with a desk(s), chairs, shelves and filing cabinet.
- ♦ Lockers should be provided to enable technicians to store clothing and personal effects in this room.

DISPOSAL ROOM

A disposal room is required with adequate space for the temporary storage of securely packed refuse and dirty linen bags (appropriately color coded) with easy access for their collection.

CLEANER'S ROOM

- ♦ A cleaners' room should be provided to service the whole accommodation.
- ♦ There should be lockable cupboard space for secure storage of stock and shelves for holding in-use materials.
- ♦ There should be adequate space for maneuvering machines, for emptying and filling buckets and bowls, and the routine servicing and cleaning of equipment.
- ♦ There should be unrestricted access to the sink, and to a wash-hand basin.

GENERAL PURPOSE LINEN STORE

- ♦ A general purpose store will be needed for a wide variety of stock items and linen that do not require specialized environmental conditions. As stock dimensions vary considerably, adjustable shelving would be an advantage. Adequate floor space should be allowed for the storage of bulky goods.
- ♦ The store must be accessible to staff servicing both the body handling and viewing areas, and the PM room activity requirements.

63.18 Crime scene support

63.18.1 GENERAL CONSIDERATIONS

Forensic pathologist may be called upon by investigating agents to support in crime scene analysis and interpretation as well as evidence collection. In this regard, the pathologist may require a basic understanding of processes and protocols in crime scene management. These include:

- ♦ Note taking
- ♦ Securing a crime scene
- ♦ Evidence management
- ♦ Scaling the investigation to the even

63.18.2 THE ROLE OF THE FORENSIC PATHOLOGIST IN CRIME SCENE MANAGEMENT

- ♦ When a forensic pathologist is requested by police authorities to attend the scene of a suspicious death, she/he is 'briefed' as to the circumstances of the case by the Senior Investigating Officer (SIO), or his/her representative.
- ♦ A strategy for approaching the body, the collection of trace evidence from, and around, the body and ultimately the recovery of the body from the scene, is agreed with crime scene investigators, forensic scientists and the SIO.
- ♦ The forensic pathologist examines the body, noting its disposition, the surroundings in which the body lies and the presence of injuries that can be seen without disturbing the body or the scene.
- ♦ The pathologist supervises recovery of the body by crime scene investigators and funeral directors.

63.19 Forensic anthropology

- ♦ Forensic anthropology is a special sub-field of physical anthropology (the study of human remains) that involves applying skeletal analysis and techniques in archaeology to solving criminal cases.
- ♦ A forensic anthropologist can assist in the identification of deceased individuals whose remains are decomposed, burned, mutilated or otherwise unrecognizable, as might happen in a plane crash.

- ♦ Forensic anthropologists are also instrumental in the investigation and documentation of genocide and mass graves.
- ♦ Along with forensic pathologists, forensic dentists, and homicide investigators, forensic anthropologists commonly testify in court as expert witnesses.
- ♦ Using physical markers present on a skeleton, a forensic anthropologist can potentially determine a person's age, sex, stature, and race.
- ♦ In addition to identifying physical characteristics of the individual, forensic anthropologists can use skeletal abnormalities to potentially determine cause of death, past trauma such as broken bones or medical procedures, as well as diseases such as bone cancer.

63.20 Forensic entomology

- ♦ Forensic entomology is the scientific study of the colonization of a dead body by arthropods.
- ♦ It involves the identification of insects and other arthropods associated with human remains as an aid to determining the time and place of death.
- ♦ This includes the study of insect types commonly associated with cadavers, their respective life cycles, their ecological presences in a given environment, as well as the changes in insect assemblage with the progression of decomposition.
- ♦ Insect succession patterns are identified based on the time a given species of insect spends in a given developmental stage, and how many generations have been produced since the insects introduction to a given food source.
- ♦ Insect development alongside environmental data such as temperature and vapor density, can be used to estimate the time since death, due to the fact that flying insects are attracted to a body immediately after death.
- ♦ The identification of postmortem interval to aid in death investigations is the primary scope of this scientific field. However, forensic entomology is not limited to homicides, it has also been used in cases of neglect and abuse, in toxicology contexts to detect the presence of drugs, and in dry shelf food contamination incidents.
- ♦ Equally, insect assemblages present on a body, can be used to approximate a given location, as certain insects may be unique to certain areas.

PART VIII: COVID-19

The coronavirus disease 2019 (COVID-19) is an acute respiratory infection caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). Coronaviruses are a large family of enveloped RNA viruses, some of which cause illness in people (e.g., common cold, SARS, MERS) and others that circulate among mammals (e.g., bats, camels) and birds. Rarely can animal coronaviruses spread to humans and subsequently spread between humans. Similar to SARS and MERS, it is thought that human transmission occurs via respiratory droplets produced when a person sneezes or coughs and aerosol in certain circumstances, including airway manipulation. Aerosol generation occurs in coughing, nebulization, tracheal intubation and airway suctioning.

WHO first declared COVID-19 a public health emergency of international concern on 30 January 2020 and subsequently declared it a pandemic on 11 March 2020. The pace at which COVID-19 spread worldwide and in Kenya was unprecedented. Kenya discovered the first documented case of COVID-19 within its borders on 13 March 2021. COVID-19 is highly transmissible and infectious and runs the risk of overwhelming the health system's capacity, with the need to support not just those with COVID-19 but also those with other illnesses. A lot of efforts have gone into reducing transmission of the virus, including restrictions on gatherings, contact tracing, quarantine and isolation. With the spread of COVID-19 in the communities, preventive public health measures such as hand washing and proper use of face masks cannot be overemphasized. The most common symptoms of COVID-19 include cough, loss of smell and/or taste, fever, difficulty breathing, headache, sore throat, running nose, chest pain, myalgia, fatigue, general weakness and diarrhoea. The most common clinical presentation is a respiratory infection with a symptom severity ranging from a mild common cold-like illness (estimated to be 80% of cases) to severe viral pneumonia in approximately 14%, leading to acute respiratory distress syndrome potentially fatal in about 5%. Current estimates of the incubation period range from 1 to 14 days, with a median incubation period of five to six days. Transmission can occur during the incubation period, even without symptoms.

Certain groups of people are at higher risk for transmission and severe disease, including healthcare workers who work with COVID-19 patients. In addition, vulnerable and marginalized groups such as people with disabilities may face challenges in accessing healthcare and have worse outcomes from COVID-19.

People of any age can catch COVID-19, but it most commonly affects middle-aged and older adults. The risk of developing severe COVID-19 disease increases with age from age. Some conditions can result in higher severity of illness in adults of any age;

- Diabetes Mellitus (Type 1 or 2)
- Heart Conditions (such as heart failure, coronary artery disease, cardiomyopathies or hypertension)
- Overweight and obesity
- Smoking
- Chronic kidney disease
- Chronic lung diseases, including COPD (chronic obstructive pulmonary disease), asthma (moderate-to-severe), interstitial lung disease, cystic fibrosis, and pulmonary hypertension
- HIV/AIDS
- Immune Suppression
- Liver disease
- Pregnancy
- Sickle cell
- Solid organ or blood stem cell transplant
- Cerebrovascular disease

Clinical manifestations of COVID-19 are generally milder in children compared with adults. Symptomatic children may present with non-respiratory symptoms such as gastroenteritis more frequently than adults. An acute hyperinflammatory syndrome leading to shock or multi-organ failure has been described, known as the Multisystem Inflammatory Syndrome (MIS-C), which is temporally associated with COVID-19 in children and adolescents.

A significant challenge in the war against the pandemic appears to be the rate at which mutations occur, resulting in several variants resulting in more infections and increased disease severity. This highlights the importance of strengthening public health measures and vaccination strategies early in the response.

64. CASE DEFINITION

Suspected case of SARS-CoV-2 infection:

1. A person who meets the clinical AND epidemiological criteria:

Clinical criteria:

- Acute onset cough AND fever;
- Acute onset of ANY TWO OR MORE of the following signs or symptoms:
Cough, fever, loss of taste or smell, difficulty breathing, sore throat, running nose, chest pain, fatigue/general weakness, headache, diarrhoea, altered mental status (Children may present with atypical symptoms)

AND

Epidemiologic criteria:

- Where there is widespread community transmission in several regions of the country, then all patients will be considered to have met epidemiologic criteria

2. A patient with severe acute respiratory illness (SARI)

(SARI: Acute respiratory infection with or without fever; and cough; with onset within the last 10 days; and requires hospitalization)

Probable case of SARS-CoV-2 infection

- A patient who meets the clinical criteria above AND is a contact of a probable or confirmed case or linked to a COVID-19 cluster
- A suspected case with chest imaging showing findings suggestive of COVID-19 disease
- Recent onset loss of taste or loss of smell with no other identified cause
(Common imaging findings include bilateral peripheral opacities with lower lung distribution. Opacities usually ground glass opacities that may progress to consolidations)
- Unexplained death in an adult with SARI prior to death AND had contact with a probable or confirmed case or linked to a COVID-19 cluster

Confirmed case of SARS-CoV-2 infection

- A person with a positive SARS-CoV-2 PCR test
- A person with a positive SARS-CoV-2 Antigen RDT AND meeting criteria for either suspected or probable case; OR has contact with a probable or confirmed case.

65. Infection Prevention and Control (IPC) plan in response to COVID-19

Introduction

The main aim of IPC is to prevent or limit the spread of SARS-COV2 at all levels of healthcare

Facility preparedness

All facilities should have the following:

- An IPC program or a dedicated IPC focal person
- A functional screening and triage area for early case identification
- A holding area for cases awaiting results or transfer
- A mechanism to ensure standard and transmission-based precautions.
- Adequate healthcare workers to provide 24-hour patient care without exhaustion.
- A plan to conduct health worker exposure risk assessment
- Continuous training and refresher courses for the existing staff and any new staff
- Adequate IPC supplies and equipment

Quarantine and Isolation

- Limit the number of visitors
- Continue to observe respiratory hygiene and cough etiquette
- Observe hand hygiene by either use of soap and water or an alcohol-based hand rub
- Ensure proper ventilation of the facility or home
- Observe for fever or other symptoms daily
- Watch for danger signs or signs of deterioration like dyspnea and report to a health facility
- Use of either separate utensils or disposable utensils

Quarantine

Quarantine is the separation and restricted movement of healthy persons who have been exposed to persons with COVID-19. It can be applied at the individual, family or community level. All persons who have had contact with a confirmed case of COVID-19 should quarantine for 14 days and get a COVID-19 test if they develop any symptoms. The quarantine can either be self-quarantine or carried out at a designated facility.

Isolation

Isolation is separating sick people with a contagious disease from those who are not ill. All confirmed COVID-19 cases identified should be isolated. The isolation location can be in a health facility for those with severe illness, at home for those who meet the self-isolation criteria or at a community isolation facility. Isolation precautions may be dropped 10 days after the onset of symptoms, provided that one has had no fever without antipyretics for at least 24 hours.

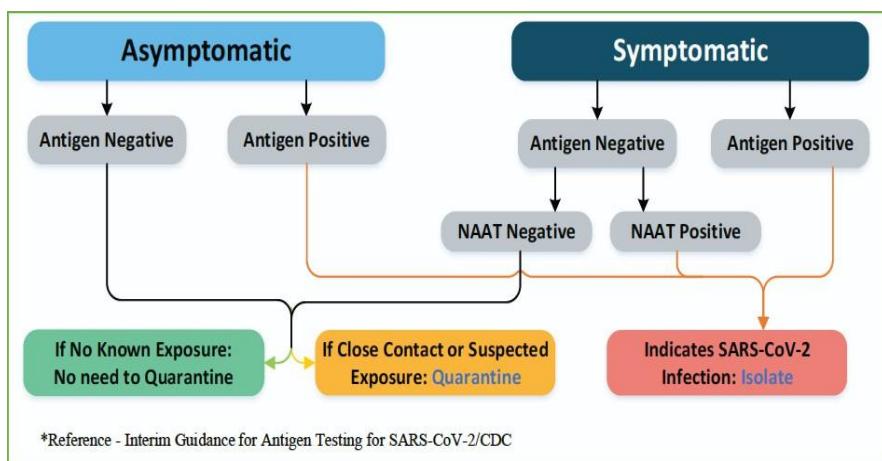
Diagnosis of COVID-19

This section aims to provide guidance on who to test for COVID-19 and the preferred tests to use in the clinical setting. Testing is only recommended for diagnosis and not as an indicator of recovery from COVID-19. Testing should be offered to all persons meeting the case definition.

Preferred Initial Tests

Nucleic Acid Amplification Tests (NAATs) such as the SARS-CoV-2 Polymerase Chain Reaction (PCR) are the preferred initial tests. Where access to a PCR test is limited or too costly then SARS-CoV-2 antigen testing can be utilized. Turn-around times for antigen tests are generally shorter than for PCR testing and thus an antigen test can help with quick identification of COVID-19 cases. Sensitivity of antigen tests is lower than that of NAATs. Therefore, a negative test may warrant confirmation by a PCR test in symptomatic patients. A positive antigen test does not warrant confirmation unless the patient is asymptomatic and the diagnosis is in doubt.

Serological tests i.e., SARS-CoV-2 antibody detection tests should not be used for diagnosis of COVID-19. They can only be used to check for previous infection for example in the setting of serological surveys. Indeterminate PCR test results usually indicate that only one of the 2 or more target genes being tested for was identified. These tests should be considered presumptively positive.



*Reference - Interim Guidance for Antigen Testing for SARS-CoV-2/CDC

Collection of Specimens

- Collect specimens from the upper respiratory tract (URT; nasopharyngeal and oropharyngeal) AND, where clinical suspicion remains and URT specimens are

negative, collect specimens from the lower respiratory tract when readily available (LRT; expectorated sputum, endotracheal aspirate, or bronchoalveolar lavage in ventilated patient) for SARS-CoV-2 testing by RT-PCR and bacterial stains/cultures.

- Use appropriate PPE for specimen collection (droplet and contact precautions for URT specimens; airborne precautions for LRT specimens). When collecting URT samples, use viral swabs (sterile Dacron or rayon, not cotton) and viral transport media. Do not sample the nostrils or tonsils. In a patient with suspected SARS-CoV-2, especially with pneumonia or severe illness, a single negative URT sample does not exclude the diagnosis, and additional URT and LRT samples are recommended. LRT samples are more likely to be positive and for a longer period. Clinicians may elect to collect only LRT samples when these are readily available (for example, in mechanically ventilated patients). Sputum induction should be avoided due to increased risk of increasing aerosol transmission.
- Samples should be collected in a timely manner for clinical management and outbreak control. Ensure that staff responsible for collection of samples are well trained and available. Samples should be transported to the laboratory using Viral Transport Media and should be triple packaged. For further details on sample collection please refer to the Ministry of Health Targeted Testing Strategy for Coronavirus disease 2019 (COVID 19) in Kenya.

Specimens for testing

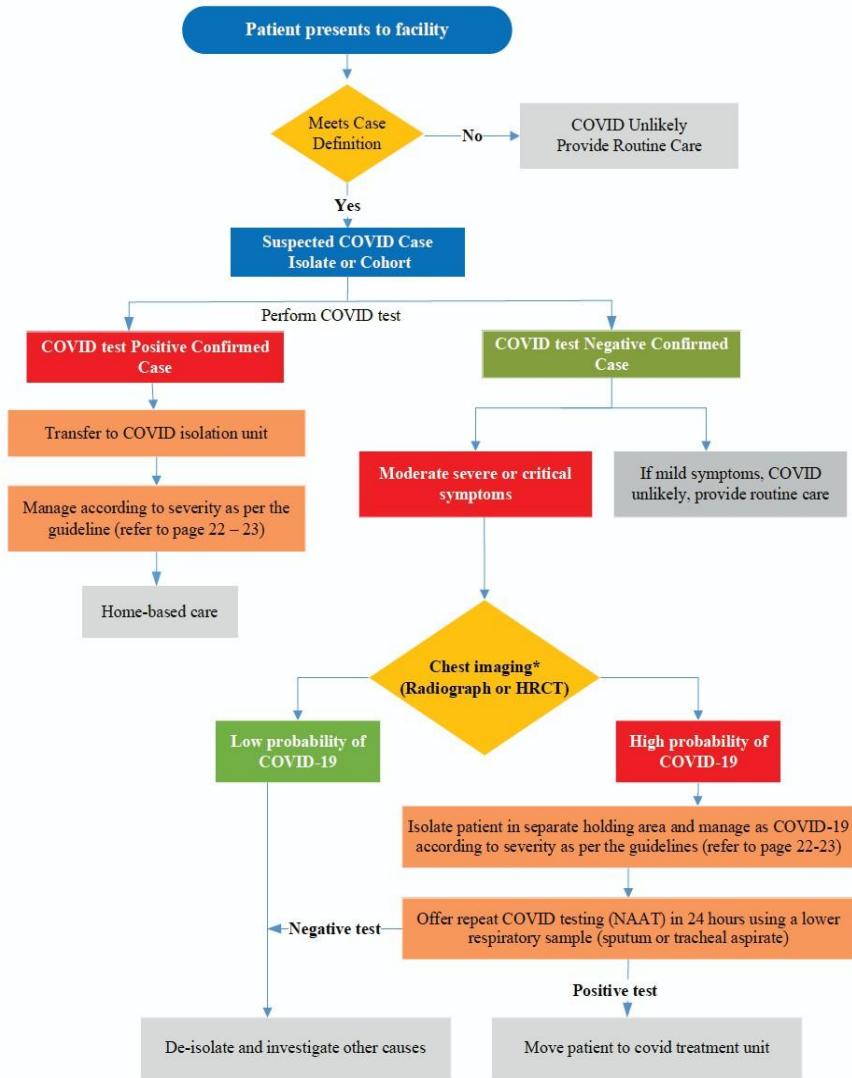
Specimens can be taken from the upper respiratory tract or the lower respiratory tract. Upper respiratory tract samples include nasopharyngeal swabs, oropharyngeal swabs and nasopharyngeal aspirates. Lower respiratory tract specimens include bronchoalveolar lavage specimens and expectorated sputum.

Collection of specimens for laboratory diagnosis

NB:

The role of radiological tests for diagnosis of COVID-19

Imaging including chest radiographs and high-resolution CT scans are useful in monitoring of the clinical course and evaluating disease severity. Chest CT scan images from patients with COVID 19 typically demonstrate bilateral peripheral ground glass opacities which are non-specific. These can be found other kinds of pneumonia. This makes the diagnostic value of chest CT scan in COVID 19 low and dependent on radiographic interpretation. Given the variability in chest imaging findings, chest radiograph or CT scan alone is not recommended for the diagnosis of COVID 19.



Management of COVID-19

The management of patients with COVID-19 depends on severity of disease at presentation.

Once patient is CONFIRMED positive by a PCR or rapid antigen test categorize them into the following groups based on presentation

Table 65:1 COVID-19 severity categorization in adults and adolescents

CATEGORY	FEATURES
1. Mild illness	Fever, cough, sore throat, malaise, headache, muscle pain BUT No dyspnoea (shortness of breath) and No abnormalities on chest imaging
2. Moderate illness	Clinical features of pneumonia (fever, cough, dyspnoea) AND/OR radiological features of pneumonia BUT Oxygen saturations (SPO2) greater than or equal to 94% on room air
3. Severe illness	Clinical and radiological features of pneumonia, tachypnea with RR>30 AND oxygen saturation (SPO2) less than 94% on room air
4. Critical illness	Features of severe illness AND Any of the following: <ul style="list-style-type: none">• respiratory failure• sepsis/septic shock• multiorgan dysfunction• acute thrombosis

Table 65:2 severity categorization in children

CATEGORY	FEATURES
1. Mild illness	Fever, cough, sore throat, malaise, headache, muscle pain BUT No dyspnoea (shortness of breath) and No abnormalities on chest imaging
2. Moderate illness	Clinical signs of non-severe pneumonia (cough or difficulty breathing) AND Fast breathing* AND/OR chest indrawing

*Fast breathing (in breaths/min): <2months: 360; 2-11months: 350; 1-5years: 340

3. Severe illness	<p>Child with clinical signs of pneumonia (cough or difficulty in breathing) + at least one of the following:</p> <ul style="list-style-type: none"> • Central cyanosis or SPO2 <90%; • Severe respiratory distress (e.g., fast breathing*, grunting, very severe chest indrawing); • General danger sign: inability to breastfeed or drink, lethargy or unconsciousness, or convulsions <p>*Fast breathing (breaths/min): <2months: ³60; 2-11months: ³50; 1-5years: ³40</p>
4. Critical illness	<p>Features of severe illness AND Any of the following:</p> <ul style="list-style-type: none"> • Acute respiratory distress syndrome • Respiratory failure requiring mechanical ventilation • Sepsis/Septic shock • Other organ failure requiring ICU care
5. MIS-C	<p>Preliminary case definition: Children and adolescents 0–19 years of age with fever > 3 days AND Two/more of the following:</p> <ul style="list-style-type: none"> • Rash or bilateral non-purulent conjunctivitis or muco-cutaneous inflammation signs (oral, hands or feet); • Hypotension or shock; • Features of myocardial dysfunction, pericarditis, valvulitis, or coronary abnormalities; • Evidence of coagulopathy; • Acute gastrointestinal problems; <p>AND No other obvious microbial cause of inflammation AND Evidence of COVID-19 (RT-PCR, antigen test or serology positive), or likely contact with patients with COVID-19.</p>

Supportive care

Supportive care should be offered to all patients diagnosed with COVID-19. This includes the following:

1. Counselling and psychosocial support
2. Symptomatic treatment
3. Adequate nutrition and hydration

Table 65:3 Management of asymptomatic, mild and moderate COVID-19

Asymptomatic or mild illness	<p>Assess for eligibility for home-based care</p> <p>Patient qualifies if they have no risk factors for disease progression or poor outcomes (see below) and a suitable space is available at home (separate room with separate bathroom), has resources to access basic PPE for family members e.g., face masks and gloves, no house members who are increased risk of severe illness if exposed e.g., see below</p> <p>Risk factors for poor outcome:</p> <p>Age >60, coronary artery disease, stroke, diabetes, hypertension, cancer, chronic lung disease, frailty, pregnancy, immunosuppression, chronic kidney disease</p> <p>Management</p> <p>Symptomatic treatment for mild disease (paracetamol, antihistamines). Steroids should NOT be used for patients with asymptomatic, mild or moderate disease. (Isolation precautions as outlined in the IPC section)</p>
Moderate Illness	<ul style="list-style-type: none">• Baseline tests - blood count, renal and liver function, HIV test, random blood sugar.• symptomatic treatment:<ul style="list-style-type: none">• Fever - Paracetamol• Sore throat - gargles• cough, nasal congestion - antihistamine• VTE prophylaxis with Enoxaparin 40mg once a day if admitted to a health facility<ul style="list-style-type: none">• Where enoxaparin is not available, use low dose unfractionated heparin at 5000units subcutaneous BD)• Where patient unable to use standard anticoagulation therapy, consider use of direct-acting anticoagulants• Consider prophylaxis for children older than 5 years with comorbidities and not ambulant. Refer to BNF for dosage guidelines for pediatrics <p>Where there is pressure for space for isolation of patients, the following patients with moderate illness can be managed at home:</p> <ul style="list-style-type: none">• Young <60 years• Oxygen saturations >94% on room air• No comorbidities• Have easy access to a health facility in case of worsening of symptoms• Physically active

Table 65:4 Management of severe and critical COVID-19

Severe illness	<ul style="list-style-type: none">• Baseline Tests (Total blood count, renal and liver function, HIV test, random blood sugar)• Symptomatic treatment• Oxygen supplementation to maintain SPO₂s above 90% and above 92% in pregnant women (oxygen supplementation can be via nasal prongs, masks, non-rebreather masks or high flow nasal cannula - see below)• Dexamethasone 6mg per day for up to 10 days (where dexamethasone is not available, consider using prednisone 40 mg OD or methyl prednisolone 32mg OD. This short duration of dosing does not require tapering)<ul style="list-style-type: none">• For children - Dexamethasone 0.15mg/kg iv/PO OD to a maximum of 6mg or prednisolone 1mg/kg OD maximum 40mg OD, methylprednisolone 0.8 mg/kg IV OD maximum 32mg OD• VTE prophylaxis Enoxaparin 40mg OD once a day for the duration of hospitalization (Where enoxaparin is not available, use low dose unfractionated heparin at 5000units subcutaneous BD)• Self proning for 12 to 16 hours a day (see self-proning guide below) as tolerated
Critical Illness	<ul style="list-style-type: none">• Baseline tests- total blood count, renal and liver function tests, HIV test, random bold sugar• Symptomatic treatment• Admit to a Critical Care Unit.• Mechanical Ventilation if no improvement in oxygenation with maximal oxygen flows with other modalities - see guide to noninvasive ventilation, tracheal intubation and ventilation below• Prone for 12 to 16 hours per day• Conservative fluid management i.e., give IV fluid only if hypovolemic• Closed suctioning of secretions where available• Give Dexamethasone 6 mg per day for up to 10 days (where dexamethasone is not available, consider using prednisone 40 mg OD or methylprednisolone 32mg OD. This short duration of dosing does not require tapering)<ul style="list-style-type: none">• For children - Dexamethasone 0.15mg/kg iv/ PO OD to a maximum of 6mg or prednisolone 1mg/kg OD maximum 40mg OD, methylprednisolone 0.8 mg/kg IV OD maximum 32mg OD• VTE prophylaxis 40mg Enoxaparin OD SC (Where enoxaparin is not available, use low dose unfractionated heparin at 5000units subcutaneous BD) <p>Where possible, document advance directives for all patients e.g., do not resuscitate for patients who are unlikely to do well or have another terminal condition</p>

Baseline Tests

- Should be done for all patients who are admitted and all patients with risk factors for poor outcomes: total blood count, random blood sugar, Urea Electrolytes Creatinine, Liver function tests. HIV testing should be offered to all patients.
- Chest imaging is recommended in patients with severe illness who fail to improve on standard therapy and in all patients with critical illness. Include an ECG if indicated.
- Where available a C-Reactive Protein (CRP) may be useful in managing patients who acutely deteriorate.

Other Therapeutic Agents

The following drugs (Table 65.5) may have a role in the management of COVID-19. Specialist input would be required in defining the appropriate patient population, weighing benefit against risk, and cost considerations. These agents are still investigational and under emergency use authorization. This means that a patient must be educated on the evidence around their use and must consent to their use prior to prescription. Their use should be reported to the Pharmacy and Poisons Board

Table 65:5 Other Therapeutic Agents

Drug	Mechanism of Action	Potential Indications
Tocilizumab	monoclonal antibody against IL-6	Hospitalized patients with severe and critical COVID-19 with disease progression and elevated markers of systemic inflammation (CRP >75) despite steroid use.
Baricitinib (with remdesivir)	Janus Kinase (JAK) 1 and 2 selective inhibitor	Hospitalized patients with severe COVID-19 with disease progression and elevated markers of systemic inflammation despite steroid use (Baricitinib alone) or in patients with severe COVID-19 in whom steroids are contraindicated (Baricitinib with remdesivir)
Remdesivir	an antiviral agent that inhibits SARS-Co-V-2 replication	Hospitalized patients with severe but not-critical COVID-19 who are within 10 days from the onset of symptoms. There is conflicting data on the use of remdesivir, with most clinical trials showing no mortality benefit. Some studies have shown that remdesivir may reduce duration of illness by few days and only if initiated very early after disease onset rather than at the time a patient is deteriorating.

Table 65:6 Adult Covid-19 Patient Care

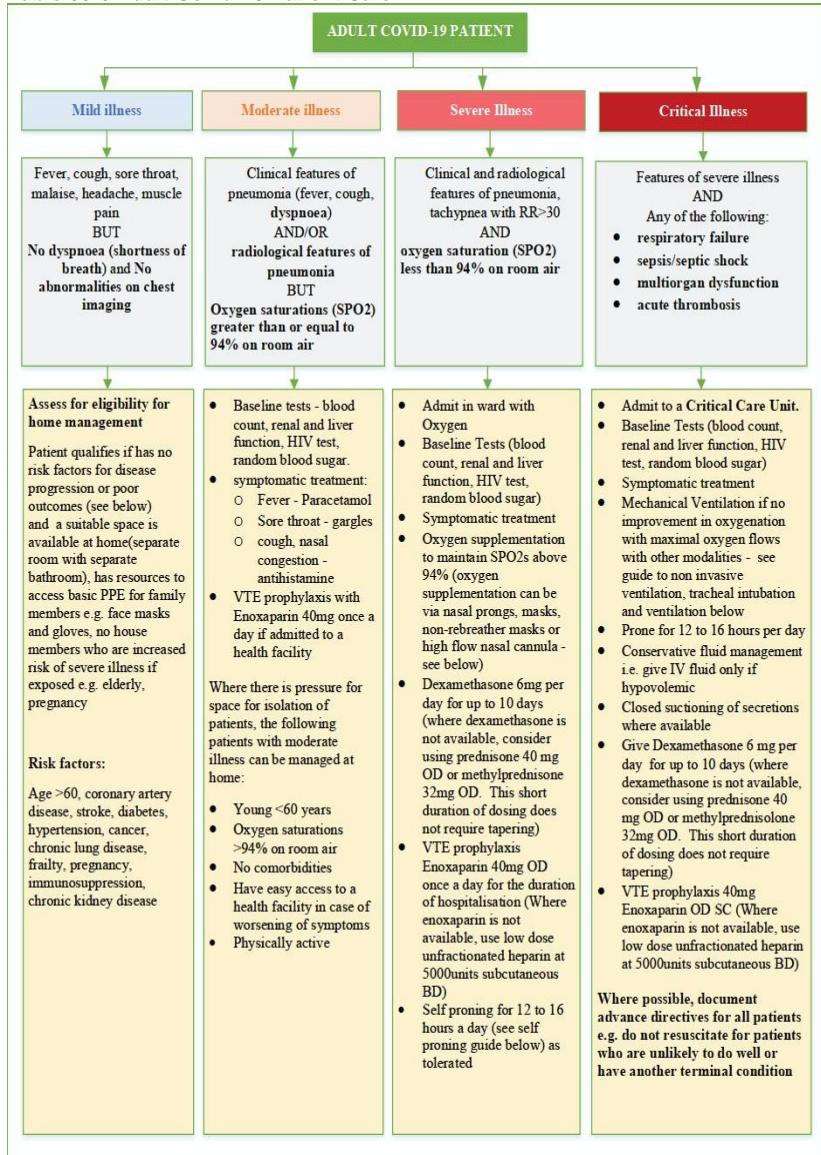


Table 65:7 Pediatric Covid-19 Patient Care

PEDIATRIC COVID-19 PATIENT				
Mild illness	Moderate illness	Severe Illness	Critical Illness	MIS-C
Fever, cough, sore throat, malaise, headache, muscle pain BUT no dyspnoea (shortness of breath) and No abnormalities on chest imaging	Clinical signs of non-severe pneumonia (cough or difficulty breathing) AND Fast breathing AND/OR chest inrawing Fast breathing (breaths/min): <2months: ≥60; 2-11months: ≥50; 1-5years: ≥40	Child with clinical signs of pneumonia (cough or difficulty breathing) + at least one of the following: Central cyanosis or SpO2 <90%; severe respiratory distress (e.g., fast breathing, grunting, very severe chest inrawing); general danger sign: inability to breastfeed or drink, lethargy or unconsciousness, or convulsions Fast breathing (breaths/min): <2months: ≥60; 2-11months: ≥50; 1-5years: ≥40	Any of the following: Acute respiratory distress syndrome, Respiratory failure requiring mechanical ventilation, Sepsis/Septic shock, other organ failure requiring ICU care	Case definition: Children and adolescents 0–19 years of age with fever > 3 days AND Two of the following: rash or bilateral non-purulent conjunctivitis or mucocutaneous inflammation signs (oral, hands or feet); hypotension or shock; features of myocardial dysfunction, pericarditis, valvulitis, or coronary abnormalities; evidence of Coagulopathy, acute gastrointestinal problems; AND No other obvious microbial cause of inflammation Evidence of COVID-19 (RT-PCR, antigen test or serology positive), or likely contact with patients with COVID-19.
Assess for eligibility for home-based isolation and care Counsel caregiver on the following danger signs and when to return: difficulty breathing, fast breathing, grunting, inability to breastfeed/drink, central cyanosis, confusion, reduced level of consciousness.	<ul style="list-style-type: none"> Baseline tests – Total blood count, renal and liver function, HIV test, random blood sugar. Symptomatic treatment: <ul style="list-style-type: none"> Fever - Paracetamol Sore throat and cough-sooth the throat with safe remedies VTE prophylaxis with Enoxaparin: Consider prophylaxis for children older than 5 years with comorbidities and not ambulant. Refer to annex for paediatric dosage guidelines. 	<ul style="list-style-type: none"> Admit in ward with Oxygen Baseline Tests (Total blood count, renal and liver function, HIV test, random blood sugar) Symptomatic treatment <ul style="list-style-type: none"> Conservative fluid management Mechanical Ventilation if no improvement in oxygenation with maximal oxygen flows with other modalities - see guide to non-invasive ventilation, tracheal intubation and ventilation below Closed suctioning of secretions where available Dexamethasone or prednisolone or methylprednisolone (refer to annex for dosage) VTE prophylaxis Enoxaparin Consider prophylaxis for children older than 5 years with comorbidities and not ambulant. Refer to annex for paediatric dosage guidelines. 	<ul style="list-style-type: none"> Admit to a Critical Care Unit. Baseline Tests (Total blood count, renal and liver function, HIV test, random blood sugar) Symptomatic treatment <ul style="list-style-type: none"> Conservative fluid management Mechanical Ventilation if no improvement in oxygenation with maximal oxygen flows with other modalities - see guide to non-invasive ventilation, tracheal intubation and ventilation below Closed suctioning of secretions where available Dexamethasone or prednisolone or methylprednisolone VTE prophylaxis Enoxaparin Consider prophylaxis for children older than 5 years with comorbidities and not ambulant. Refer to annex for paediatric dosage guidelines. 	<p>Supportive measures:</p> <ul style="list-style-type: none"> fluid resuscitation; inotropic support; respiratory support; (In rare cases), extracorporeal membranous oxygenation (ECMO). Intravenous Immunoglobulin (IVIG) Steroids Enoxaparin or Refer to annex for paediatric dosage guidelines.

Oxygen therapy:

Oxygen therapy: Oxygen via nasal cannulae is indicated in those with saturations of 94% or below. Up to 4 litres of oxygen can be administered via this route. Monitoring of response can be done both via pulse oximetry and arterial blood gases.

If the patient continues desaturating despite this, higher flow oxygen will be required. Current delivery systems available include the face mask (5-10L/min) and the non-rebreather mask (up to 15 L/min). High flow nasal cannula can support flows of up to 60L/min. If the patient requires high flow oxygen, please contact critical care/pulmonology team as escalation to the ICU may be necessary.

Remember that the risk of aerosolization increases once oxygen flows of above 4L/min per minute are required and an N95 mask should be used in addition to other precautions.

REFERENCES

- American Association of Blood Banks (2015). Building a better patient blood management program. Bethesda, MD.
- AABB, American Red Cross, America's Blood Centers, Armed Services Blood Program (2017). Circular of Information for the Use of Human Blood and Blood Components.[Online]. Available at: aabb.org.
- American Red Cross (2021). Acompendium of Transfusion Practice Guidelines.[Online]. Available from:
https://www.redcrossblood.org/content/dam/redcrossblood/hospital-page-documents/334401_compendium_v04jan2021_bookmarkedworking_rwv01.pdf.
- British Association for the Study of Headache [Online]. Available from:
<https://www.bash.org.uk>
- Community transfusion Committee (2021), Guidelines for Transfusion and patient Blood management. Lincoln, Nebraska
- Chou ST, Alsawas M, et al.; American Society of Haematology 2020 guidelines for sickle cell disease: transfusion support. Blood Adv 2020; 4 (2): 327–355.
- Emergency Medicine Foundation Kenya [Online]. Available from:
<https://www.emergencymedicinekenya.org/>.
- International Classification of Headache Disorders (2021).[Online]. Available from
<https://ichd-3.org>.
- International League Against Epilepsy [Online]. Available from:
<https://www.ilae.org/guidelines/definition-and-classification>.
- Janani, S (2012). Standard Operating Procedures for Use in Clinical Forensic Medicine Examination. Journal of Forensic Medicine and Toxicology. Vol 29. No.2 .
- Ministry of Health (2005). Reversing the Trends – The Second National Health Sector Strategic Plan of Kenya: NHSSP II – 2005–2010. Ministry of Health, Nairobi, Kenya.
- Ministry of Health (2006). Taking the Kenya Essential Package for Health to the Community: A Strategy for the Delivery of LEVEL ONE Services. Ministry of Health, Nairobi, Kenya.
- Ministry of Health (2007). Reversing the Trends: The Second National Health Sector Strategic Plan of Kenya – The Kenya Essential Package for Health, Ministry of Health, Kenya.

Ministry of Health (2007). Enhancing Community Health Systems- Partnership in Action for Health: A Manual for Training Community Health Extension Workers. Ministry of Health, Kenya

Ministry of Health (2007). Linking Communities with the Health System: The Kenya Essential Package for Health at Level 1-A Manual for Training Community Health Worker. Ministry of Health, Kenya.

Ministry of Health (2007). Key Health Messages for Level 1 of the Kenya Essential Package for Health-A Manual for Community Health Extension Workers and Community Health Workers. Ministry of Health, Kenya.

Ministry of Health (2009). Guidelines for the appropriate use of Blood and Blood products,3 rd. edition, Ministry of Health, Kenya.

Ministry of Health (2014). National Guidelines on Management of Sexual Violence in Kenya. Ministry of Health, Kenya.

Ministry of Health (2016). Basic Paediatric Protocols. [Online]. Available form: <https://www.psk.or.ke/public/uploads/file/c0d3675787d651dedbf4a0edfc9a2898.pdf>

Ministry of Health (2016). The Kenya National Guidelines for the Management of Epilepsy. Ministry of Health, Kenya.

Ministry of Health (2017). Guidelines for Integrated Tuberculosis Leprosy and Lung Disease in Kenya. Ministry of Health, Kenya.

Ministry of Health (2018). Guidelines on Use of Antiretroviral Drugs for Treating and Preventing HIV in Kenya. Ministry of Health, Kenya.

Ministry of Health (2018). Kenya National Guidelines for Cardiovascular Disease Management. Ministry of Health, Kenya

Ministry of Health (2020). Guidelines for the Diagnosis, Treatment and Prevention of Malaria in Kenya, 6th Edition. Ministry of Health, Kenya.

Ministry of Health (2020). Kenya Community Health Strategy 2020-2025 guidelines.[Online]. Available form: https://www.health.go.ke/wp-content/uploads/2021/01/Kenya-Community-Health-Strategy-Final-Signed-off_2020-25.pdf

New York State Council on Human Blood and Transfusion Services. (2010). Guidelines for transfusion options and alternatives. 1st ed. New York State Department of Health, Available at: wadsworth.org/labcert/blood_tissue/pdf/txoptsaltsfixed122811.pdf.

O'Driscoll BR, Howard LS, Earis J on behalf of the British Thoracic Emergency Oxygen Guideline Group, et al BTS guidelines for oxygen use in adults in healthcare and emergency settings. Thorax 2017;72:ii-ii90.

Organisation for the Understanding of Cluster Headache [Online]. Available from: <https://ouchuk.org>

The Constitution of Kenya.(2010) Kenya Law Reports [Online]. Available from: <http://www.kenyalaw.org/lex/actview.xql?actid=Const2010>

The Criminal Procedure Code Act. Kenya Law Reports.[Online]. Available from: <http://www.kenyalaw.org/lex/actview.xql?actid=CAP.%2075>.

The Evidence Act. Kenya Law Reorts [Online]. Available from: http://kenyalaw.org/kl/fileadmin/pdfdownloads/Acts/EvidenceAct_Cap80.pdf.

The Migraine Trust [Online]. Available from: <https://migrainetrust.org>.

The Occupational Health and Safety Act (2007). Kenya Law Reports.[Online]. Availablefrom:[http://kenyalaw.org/kl/fileadmin/pdfdownloads/Acts/OccupationalSafetyandHealth\(No.15of2007\).pdf](http://kenyalaw.org/kl/fileadmin/pdfdownloads/Acts/OccupationalSafetyandHealth(No.15of2007).pdf)

The Traffic Act 2012 (2010). Kenya Law Reports.[Online] Available from: <http://kenyalaw.org:8181/exist/kenyalex/actview.xql?actid=CAP.%20403>

Stark, M (2020). A Physicians Guide to Clinical Forensics. London, UK. Springer.

The Faculty of Forensic & Legal Medicine of the Royal College of Physicians. (2020). Clinical effects and management of those subjected to Taser discharge.[Online].Availablefrom:<https://fflm.ac.uk/wp-content/uploads/2020/12/ARCHIVED-Effects-and-management-of-TASER-discharge-Dr-J-Payne-James-and-Dr-B-Sheridan-Dec-2017.pdf>

World Medical Association (2005). Medical Ethics Manual [Online]. Available from: <https://www.wma.net/what-we-do/education/medical-ethics-manual/>.

World Health Organization (2020). The Clinical Use of Blood Handbook. Blood Transfusion Safety, Geneva 2020.

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