STANDARD TREATMENT GUIDELINES FOR LESOTHO

MINISTRY OF HEALTH

3RD EDITION

2022

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FOREWORD

It is our pleasure to introduce the third edition of the Standard Treatment Guidelines and Essential Medicines List for Primary and Secondary Health Care. In keeping with the goals of the Medicines Policy, the review was done to keep pace with the advances in the field of medicine. Changes in this edition are a reflection of current epidemiology norms and recent developments in medicine. The effective and efficient use of medicines will go a long way towards meeting these challenges.

Our goal of evidence based medicine selection has been strengthened in this edition. Affordability, without compromising quality, has been taken into account. The numerous comments received and involvement from stakeholders is heartening and has contributed enormously to the excellence of this edition. We are indebted to all experts, opinion leaders and users of this book for their contribution. The Standard Treatment Guidelines and Essential Medicines List is a living document and comments are invited in order to ensure appropriateness and responsiveness to emerging needs.

I would like to congratulate the review team on completing the review and to thank them for their continued commitment to the process over the years despite their busy schedules. It is our sincere hope that the healthcare workers will continue to utilise the Standard Treatment Guidelines and Essential Medicine List in their efforts to providing quality care which we ourselves expect to receive.

Dr. Nyane Letsie
Director General Health Services

IINTRODUCTION

The Ministry of Health formulated Standard Treatment Guidelines in 2006 in order to assist the health worker in choosing the appropriate treatment after the correct diagnosis has been made. In response to new knowledge on medicines and diseases and changes in the epidemiology of diseases in Lesotho it has now been found necessary to review and revise the document. This review and revision is being supported with funding from Government of Lesotho through the Ministry of Health, the Global Fund and EGPAF.

The Government of Lesotho, through the National Medicines Policy, remains committed to ensuring the availability and accessibility of good quality medicines for all her people, and that these medicines are affordable and are rationally used. Achieving these objectives requires a comprehensive strategy that, not only includes supply and distribution, but also appropriate and rational prescribing, dispensing and use of medicines by the community.

These Standard Treatment Guidelines have been prepared to assist and guide prescribers (including doctors, nurse clinicians and midwives), pharmacists, pharmacy technicians, and other healthcare workers who work at primary and secondary care facilities in providing quality care to patients. The guidelines list the preferred treatments for common health problems experienced by people in the health system and were field-tested before being finalised to ensure that the opinion of the intended users were considered and incorporated.

The guidelines are designed to assist in treatment choices and as a reference book to help in the overall management of patients, such as when to refer. The guidelines are meant for use at two levels of care within the health system at both public and private. It is recognised that the treatment guidance detailed in this book may differ from current practice. It is emphasised that the choices described here have the weight of scientific evidence to support them, together with the collective opinion of a wide group of recognised national and international experts.

The recommendations have been rated according to the following basis:
Evidence rating A − requires at least one randomized- controlled trial as part of a body of scientific literature of overall good quality and consistency addressing the specific recommendation.

Evidence rating B − requires the availability of well conducted clinical studies but no randomized clinical trials on the topic of recommendation.

Evidence rating C − requires evidence obtained from expert committee reports or opinions and/ or clinical experience of respected authorities. This indicates an absence of directly applicable clinical studies of good quality.

To use treatment other than those recommended here may have to be justified to colleagues and health services managers. The recommendations in these treatment guidelines will undergo a process of continuous review. Comments or suggestions for improvement are welcome. Those comments or suggestions for addition of diseases should include evidence of prevalence as well as a draft treatment guideline using the format set out in this book. These suggestions should be sent to the Director of Pharmaceutical Services, MOH.

When treating patients, the final responsibility for the well-being of the individual patient remains with the prescriber who must take steps to ensure that they are competent to manage the most common conditions presenting at their practice. He/she should familiarise himself or herself particularly with those aspects of the treatment guidelines relating to those conditions. It is important to remember that the guidance given in this book is based on the assumption that the prescriber is competent to handle patients at this level, including the availability of diagnostic tests and monitoring equipment.

ACKNOWLEDGEMENTS

The Ministry of Health wishes to convey sincere gratitude to all those who participated in the review of this Edition. The advice, comments, criticisms and contributions from the various stakeholders including professional societies, expert committees and individuals, has gone a long way toward producing a hugely improved Edition of the Standard Treatment Guidelines and Essential Medicines List for Primary and secondary Health Care. Without the willingness to participate in this consultative process, this edition would not have been possible.

The Ministry extends the acknowledgements to the Global Fund for financial support.

The Ministry of Health in particular would like to thank the under listed for the sterling work and support.

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LIST OF OFFICIAL ABBREVIATIONS

The following abbreviations, in respect of route of administration, dose, and dosing, have been used in the text:

ACEI	Angiotensin Converting Enzyme Inhibitor
ACR	Albumin Creatinine Ratio
ACS	Acute Coronary Syndrome
AE	Acute Epiglottis
AF	Atrial Fibrillation
AHF	Acute Heart Failure
AIDS	Acquired Immunodeficiency Syndrome
ALU	Artemether Lumefantrine
ANUG	Acute Necrotising Ulcerative Gingivitis
APH	Ante partum Haemorrhage
APTT	Activated Partial Thromboplastin
ARB	Angiotensin Receptor Blocker
ARDS	Angiotensin Receptor Blocker
ARF	Acute Renal Failure
ARI	Acute Respiratory Infections
ATS	Anti Tetanus Serum
BCC	Basal Cell Carcinoma
BCG	Bacillus Calmette – Guerin Vaccines
BG	Blood Glucose
BP	Blood Pressure
CBT	Cognitive Behavioural Therapy
CCB	Calcium Channel Blocker
CCF	Congestive Cardiac Failure
CKD	Chromic Kidney Diseases
CNS	Central Nervous System
CO	Corneal Opacity
COCs	Combined Oral Contraceptives
CPT	Cotrimoxazole Preventive Therapy
CrCl	Creatinine Clearance
CS	Caesarian Section
CT	Computer Tomography
CVD	Cardiovascular Disease

CVP	Central Venous Pressure
CSF	Cerebral-Spinal Fluid
DBP	Diastolic Blood Pressure
DAHF	Decompensate Acute Heart Failure
DC	Direct Current
D&C	Dilation and Curettage
DIC	Disseminated Intravascular Coagulation
DDVAP	Desmopresin
DKA	Diabetes Ketoacidosis
DPM	Drops Per Minute
DRE	Digital Rectal Examination
DSM	Direct Smear Microscope
DT	Delirium Tremens
DVT	Deep Vein Thrombosis
EAU	Examination Under Anaesthesia
EBTR	External Beam Therapy
EBV	Epstein Barr Virus
ECG	Electro Cardiogram
ENL	Erythema Nodosum Leprosy
ENT	Ear Nose and Throat
ESR	Erythrocyte Sedimentation Rate
FBP	Full Blood Picture
FFP	Fresh Frozen Plasma
FBC	Full Blood Count
GAS	Group A beta haemolytic Streptococci
GFR	Glomerular Filtration Rate
GIT	Gastro Intestinal Tract
GDM	Gestational Diabetes Mellitus
GI	Gastro Intestinal
GS	Glomerular Diseases
HB	Haemoglobin
HD	Hodgkin Disease
HDCV	Human Diploid Cell Vaccines
HF	Heart Failure
HIV	Human Immunodeficiency Virus
HSV	Herpes Simplex Virus

ICD	International Classification of Disease
ICT	Intracavity
ICU	Intensive Care Unit
IDDM	Insulin Dependent Diabetes Mellitus
IE	Infective Endocarditis
IHD	Ischemic Heart Diseases
I.M/i.m	Intramuscular
ITP	Idiopathic Thrombocytopenic Purpura
I.V/i.v	Intravenous
IVU	Intravenous urography
IUFD	Intrauterine foetal death
IUGR	Intra Uterine Growth Restriction
JNC	Joint National Committee
KS	Kaposi's Sarcoma
L/l	Litre
LDL	Low Density Lipoprotein
MCV	Mean Corpuscular Volume
MDIY	Multiple Daily Insulin Therapy
MDR	Multiple Drug Resistance
MI	Myocardial Infarction
mmHg	Millimeters of Mercury
MRI	Magnetic Resonance Imaging
MU	Mega Unit
NGT	Nasal Gastric Tube
NIDDM	Non Insulin Dependent Diabetes Mellitus
NKHS	Non Ketotic Hyperosmolar State
NSAID	Non Steroidal Anti- Inflammatory Drugs
NSTEMI	Non ST Elevation Myocardial Infraction
OGD	Oesophagoduodenoscopy
ORS	Oral Rehydration Salts
PB	Paucibacillary
PCR	Protein Creatinine Ratio
PCWP	Pulmonary Capillary Wedge Pressure
PE	Pulmonary Embolism
PEEP	Positive End –Expiratory Pressure
PEM	Protein Energy Malnutrition
PHC	Primary Health Care

PID	Pelvic Inflammatory Disease
PIH	Pregnancy Induced Hypertension
PITC	Provider Initiated Testing and Counseling
POPs	Progesterone Only Pills
PPE	Papular Pruritic Eruption
PPH	Post Partum Hemorrhage
PPROM	Preterm Premature of Rapture of Membrane
PROM	Prolonged Premature Rapture of Membrane
PSA	Prostate Specific Antigen
PT	Prothrombin
PTT	Partial Thrombin Time
RV	Right Ventricle
RT	Radiotherapy
SBO	Systolic Blood Pressure
SC	Subcutaneous
SJS	Steven Johnson Syndrome
SLE	Systemic Lupus Erythematous
SP	Sulfadoxine Pyrimethamine
SSS	Salt Sugar Solution
STD	Sexually Transmitted Diseases
STEMI	ST Elevation Myocardial Infraction
SVTs	Supraventricular Tachyarrhythmia's
TCC	Transitional Cell Carcinoma
TEN	Toxic Epidemial Necrolysis
TIG	Tetanus Immunoglobulin
TORCH	(T)oxoplasmosis, (O)ther Agents, (R)ubella (also known as German Measles), (C)ytomegalovirus, and (H)erpes Simplex
TSH	Thyroid Stimulating Hormone
TT	Tetanus Toxoid
UFH	Unfractionated Heparin
UTI	Urinary Tract Infection
VF/VT	Ventricular Fibrillation/flutter/ Ventricular tachyarrhythmia's
VWD	Von Willebrand Disease
WFI	Water For Injection
WPW	Wolff-Parkinson White
µg	Microgram

HOW TO USE THIS BOOK

To use this guideline effectively, it is important that you become familiar with the contents. Take time to read the book and understand the content and layout.

Order of sections: The contents of this book have been arranged in alphabetical order by the Anatomical Therapeutic Chemical groups following the same basic arrangement as the "WHO Model List of Essential Medicines". Within each section, a number of diseases states which are significant in Lesotho have been identified. For each of these diseases states the structuring of the information and guidance has been standardised to include the generic name of the medicine of choice, adult dosage and where relevant, child dose.

The choice of treatment guidance used here is based on the principles of 'evidence based medicine'. That is, it is based on the international medical and pharmaceutical literature, which clearly demonstrates the efficacy of the treatment choices.

Care should be taken to avoid symptomatic management of uncertain diagnoses.

This book is designed and aimed to align with all other guidelines in different programmes within the Ministry of Health. In cases where individual prescriber feels that this does not address specific conditions (HIV related illness) properly, a prescriber is allowed to refer to the specific guideline for the condition.

REFERRAL

This guideline makes provision for referral of patients to higher health care facilities and from higher level facilities to lower level. Patients should be referred when the prescriber is not able to manage the patient either because the condition is treated at the different level of care as per policy or protocol or the availability of appropriate facilities. Patients should be referred in accordance with agreed arrangements to facilities where the necessary competence, diagnosis and support facilities exist. The patient should be given a referral letter or note indicating the condition and all investigations which have been done, emergency treatment and laboratory tests where applicable. The referred patient remains the responsibility of the prescriber for follow up. The following points should be considered for down referral:

- Documentation that support down referral, to allow for ordering of specific medicines that may not be available at that level
- EML should indicate medicines for each level of care to support down referral.

ANTIMICROBIAL USE

1. **Choice of antimicrobials** should be guided by factors such as spectrum of activity, anticipated efficacy, safety, previous clinical experience, cost, and potential for resistance. These are influenced by the severity of illness and whether the medicine is to be used for prophylaxis, empirical therapy or therapy directed by identification of one or more pathogens.

2. **Prophylactic therapy** should be restricted to the use of a limited range of medicines of proven efficacy in invasive procedures with a high risk of infection or where the consequences of infection are disastrous. Most surgical prophylaxis should be parenteral and commence just before the procedure, continuing for no more than one or two doses after the end of the operation.
3. **Empirical therapy** should be based on local epidemiological data on potential pathogens and their patterns of antibiotic susceptibility. Maintaining a database of susceptibility profile is useful as a guide for appropriate choice of empirical antibiotic therapy which is based on local, regional and national patterns.
4. **Directed antimicrobial therapy** for proven pathogens should include the most effective, least toxic, narrowest spectrum agent available. This practice reduces the problems associated with broad-spectrum therapy, that is, selection of resistant micro-organisms and superinfection.
5. **The selection of** antimicrobials was guided by the World Health Organisation Essential Medicines List Access, Watch and Reserve (AWaRe) classification in order to safeguard against anti-microbial resistance.

PRESCRIPTION WRITING

Medicines should be prescribed only when required in treatment following a clear diagnosis. Not all patients need medicinal intervention, some could be managed non pharmacologically, In all cases the benefit of administering the medicine should be considered in relation to the risk involved. This is particularly important during pregnancy and lactation where the risk to both mother and foetus or child must be considered respectively.

Prescriptions should

- Be written legibly in ink to be indelible.
- Be written and completed by one prescriber and be dated.
- State the full name and address of the patient.
- Specify the age and weight of the patient (especially in the case of children).
- State the history of patient, complaints presented and diagnoses.
- Be in generic name.
- Specify the route of administration and the dosage regimen.
- Be signed in ink by the prescriber and have contact details and signature of the prescriber.

When writing a prescription the following should be borne in mind:

- Name of medicines and preparations should be written in full.
- Non-proprietary (generic) names are used.
- Avoid the unnecessary use of decimal points e.g. 3 mg, not 3.0 mg.
  - Quantities of 1 gram or more should be written 1 g.
  - Quantities less than 1 gram should be written in milligrams, e.g. 500 mg, not 0.5 g.
  - Quantities less than 1mg should be written in micrograms or milligrams e.g. 100 microgram not 0.1 mg.
  - Where decimals are unavoidable a zero should be written in front of the decimal point where there is no other figure, e.g. 0.5 ml, not .5ml.

- ‘Micrograms’ and ‘nanograms’ should NOT be abbreviated.
- Use the term ‘millilitre’ (ml or mL) NOT cubic centimetre (cc, or cm3).
- State dose and dose frequency. In the case of ‘as required’, a minimum dose interval should be specified, e.g. ‘every 4−6 hrs as required for pain’.
- State the quantity to be supplied or indicate the number of days of treatment required.
- Write directions, preferably in English without abbreviation. It is recognised that some Latin abbreviations are used and these are detailed in the section on abbreviations. Do NOT use other abbreviations.
- Avoid the use of symptomatic treatment for minor self-limiting conditions.
- Avoid, where possible, the prescribing of placebos. Spend a little time educating and reassuring the patient.
- Avoid multiple prescribing (polypharmacy), especially when the diagnosis is not clear.

For prescribing purposes, the age group is divided into 4 broad groups as follows:

Child: <5 years
Child: 5-8 years
Child: 9-12 years
Adult: >12 years

Where possible, all children (<12 years) should get dosage according to the body weight. In this guidelines, “Child” refers to patients <12 years unless it is otherwise specified.

For ease of administration, syrups should be availed to children below 5 years where possible and the dosage of the base of the medicine by weight should be well spelt.

At all levels of health care, oral administration should be preferred to parenteral route. All medicines should be given with caution in pregnant mothers, children and the elderly. Diseases are grouped according to the Anatomical Therapeutic Chemical (ATC) category and the categories appear in order of importance in a Lesotho setting. However, under each category, diseases are listed in alphabetical order for ease of reference.

Only generic names of medicines are presented in this book and it should therefore be used together with the Essential Medicines List.

chapter

1

Cardiovascular Conditions

1.1 Hypertension

Description

Hypertension is defined as persistently raised arterial blood pressure and is one of the most important treatable causes of premature morbidity and mortality. It is a major risk factor for stroke, myocardial infarction, heart failure, chronic kidney disease, cognitive decline and premature death (British National Formulary).

Table 1.1 Levels of hypertension in adults
Refer to emergency chapter for hypertension-related emergencies (WHO PEN)

Levels of Hypertension	Systolic mmHg	Diastolic mmHg
Optimal	<120	<80
Normal	120-129	80-84
High normal	130-139	85-89
Mild	140-159	90-99
Moderate	≥160-169	>100
Severe	≥180	>110

Signs and symptoms

Most patients with hypertension are asymptomatic, therefore active screening is required. A minority of patients may present with the following symptoms:

- Headache
- Palpitations
- Blurred vision
- Chest pains
- Shortness of breath
- Epistaxis

Causes

- 90-95%: Primary hypertension
- 5-10%: Secondary to other diseases e.g. renal and endocrine disorders etc.
    - Consider screening for secondary hypertension in (1) patients with early onset hypertension (<30 years of age) in particular in the absence of hypertension Risk factors (obesity, metabolic syndrome, familial history etc.), (2) those with resistant hypertension, (3) individuals with sudden deterioration in BP control, (4) hypertensive urgency and emergency, (5) those presenting with high probability of secondary hypertension based on strong clinical clues (ISH Guidelines)

Risk factors

- Old age
- Family history
- Lifestyle e.g. sedentary, obesity, smoking etc.
- Other chronic diseases such as diabetes or chronic kidney disease

Diagnostic criteria and investigations

Correct BP measurement

At the first visit, measure BP on both arms. In case of a relevant difference between the arms, consider the arm with the higher value for future measurements. A difference of more than 15 mmHg is indicating elevated cardiovascular risk (ESC 2018).

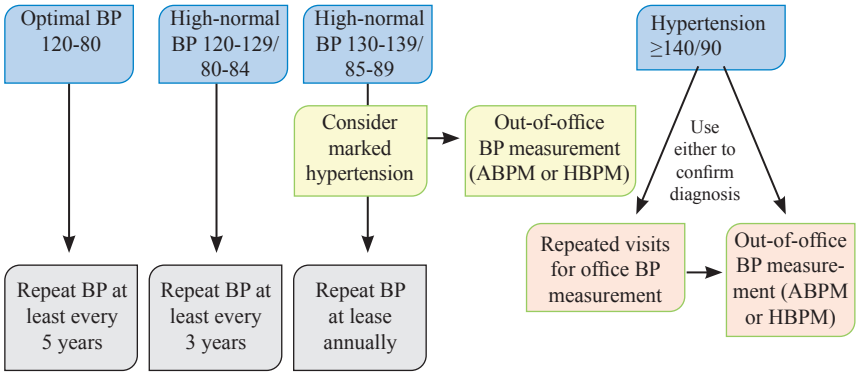
General conditions for correct BP measurement are the following (ISH 2020):

- Patient sitting, back and arm supported
- Choose cuff of correct size
- No talking or moving during the measurement
- No caffeine or exercise 30 minutes prior to the measurement
- Quiet room with comfortable temperature

Take three consecutive measurements, 1 min apart. Consider the average of the last two for diagnosis.

Screening

- Screening is recommended in people 18 years or older



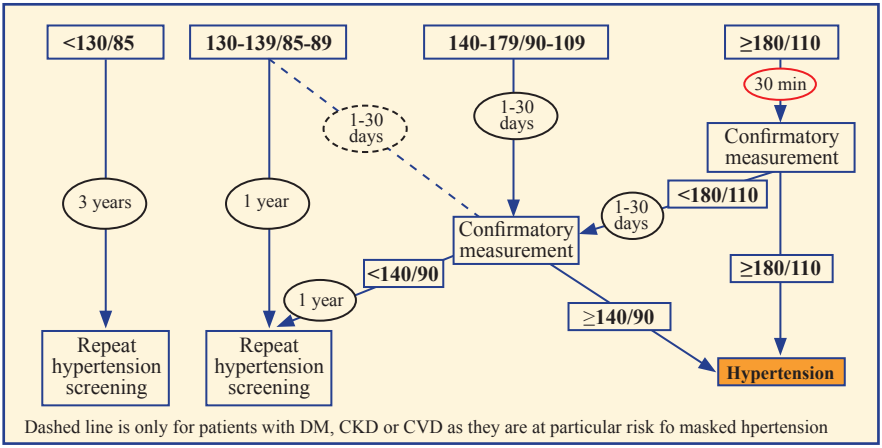


Figure 1.3 Screening and diagnosis for hypertension

For the diagnosis of hypertension two elevated measurements (each time considering the average of the last two of three measurements) are required. In case of severe hypertension (>180/110 mmHg) a confirmatory measurement may be conducted on the same day (after 30 minutes resting after the first measurement).
Exceptionally if severe or symptoms of organ damage are present, diagnosis may be given immediately and treatment started. If available, home-measurements by patients may be considered to confirm the diagnosis.

Relevant investigations for patients diagnosed with hypertension

- Weight & height for BMI calculation (at every visit)
- Clinical examination, including check for signs or symptoms of complications and cardiac examination with auscultation and check for signs of heart failure (at every visit)
- Blood tests (yearly):
  - Sodium, potassium, serum creatinine and estimated glomerular filtration rate (eGFR). If available, lipid profile and fasting glucose.
  - Urine analysis (yearly)
  - 12-Lead ECG for detection of atrial fibrillation, left ventricular hypertrophy (LVH), ischemic heart disease if signs or symptoms of cardiac disease are present (i.e. pulse irregularities, signs of heart failure).

Cardiovascular risk assessment

Patients with hypertension should be assessed for their overall cardiovascular risk. Consider the following risk factors: Age (>65 years), sex (male>female), heart rate (>80 beats/min), increased body weight, diabetes, high LDL-C/triglyceride, family history of CVD, family history of hypertension, smoking habits, psychosocial or socioeconomic factors. Left-ventricular-hypertrophy (LVH with ECG), moderate-severe CKD (CKD; eGFR <60 ml/min/1.73m2), previous coronary heart disease (CHD), heart failure, stroke, peripheral vascular disease, atrial fibrillation.

Patients with elevated cardiovascular risk (i.e. presence of diabetes, CKD, previous coronary heart disease, LDL >4.9 or ≥ 2 other Risk factors) should receive a statin (i.e. atorvastatin, rosuvastatin, pravastatin or simvastatin)

Management

Community level

At community-level, lifestyle counselling and hypertension screening and monitoring may be provided without additional supervision.

Health centre level

Lifestyle modifications

All patients with hypertension or high-normal blood pressure should receive the following lifestyle recommendations:

- Abstain from smoking
- Avoid excess alcohol intake
- Adhere to a healthy diet:
  - limit daily calorie intake to maintain a healthy bodyweight (BMI 20-25)
  - avoid sugar, sweets and sweetened beverages
  - choose high-fibre and low-glycemic index foods
  - eat 3-5 daily portions of vegetables AND/OR fruits
  - avoid fried food and fatty meat
- Increase physical activity
  - start with walking for 30 minutes at least every second day
  - if possible increase to a more intensive physical activity programme
- Reduce salt intake

Initiate newly diagnosed HTN patients especially those with Medical Doctors available
Refer to the Hospital all patients with HTN urgency and emergency signs and symptoms.

Hospital level

Follow three drug algorithm and refer if the patients still uncontrolled hypertension.

Patients with signs or symptoms of hypertension should be referred. Drug treatment up to combinations including three molecules may be prescribed according to the algorithms provided.

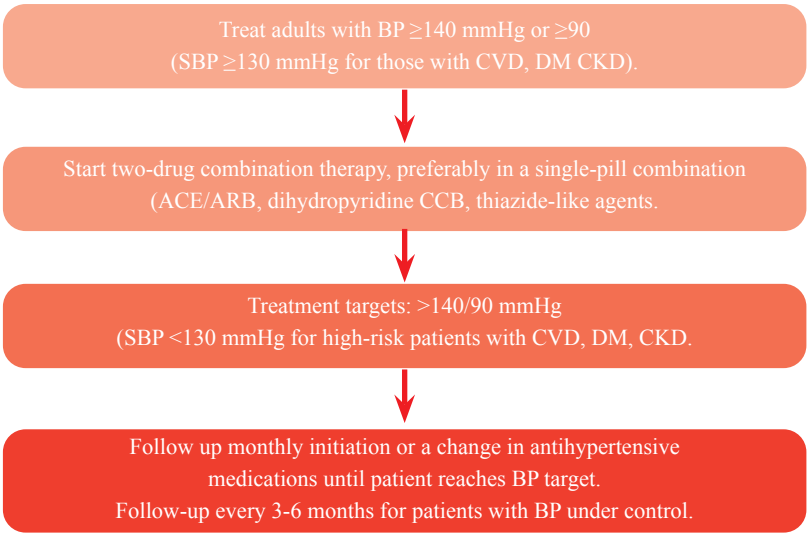
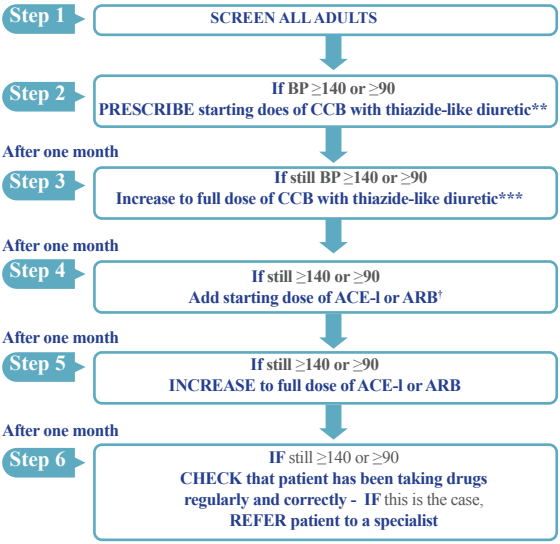


Figure 1.3 Algorithm for the management of hypertension. CVD: Cardiovalscular disease, DM: Diabetes Mellitus, CKD: Chronic Kidney Disease, SPB: Systolic Blood Pressure, ACE: Angiotensin Converting Enzyme, ARB: Angiotensin Receptor Blocker, CCB, Calcium Channel Blocker (Source WHO),

Together with lifestyle recommendations all patients with hypertension should be treated pharmacologically according to the algorithms provided. For all patients treatment initiation with a low-dose single-pill combination is recommended.

At primary level (health centre), patients not reaching the BP targets under full dose triple therapy should be referred to secondary or tertiary level care for specialist treatment.



DRUGS AND DOSES

Class	Medication	Starting dose	Intensification dose
CCB (calcium channel blocker)	amlodipine	5 mg	10 mg
Diuretic thiazide-like	chlorthalidone	12.5 mg	25 mg
	or indapamide	1.5 mg	stay at 1.5 mg
ACT inhibitor (angiotensin-converting enzyme inhibitor	lisinopril	20 mg	40 mg
	ramipril	5 mg	10 mg
	perindopril	4 - 5 mg	8-10mg
ARB	losartan	50 mg	100 mg
	telmisartan	40 mg	80 mg

PROVISION FOR SPECIFIC PATIENTS

- Manage diabetes as indicated by national protocol.
- Aim for PB >130/80 for people at high risk, such as individuals with diabetes, CAD, stroke, or CKD

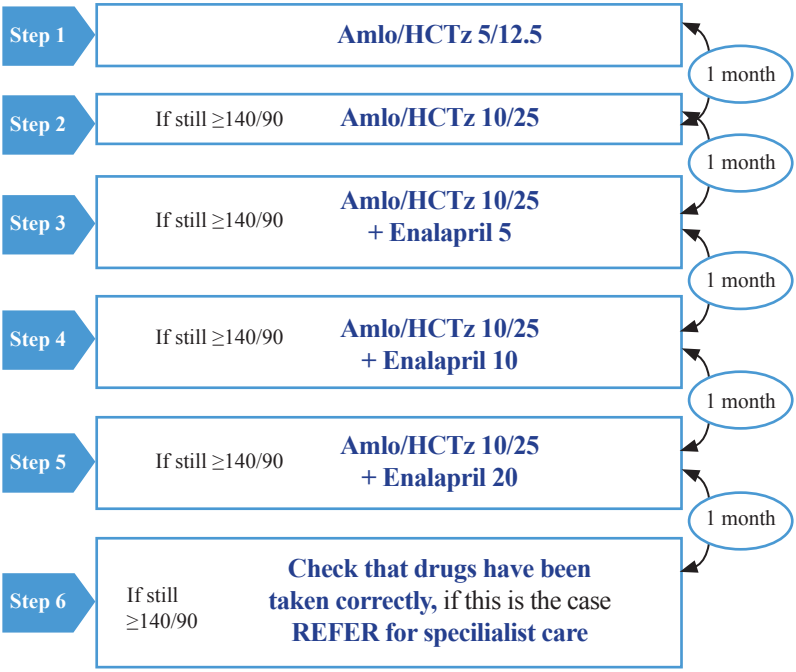
LIFESTYLE MANAGEMENT ADVICE FOR ALL PATIENTS

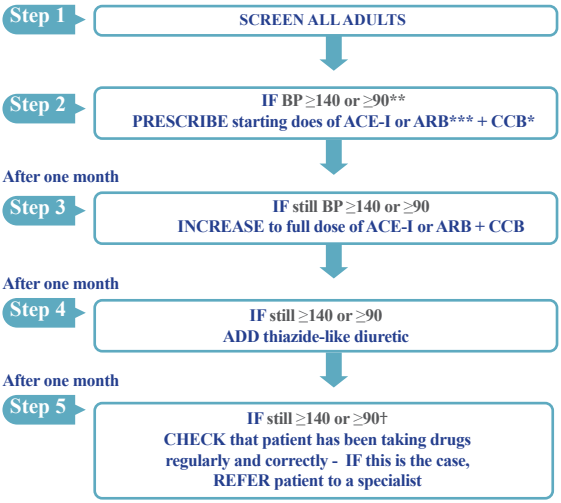
- Stop all tobacco use, avoid second hand tobacco smoke.
- Drink no more than two units of alcohol per day and do not drink on at least two days of the week.
- Increase physical activity to equivalent of brisk walk 150 minutes per week.
- If overweight, lose weight.
- Eat heart-healthy diet.
- Eat a low salt diet.
- Eat 5 servings of vegetables, fruit per day
- Use healthy oils (e.g. olive or safflower)
- Eat nuts, legumes, wholegrain and foods rich in potassium.
- Limit red meat to once or twice a week at most.
- Eat fish or other food rich in omega 3 fatty acids (e.g. flax seeds) at least twice a week.
- Avoid added sugar from cakes, cookies, sweets, fizzy drinks and juice.

* Or other BP target, as determined by clinical factors. If PB ≥ 160 or ≥ 100, start same day. If 140-159 or 90-100, check on a different day and if still elevated, start.
** Consider statin use.
*** Consider increasing to intesification dose of thiazide-like diuretic. Hypokalaemia more common using intensification dose diuretic – consider increased lab monitoring.
† ACE-I or ARB according to local guidelines/costs/intolerance ACE-I. ACE-Inhibitors cause chronic cough in approximately 10% of patients. Neither ACE-I nor ARBs should be give to pregnant women.
‡ These are suggested examples of medications based on scientific evidence, once-daily suitability, common usage, and availability.
§ Before initiating and several weeks after starting ACE-Is, ARBs or diuretics, consider checking serum creatinine and potassium.
¤ If neither diuretic agent is available, hydrochlorothiazide can be used (25 mg starting, 50 mg full) or indapamide (1.25 mg starting, 2.5 mg full) can be used.

Figure 1.4 Treatment algorithm for hypertension recommended for patients without comorbidities. Use single-pill combination if available (source WHO). Other ARBs (i.e. olmesartan, valsartan) and other ACEi (i.e. enalapril) may be used if the drugs mentioned in the table are not available.

Algorithm for patients without Comorbidities





DRUGS AND DOSES‡

Class	Medication	Starting dose	Intensification dose
ACC inhibitor (angiotensin-converting- enzyme inhibitor)	lisinopril	20mg	40mg
	ramipril	5 mg	10 mg
	perindopril	4-5 mg	8-10 mg
ARB	losartan	50 mg	100 mg
	telmisartan	40 mg	80 mg
CCB (calcium channel blocker)	amlodipine	5 mg	10 mg
diurectic thiazide-like	chorthalidone or indapamide SR	12.5 mg	25 mg
		1.5mg	stay at 1.5mg

PROVISION FOR SPECIFIC PATIENTS

THIS PROTOCOL IS CONTRA-INDICATED FOR WOMEN WHO ARE OR COULD BECOME PREGNANT

- Manage diabetes as indicated by national protocol.
- Aim for PB >130/80 for people at high risk, such as individuals with diabetes, CAD, stroke, or CKD

LIFESTYLE MANAGEMENT ADVICE FOR ALL PATIENTS

- Stop all tobacco use, avoid second hand tobacco smoke.
- Drink no more than two units of alcohol per day and do not drink on at least two days of the week.
- Increase physical activity to equivalent of brisk walk 150 minutes per week.
- If overweight, lose weight.
- Eat heart-healthy diet.
- Eat a low salt diet.
- Eat 5 servings of vegetables, fruit per day
- Use healthy oils (e.g. olive or safflower)
- Eat nuts, legumes, wholegrain and foods rich in potassium.
- Limit red meat to once or twice a week at most.
- Eat fish or other food rich in omega 3 fatty acids (e.g. flax seeds) at least twice a week.
- Avoid added sugar from cakes, cookies, sweets, fizzy drinks and juice.

* ACE-I or ARB according to local guidelinse/costs/intolerance to ACE-I. ACE-Inhibitors cause chronic cough in approximately 10% patients. Neither ACE-I nor ARBs should be give to pregnant women.

** Or other BP target, as determined by clinical factors. If BP ≥160 or ≥100, start same day. If 140-159 or 90-100, check on a different day and if still elevated, start.

*** Consider satin use.

¥ The two medications can be used as two free agents or as a single pill combination (SPC), accordingly.

† Consider increase to intensification dose diuretic. Hypokalaemia more common using intensification dose diuretic – consider increased lab monitoring.

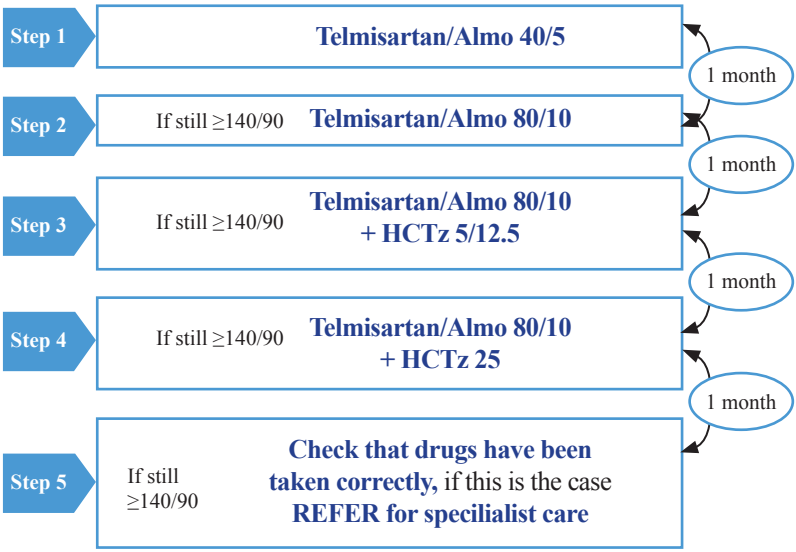
‡ These are suggested examples of medications based on scientific evidence, once-daily suitability, common usage, and availability.

§ Before initiating and several weeks after starting ACE-Is, ARBs or diuretics, consider checking serum creatinine and potassium.

¤ If neither diuretic agent is available, hydrochlorothiazide can be used (25mg starting, 50mg full) or indapamide (1.25mg starting, 2.5mg full) can be used.

Figure 1.5 Treatment algorithm for hypertension using a single-pill combination for example including Telmisartan and Amlodipine. This algorithm is recommended for patients with diabetes, cardiovascular disease or chronic kidney disease (with adapted treatment targets of 130/80).

Algorithm for patients with comorbidities – e.g. Diabetes Mellitus



Treatment Targets

Target is 140/90 mmHg for patients without comorbidities and below 130/80 for patients at high cardiovascular risk, such as patients with diabetes, cardiovascular disease or chronic kidney disease.

Follow-up intervals

Monthly follow-ups with dose adjustment should be conducted until the treatment target is reached. For patients within the treatment target for which no dose adjustment is required, follow-up visits should be scheduled at 3 to 6 monthly intervals

Distribution of tasks

At community-level, lifestyle counselling and hypertension screening and monitoring may be provided without additional supervision. At primary level (health centre), drug treatment up to combinations including three molecules may be prescribed according to the algorithms provided. Patients not reaching the BP targets under full dose triple therapy should be referred to secondary or tertiary level care for specialist treatment (see below)

Specialist Level

Patients with resistant hypertension (uncontrolled BP under triple therapy) should undergo basic screening for secondary hypertension, including a thorough assessment of history, physical examination (see clinical clues), basic blood biochemistry (including serum sodium, potassium, eGFR, TSH), and dipstick urine analysis.

Add a low dose of spironolactone as the 4th line agent in those whose serum potassium is <4.5 mmol/L and whose eGFR is >45 ml/min/1.73m^2 to achieve BP targets. If spironolactone is contraindicated or not tolerated, amiloride, hydralazine, methyldopa, and beta-blockers are alternatives, or any available antihypertensive class not already in use.

NB: Contraindications

i. Avoid hydrochlorothiazide in gout and dyslipidemias
ii. Avoid beta-adrenergic blocking agents e.g. propranolol in;
    - Asthma
    - Heart failure
    - Diabetes mellitus
    - Chronic obstructive air ways disease
    - Peripheral vascular disease
        - Bradycardia pulse rate less than 50/minutes
iii. Avoid ACE inhibitors
    - Hyperkalemia
    - Pregnancy
    - Renal impairment

REFERRAL

Referral is dynamic and patients can be referred up to a specialist or down to lower health care level when controlled. Referrals are indicated when:

- Patients are compliant with therapy, and the blood pressure is refractory, i.e. >140/90 mmHg, while on drugs from three to four different classes at appropriate dose, one of which is a diuretic.
- All cases where secondary hypertension is suspected.
- Complicated hypertensive urgency e.g. malignant/accelerated hypertension, severe heart failure with hypertension and hypertensive emergency

Note: In the Clinic or Health centre, if a patient presents with suggestive end organ damage or major Risk factors, refer to the hospital immediately

Hypertensive emergencies and Urgency

Hypertension urgency

Increased BP of more than 180/100mmHg without any end organ damage

Management

Diazepam 5mg stat dose, review after one hour

If still high, illicit what may be causing increased blood pressures

If it drops, follow the algorithm

A hypertensive emergency is the association of substantially elevated BP with acute end organ damage. Target organs include the retina, brain, heart, large arteries, and the kidneys.

This situation requires rapid diagnostic workup and immediate BP reduction to avoid progressive organ failure. Intravenous therapy is usually required.

- **Malignant hypertension**
  Severe BP elevation (commonly >200/120 mm Hg) associated with advanced bilateral retinopathy (hemorrhages, cotton wool spots, papilloedema).

- **Hypertensive encephalopathy:**
  Severe BP elevation associated with lethargy, seizures, cortical blindness and coma in the absence of other explanations.

- **Hypertensive thrombotic microangiopathy:**
  Severe BP elevation associated with hemolysis and thrombocytopenia in the absence of other causes and improvement with BP-lowering therapy.

Other presentations of hypertensive emergencies include severe BP elevation associated with cerebral hemorrhage, acute stroke, acute coronary syndrome, cardiogenic pulmonary oedema, aortic aneurysm/dissection, and severe preeclampsia and eclampsia. Patients with substantially elevated BP who lack acute end organ damage are not considered a hypertensive emergency and can typically be treated with oral antihypertensive therapy.

Clinical Presentation	Timeline and Target BP	First Line Treatment
Malignant hpertension with or without TMA or acute renal failure	Several hours, MAP – 20% to 25%	Labetalol Nicardipine
Hypertensive encephalophathy	Immediate, MAP - 20% to 25%	Labetalol Nicardipine
Acute ischaemic; stroke and S&P >220mmHg or DPB>120mmHg	1h, MAP – 15%	Labetalol Nicardipine
Acute ischaemic stroke with indication for thrombolytic therapy and S&P >220mmHg or DBP> 120mmHg	1h, MAP – 15%	Labetalol Nicardipine
Acute haemorrhagic stroke and SBP < 180mmHg	Immediate, 130<SBP<180mmHg	Labetalol Nicardipine
Acute coronary event	Immediate, SBP<140mmHg	Labetalol Nicardipine
Acute cardiogenic pulmonary oedema	Immediate, SBP<140mmHg	Nitroprusside or nitro-glycerine (with loop diuretic)
Acute aortic disease	Immediate, SBP 120mmHg and heartrate <60bpm	Esmolol and nitroprusside or nitroglycerine or nicardipine
Eclampsia and severe pre-eclampsia/HELLP	Immediate, SBP 160mmHg and DBP <105 bpm	Labetalol or nicardipine and magnesium sulphate

Note Instructions for labetalol: Administer in 50mg bolus as slow infusion. Assess effect after 5 minutes. Repeat 50mg boluses to maximum of 200mg if no sufficient effect.

1.2 Acute rheumatic fever

Description

Rheumatic fever is a disease/condition in which the body develops antibodies against its own tissues following a streptococcal throat infection, especially between the ages 3 – 15 but it can go up to 30 years.

It is a systemic disease that primarily affects the heart and joints which follows group A. Streptococcal upper respiratory infection. It is characterised by:

- Carditis
- Migratory poly arthritis
- Syndenhams chorea
- Subcutaneous erytherma margineta
- Elevated acute phase reactants
- Fever/joint pains

Signs and symptoms

- Fever
- Anorexia
- Flitting migratory joint pain
- There may have been a previous sore throat or skin infection
- Heart murmurs
- Erythema marginatum (reddish rash at the extremities)
- Chorea (involuntary movement of limbs and face)
- Subcutaneous nodule

Causes

- Streptococcus pyogenes

Risk factors

- Family history
- Environmental factors
- Type of streptococcus bacteria

Diagnostic criteria and investigations

- Modified Jone's criteria
- Based on the signs and symptoms
- Echocardiography
- Electrocardiogram
- Blood tests to detect antibodies

Management

Community level	Health centre level	Hospital level
• Tepid sponging for fever	• Treat as CL • Ibuprofen 200mg tds for children, 400mg tds for adults. • Then **refer**.	• Treat as HC. **AND/OR** • Phenoxymethylpenicillin 500mg 8 hourly daily for 7-10 days. • Ibuprofen 200mg tds for children, 400mg tds for adults • Prednisolone 1-2mg/kg 24 hourly for 3-4 weeks. ***NB: Gradual reduction and discontinuation of prednisolone may be started after 3-4 weeks where there has been substantial reduction in clinical disease.***

Prophylaxis for adults for rheumatic fever

Patient status	Management
All patients confirmed with rheumatic fever and no rheumatic valvular disease: All patients confirmed with rheumatic fever and valvular heart disease: Penicillin allergic	Benzathine benzylpenicillin IM 1.2 MU every 21-28 days (3-4 weeks) up to 21 years • Benzathine benzylpenicillin IM 1.2 MU every 21-28 days (3-4) weeks up to 35 years **OR** • Phenoxymethylpenicillin 250mg orally 12 hourly daily for life. Erythromycin 250mg orally 12 hourly for Adults up to 21-30 years.

1.3 Valvular heart diseases

Description

Damage to heart valves commonly caused by rheumatic fever and occasionally by other causes e.g. congenital heart defects.

Signs and symptoms

- May be asymptomatic
- Features of congestive cardiac failure
- Heart murmurs

Causes

- Age- related changes
- Rheumatic fever
- Heart conditions and other disorder
- Streptococcus infections

Risk factors

- Old age
- High blood pressure
- Insulin resistance
- Lack of physical activity
- High blood cholesterol
- Smoking
- Overweight or obesity
- Family history

Diagnostic criteria and investigations

- Based on the signs and symptoms
- Physical examination with stethoscope
- Cardiac MRI (magnetic resonance imaging)
- Chest X-ray
- Echocardiography
- Electrocardiogram
- Cardiac catheterisation

Management

Community level	Health centre level	Hospital level
Health education on the following: • Heart-healthy eating • Physical activity • Heart- healthy life style • **Refer** to the health centre	• Treat as CL and refer	• Treat as CL and refer. • Refer all patients with heart murmurs for assessment. • Advise all patients with heart mur-mur to inform health care providers of the presence of the heart problems whenever reporting medical or dental treatment **Refer** all cases for specialist treatment

1.4 Congestive Cardiac Failure (CCF)

Description

Failure of the heart to pump blood at sufficient rates to meet the demands of the body resulting in inadequacy of the delivery of oxygen rich blood to the rest of the body.

Signs and symptoms

- Progressive swelling of the body (generalised oedema)
- Dyspnoea (shortness of breath)
- Orthopnoea (Shortness of breath whilst lying down)

- Paroxysmal nocturnal dyspnoea (sudden shortness of breath at night in the orthopnic position)
- Persistent productive cough (frothy)
- Fatigue
- Nocturia

Causes

- Anaemia
- Thyroid disease
- Valvular heart disease
- Constrictive pericarditis
- Thiamine deficiency
- Ischaemic heart disease
- Haemochromatosis

Risk factors

- High blood pressure
- Heart attack
- Viruses
- Kidney conditions
- Medications e.g. some diabetes medications
- Congenital heart defects
- Coronary artery disease
- Irregular heartbeats
- Alcohol use
- Diabetes
- Sleep apnoea

Diagnostic criteria and investigations

CCF must be identified and treated to prevent further damage to the heart.

Signs	Right Ventricular Failure	Left Ventricular Failure	Congestive CCF
	Raised jugular vein	Crepitations in both lungs	All signs for right and left
	Rapid pulse	Cyanosis	
	Pitting oedema	Heart Gallop	
	Enlarged and tender liver	Displaced apex beat	
	Hepatojugular reflex		
	Ascites		

The following functional classification will help to tell how severe the cardiac failure is:

Class 1: Dyspnoea only with greater than ordinary activities
Class 2: Dyspnoea with ordinary activity
Class 3: Dyspnoea with minimal activity
Class 4: Dyspnoea at rest

Investigations

- Blood test
- Echocardiogram
- Chest X-ray
- Electrocardiogram

- Cardiac CT or MRI scan
- Stress test
- Coronary catheterisation

Management

Community level	Health centre level	Hospital level
Health education on the following: • Low salt diet • Limit fluid intake to 1–1.5 L/day if fluid overloaded despite diuretic therapy • Allow patient to exercise according to ability • Stop smoking	• Treat as CL • Oxygen • Furosemide 20-40mg IV if necessary • Semi-Fowlers position • Refer all cases to hospital • Caution: Avoid NSAIDs as these may exacerbate fluid retention	• Treat as HC. **AND/OR** **Step 1:** Diuretic: Mild volume overload (mild CCF) and normal renal function: • Hydrochlorothiazide, oral, 25 – 50mg daily Significant volume overload or abnormal renal or hepatic function: • Furosemide, oral, daily. Initial dose: 20-40mg/day. Higher dosages may be needed, especially if also renal failure. **AND** **ACE Inhibitor:** Captopril 12.5mg – 25mg orally daily gradually increasing after a month to twice daily (Caution if BP is low) **Step 2: Add** Spironolactone 25mg orally daily (only if serum potassium can be monitored) **NB:** Spironolactone can cause hyperkalemia. Do not use together with potassium supplements. Do not use in kidney failure. Make laboratory test to assess the electrolyte levels of the patient. **Refer** for Specialist treatment

1.5 Angina pectoris

Description

Angina pectoris is the result of myocardial ischemia caused by an imbalance between myocardial blood supply and oxygen demand.

Signs and symptoms

- Retrosternal chest discomfort (pressure, heaviness, squeezing, burning, or choking sensation)
- Pain localised primarily in the epigastrium, back, neck, jaw, or shoulders

- Pain precipitated by exertion, eating, exposure to cold, or emotional stress, lasting for about 1-5 minutes and relieved by rest or nitroglycerine

Causes

- Decrease in myocardial blood supply due to increased coronary resistance
- Increased extravascular forces
- Reduction in the oxygen-carrying capacity of blood

Risk factors

- Hypertension
- Severe anaemia
- Obesity
- Left ventricular hypertrophy
- Atherosclerosis
- Cigarette smoking

Diagnostic criteria and investigations

- Based on history and physical examination

Management

Community level	Health centre level	Hospital level
• Health education • Rest during the attack • Life style modification • **Refer** to health centre	• Treat as CL and Refer to hospital	• Treat as HC **AND/OR** • Isosorbide dinitrate sublingual 5 mg immediately may be repeated 5 to 10 minutes interval for 3 doses until stable **OR** • Glyceryl trinitrate 0.5 mg **AND** • Acetylsalicylic acid 75 mg – 150 mg 24 hourly • Isorsobide mononitrade 10 mg – 20 mg 12 hourly **OR** • Isorsobide dinitrate 20 mg – 40 mg 24 hourly **AND** • Atenolol 50 mg – 100 mg 24 hourly **OR** • Amlodipine 5 mg 24 hourly **OR** • Amlodipine 5 mg 24 hourly **OR** • Nifedipine 10 mg – 20 mg SR **OR** • Verapamil 40 mg 24 hourly **AND** • Nicotinic acid 250 mg 24 hourly **OR** Simvastatin 10 mg 24 hourly of the patient. **Refer** for Specialist treatment

1.6 Cardiac Arrhythmias

Description

Irregular heartbeat. The heart may beat too fast (tachycardia) or too slow (bradycardia), too early (premature contraction) or too irregular (fibrillation)

Signs and symptoms

- Fast heart beat
- Shortness of breath
- Syncope
- Chest pain
- Fatigue

Risk factors

- Heart attack
- Hypertension
- Smoking and alcohol
- Electrolyte imbalance
- Cardiomyopathy
- Diabetes
- Coronary heart disease

Diagnostic criteria and investigations

- ECG
- FBC, lipid profile, cardiac markers
- Chest X-ray
- Echo Cardiogram

Management

Community level	Health centre level	Hospital level
• Health education on life style modification • **Refer** to health centre	• Treat as CL **AND/OR** • **Refer** to hospital	Treat as HC. **AND/OR** • Verapamil 40mg 24 hourly **OR** • Atenolol 50mg-100mg 24 hourly **OR** • Amiodarone 200mg 24 hourly **OR** • Digoxin 0.25mg 24 hourly **AND** • Acetylsalicylic acid 75 mg – 150 mg 24 hourly **OR** • Isosorbide monohydrate 10 mg – 20 mg 12 hourly **OR** • Simvastatin 10 mg 24 hourly **OR** • Warfarin 5 mg 24 hourly

chapter

2

Central Nervous System

2.1. Headache and facial pain syndrome

The term headache encompasses all aches and pains located in the head, in practice its application is restricted to discomfort at the cranial vault. It is usually caused by traction, displacement, inflammation, vascular spasm or distension of the pain sensitive structures in the head and neck.

2.1.1 Migraine

Description

A migraine is an episodic headache, usually located unilaterally and throbbing/ pulsating in nature, which may occur with or without an aura.

Signs and symptoms usually accompanied by

- Nausea and/or vomiting
- Sensitivity to light
- Sensitivity to sound
- Eye pain

Causes

The specific cause of migraines is not known, but there may be fluctuations in certain neurotransmitters, chemicals that send messages between brain cells. These changes may predispose some people to develop migraine headaches.

Risk factors

- Genetic
- Gender - females are at higher risk than males
- Smokers

Diagnostic criteria and investigations

Two related clinical syndromes have been identified: migraine with aura or classic migraine, and migraine without aura or common migraine.

International Headache Society Diagnosis Criteria for Migraine
Without aura

- Headache attacks lasting 4-72 hours (untreated or unsuccessfully treated)
- Headache with at least two of the following four characteristics:
- Unilateral location
- Pulsating quality
- Moderate or severe intensity which inhibits or prohibits daily activities
- Aggravated by walking on the stairs or similar routine physical activity.

During a headache at least one of the two following symptoms occurs

- Nausea and/or vomiting
- Photophobia and phonophobia
- Not attributed to other disorder

With aura

Headache has at least three of the following four characteristics

- One or more fully reversible aura symptoms indicating focal cerebral cortical and/or brain stem dysfunction
- At least one aura symptom develops gradually over more than 4 minutes, or two or more symptoms occur in succession
- No aura symptom lasts more than 60 minutes; if more than one aura symptom is present, accepted duration is proportionally increased
- Headache follows aura with a free interval of less than 60 minutes (it may also begin before or simultaneously with the aura).

Management

Community level	Health centre level	Hospital level
• Relaxation techniques • Identify any precipitating factors or food triggers and avoid them • Paracetamol 500mg- 1g 8 hourly for 3 days • **Refer** to health centre	• Treat as CL **AND** • Counselling/psycho-therapy **AND** • **Analgesics:** Paracetamol 500mg – 1g 8 hourly for 5 days OR • Diclofenac 25 -50mg 8 hourly for 7 days **AND OR** **Nausea and vomiting** • Metoclopramide, oral/IM, 10 mg 8 hourly, as required • **Refer** to the hospital.	• Treat as HC **AND/OR** • **Prophylaxis** • Amitriptyline, oral, 10–25mg at bed-time. Up-titrate dose to adequate clinical response **OR** • Propranolol, oral, 40mg 12 hourly **OR** • Carbamazepine 200mg OD up to 200-600mg TDS

Management of Acute Attack

Community level	Health centre level	Hospital level
• Paracetamol 500mg - 1g 6 – 8 hourly for 5 days	• Treat as CL **AND/ OR** • Diclofenac orally 25-50mg 8 hourly for 7 days **OR** Ibuprofen orally 200-400mg 8 hourly for 7 days	• Treat as HC **AND/OR** • Sumatriptan 6mg SC **OR** 50-100mg orally; Repeated in 2 hours if needed **OR** • Ergotamine 1-2mg under the tongue. Repeated every 30mins until headache is relieved **OR** until a total of 8mg

Community level	Health centre level	Hospital level
		Adult: • Initially propranolol 40mg 8 - 12 hourly daily, increased by same amount at weekly intervals if necessary; usual maintenance dose is in the range, 80–160 mg daily. **Child:** • Under 12 years, propranolol 20mg 8 -12 hourly • **Refer** for medication dosage adjustment or medication change to a specialist.

2.1.2 Tension headaches

Description

It is the most common type of headache, usually bilateral, with occipital-nuchal, temporal, or frontal predominance or diffuse extension over the top of the cranium. Usually described as dull and aching, but also fullness, tightness or a feeling that the head is swollen and may burst.

Signs and symptoms

- Worsening in the afternoon, but often present all day.
- Normally felt in the neck and the back of the head but may be felt over the entire head. It is often associated with dizziness and/or blurring of vision
- A tight band around the head or a pressure on the top of the head and does not progress through stages like a migraine (no nausea, no visual symptoms).

Causes

- It is caused by the muscle contraction in the head
- Some food substances
- Dehydration
- Bright sunlight
- Squinting
- Stress and anxiety
- Tiredness

Risk factors

- Alcohol
- Eye strain
- Dry eyes

- Fatigue
- Smoking
- Cold or flu
- Sinus infection
- Caffeine
- Poor posture
- Emotional stress

Differential diagnosis

Screen red-flag symptoms/signs to rule out life-threatening condition:

- Focal neurological signs (motor, sensory, visual disturbances, loss of balance, etc)
- Consciousness
- Fever and chillness
- Seizures
- Nuchal rigidity or other meningism
- Papilloedema, pre-retinal or retinal haemorrhage
- History of bleeding diathesis, hypercoaguable state, cancer, HIV/AIDS, autoimmune disorders, illicit drug abusers, mainly migraine without aura.

Very commonly, waves of aching pain are superimposed, which may be interpreted as paroxysmal and throbbing, especially if the headache is more on one side. However, absence in persistent throbbing quality, photophobia, and phonophobia of migraine. Although they can be uncomfortable, a tension headache will not typically be severe enough to interfere with daily activities.

No further investigations are needed if tension headache is the definite diagnosis

Management

Community level	Health centre level	Hospital level
• Relaxation techniques • Avoid stress Adult dosage: • Paracetamol 1g every 8 hours. Child: Age-based dosage:	• Treat as CL **AND** • Counselling/psycho-therapy • **Refer** to the hospital	**Adult** • Paracetamol 500mg - 1g every 6 – 8 hourly **OR** • Diclofenac orally 25-50mg 8 hourly OR • Ibuprofen orally 200-400mg 12 hourly

Community level	Health centre level	Hospital level
• 3 months -1 year: Paracetamol 60-120mg 6 – 8 hourly • 1year -5years: Paracetamol 120-250mg 6 – 8 hourly • 6 years -12years: Paracetamol 250-500mg 6 – 8 hourly Weight-based dosage • Paracetamol 10-15 mg/kg every 6-8 hours. • Do not exceed 5 doses per day • **Refer** to health centre		**Child:** Age-based dosage: • 3 months -1 year: Paracetamol 60-120mg 6 – 8 hourly • 1year -5 years: Paracetamol 120-250mg 6 – 8 hourly • 6 years -12years: Paracetamol 250-500mg 6 – 8 hourly Weight-based dosage • Paracetamol 10-15 mg/kg every 6-8 hours, may repeat dose every 6 hours. • Do not exceed 5 doses per day • **Refer** to specialist if: Secondary headache is suspected

2.1.3 Cluster headache

Description

Cluster headache are repetitive episodes of excruciating headache typically of short duration (up to 2 hours) in clusters that come in groups lasting weeks or months, separated by pain-free periods of months or years.

Signs and symptoms

- Pain occurs once or twice daily and last for 30 to 90 minutes
- The pain occurs at the same time every day
- The pain is excruciating and located around or behind one eye
- Eye tearing, inflammation and watery
- Nasal congestion and discharge

Causes

- Uncertain but happen due to activation of the trigeminal nerve due to abnormal activity in the hypothalamus.

Risk factors

- Family history, it runs in families meaning it has a genetic role
- Change in sleep patterns
- Use of certain medications like nitroglycerin
- Gender- men are at a high risk than women

Diagnostic criteria

- Based on the signs and symptoms
- Brain scan

Management

Community level	Health centre level	Hospital level
• Stop smoking • Reduce alcohol intake **AND** • Paracetamol 1g immediately **AND** • **Refer** to health centre	• Treat as CL **AND** • **Refer** to hospital	• Treat as HC **AND/OR** • Sumatriptan 6mg; repeated after 1 hour. **Maximum dose per 12mg a day OR** • Oxygen at the rate of 10-15l/Min for 10-20 minutes. Prophylaxis • Verapamil 240-960mg 8-12 hourly divided doses **OR** • Prednisolone P.O. 40mg daily with food in the morning 5-10 days • Amitriptyline 25-50 mg 24 hourly

2.1.4 Trigeminal Neuralgia

Severe, very short-lived stabs of facial pain in the sensory trigeminal distribution.

Signs and symptoms

- Attacks of severe, sharp, shooting facial pain that last from a few seconds to about 2 minutes.

Causes

- Primary (Unknown cause, linked to the compression of the nerve, typically in the base of the head where the brain meets the spinal cord)
- Secondary: tumor, cyst, facial injury

Differential diagnosis

- Intracranial mass lesions, which may impinge on the trigeminal nerve

Diagnosis and Investigations

- Physical and neurological examinations
- MRI

Management

Community level	Health centre level	Hospital level
• **Refer** to health centre	• **Refer** to hospital	• Carbamazepine P.O. 100mg BD

2.1.5 Secondary headache

Description

Headache due to an underlying disease or an injury that needs to be diagnosed and treated.

Causes

- Head and neck trauma
- Blood vessel problems in the head and neck
  - Stroke or transient ischemic attack (TIA)
  - Arteriovenous malformations (AVM) may cause headache before they leak
  - Carotid artery inflammation
  - Temporal arteritis (inflammation of the temporal artery)
- Non-blood vessel problems of the brain
  - Brain tumors, either primary, or metastatic
  - Seizures
  - Idiopathic intracranial hypertension, once named pseudo tumor cerebri,
- Medications and drugs (including withdrawal from those drugs)
- Infections:
  - Malaria
  - Meningitis
  - Encephalitis
  - HIV/AIDS
  - Systemic infections

Diagnostic criteria and investigations

- Complete neurological examination
- Blood pressure, temperature, and pulse rate
- Tender points, involving the temporal arteries, scalp, sinuses, neck and shoulder muscles
- Evaluation for papilloedema

Management

Community level	Health centre level	Hospital level
• Relaxation techniques • Stress management techniques • Counselling **AND** • Paracetamol 500-1g STAT • **Refer** to the health centre.	• Counselling and psychotherapy **AND** **Adult** • Paracetamol 500mg - 1g every 6 – 8 hourly **OR** • Diclofenac orally 25-50mg 8 hourly, after meals **OR** • Ibuprofen orally 200-400mg 12 hourly, after meals **Children** **Age-based dosage:** • 3 months -1 year: Paracetamol 60-120mg 6 – 8 hourly • 1 year-5years: Paracetamol 120-250mg 6 – 8 hourly • 6 year-12years: Paracetamol 250-500mg 6 – 8 hourly **Weight-based dosage:** • Paracetamol 10mg -15 mg/kg every 6-8 hours. • Do not exceed 5 doses per day. • **Refer** to hospital.	• **Treat as HC**

chapter

3

Oral diseases and conditions

3.1 Candidiasis (Oral thrush)

Description

This is a fungal infection of the oral mucosa caused by Candidal infection mainly Candida albicans. Candida albicans is a yeast and is a normal oral commensally. Under certain circumstances candida becomes pathogenic producing both acute and chronic infection. Acute oral candidiasis (thrush) is seen most commonly in the malnourished, the severely ill, neonates and HIV-AIDS patients or patients on long term oral corticosteroids use. In chronic oral candidiasis dense white plaques of keratin are formed.

Signs and symptoms

- Painful creamy white patches that can be scraped off the tongue, palate and buccal mucosa leaving red raw area
- Discomfort when eating spicy foods
- Burning sensation in the mouth
- Altered taste sensation
- Difficulty in swallowing
- Breast feeding babies may refuse to suck

Cause

- Candida albicans

Risk factors

- Poor oral hygiene
- Immunosuppression
- Prolonged use of antibiotics
- Prolonged use of corticosteroids
- Certain chronic diseases e.g. diabetes, cancer
- Trauma e.g. poorly fitting dentures

Diagnostic criteria and investigations

- Identify underlying causes e.g. patient disease, use of medicines
- Based on listed signs and symptoms

Management

Community level	Health centre level	Hospital level
• Provide oral Health education • Rinse with warm salty water • Advice on cup feeding instead of bottle feeding	• Treat as CL • Nystatin suspension 100,000 IU/mL 0.5-1 ml for 7 days OR • 2% Miconazole oral gel every 12 hours for 7 days OR • Gentian violet 0.5 % 3 times daily for 7 days **AND**	• Treat as HC • Nystatin suspension 100,000 IU/ml, 1-5ml four times a day for 7 days **OR** • Miconazole 2 % oral gel 5-10 ml 12 hourly.

Community level	Health centre level	Hospital level
• Advice on soft diet and avoid salty and spicy food • **Refer** immediately to health centre	• Paracetamol 1.0 g every 8 hours for 5 days. • **Refer** to the hospital when necessary	• Paracetamol 1g 8 hourly for 5 days

Note: Patients with oral candidiasis, painful and/or difficulty in swallowing and have oesophageal involvement. Provide fluconazole 200mg OD/BD depending on severity of the condition for one week.

3.2 Dental abscess

Description

A dental abscess is a collection of infected material (pus) around the affected tooth and it may spread to the surrounding tissues.

Signs and symptoms

- Pain
- Fever
- Pain when touching or brushing the tooth
- Swelling and redness of gums around the tooth
- May have lymph gland swelling or swelling on the side of the face
- Looseness of the tooth (after infection reaches the bone)
- Tooth feels elongated
- Restriction in mouth opening (trismus) and difficulty in swallowing (dysphagia)

Causes

Bacterial infection by anaerobic cocci, Prevotella, Fusobacterium species

Risk factors

- Dental caries
- Periodontal infection
- Poor oral hygiene
- Jaw fractures

Investigations

Pus for Grams stain, culture and sensitivity and where necessary, perform full blood count

Management

Community level	Health centre level	Hospital level
• Oral Health education on proper brushing of teeth (twice a day) • Dental flossing at least once a day • Rinse with warm salty water (half tea spoon of salt in half cup of water) • **Refer** immediately to health centre	• Treat as CL **Adult:** • Paracetamol 1.0 g every 8 hours for 5 days **AND** • Amoxycillin orally 500mg every 8 hours for 5 days **OR** **Penicillin allergic patients:** • Erythromycin stearate 500mg 6 hours for 5 days **OR** • Azithromycin 500mg STAT then 250mg 12 hourly for 3-4 days **AND** • Metronidazole 400mg 8 hourly for 7 days **Child dosage:** **Age-based dosage:** • 1 year-5 years: Paracetamol 120-250mg 6 – 8 hourly for 5 days. • 6 years-12years: Paracetamol 250-500mg 6 – 8 hourly for 5 days. **Weight-based dosage:** • Paracetamol 10-15 mg/kg 6-8 hourly. Do not exceed 5 doses per day **AND** • Children 10-20 kg amoxycillin 125 mg every 8 hourly **Children over 20 kg and adults;** amoxycillin 250 mg every 8 hours • Amoxycillin 20-50 mg/kg/day in 3 divided doses 8 hourly **Penicillin allergic Children:** **Age-based dosage** **Children 10-15 kg;** • Erythromycin 125mg 6 hourly for 5 days **Children over 15 kg;** Erythromycin 250mg 6 hourly for 5 day **Weight-based dosage:** • Erythromycin 30-50mg/kg/day every 6 hours **OR** • Azithromycin 10-20mg/kg for 3 days **AND**	• Treat as HC If patients unable to chew • Provide supplements such as nutren optimum, ensure etc. • Incision and drainage treat the cause of the abscess • **Refer** to specialist when: infection spread to other facial spaces e.g. neck region (Ludwig's angina)

Community level	Health centre level	Hospital level
	Child dosage **Age-based dosage:** • **Children 1-3 years:** Metronidazole 50 mg 8 hourly • **Children 3-10 years:** Metronidazole 100 mg 12 hourly • **Children over 10 years and adults:** Metronidazole 200 mg 8 hourly **Weight-based dosage:** • Metronidazole 7.5 mg/kg every 8 hourly • **Refer** all cases to hospital	

3.3 Dental caries

Description

This is tooth decay which occurs when bacteria act on carbohydrates and produces acid that destroy tooth structure and make a hole on a tooth.

Signs and symptoms

- Painful teeth
- White chalky spot
- A hole or black spot may be visible on any surface of the tooth
- Tenderness on percussion of the affected tooth
- May have swollen, red gums

Causes

Mainly Streptococcus (S.mutans, S.viridians)

Risk factors

- Tooth location
- Dry mouth (inadequate saliva flow)
- Frequent snacking on sugars, refined carbohydrates and acidic foods
- Inadequate tooth brushing
- Bedtime infant feeding
- Not getting enough fluoride
- Worn filling and dental appliances
- Poor oral hygiene

Diagnostic criteria

- Early stage – asymptomatic
- Intermediate stage:
  - Black/brown spot which may be visible on any surface of tooth
  - Cavities developing on tooth surface

  - Pain/toothache elicited by hot, cold or sweet foods/drinks
- Late stage:
  - Pain may be spontaneous, intermittent, sharp and severe, even interfering with sleep
  - There is tenderness on percussion of the tooth

Investigations

X-rays: Periapical X-ray of tooth/teeth may need to be done especially to confirm extent of caries for treatment decision e.g. the caries contained in the dentine can be distinguished from pulpal caries.

Management

Community level	Health centre level	Hospital level
Oral health education on: • Reduction of sugar intake. • Tooth brushing with fluoridated toothpaste at least twice a day • Dental flossing at least once a day • Paracetamol orally 1g 4-6 hourly when needed to a maximum of four doses for 5 days • **Refer** to health centre	• Treat as CL **AND/OR** **Adult:** • Ibuprofen orally 200 – 400mg daily for 5 days **Children:** • 200mg Ibuprofen (5mg/kg, 4 – 6 hourly) for 5 days • Book patients for oral health team visits for Atraumatic Restorative Treatment and Extraction depending on the extent of caries. • **Refer** to the hospital.	• Treat as HC **AND/OR** • Restorative treatment (Atraumatic Restorative Treatment, Fillings, Root Canal Treatment) • Extraction depending on the extent of caries • **Refer** to specialist when a more complicated restoration is needed e.g. crown

3.4 Gingivitis

Description

Gingivitis is an inflammation of the gums caused by accumulation of plaque in gum tissues.

Signs and symptoms

- Painful gums
- Bleeding gums especially during brushing
- Swollen, red, tender gums
- Bad breath and taste when that does not go away when brushing
- Gums slightly pulled away from teeth
- Pain when chewing

Causes
Bacterial infection by Gram-negative rods, fusiforms, filaments, spirilla and spirochetes

Risk factors
- Poor oral hygiene
- Diabetics
- Pregnancy
- Some medications such as phenytoin, some contraceptives, steroids
- Smoking and chewing tobacco
- Poorly fitting dental appliances
- Compromised immunity such as HIV/AIDS patients

Diagnostic criteria and investigations
- Inflammation of the gingiva
- Gingival redness and swelling which bleeds on gentle probing during tooth brushing or even on touch

Management

Community level	Health centre level	Hospital level
• Oral Health E ducation on proper brushing technique • Rinse with warm salty water (half tea spoon of salt in half cup of water) • Paracetamol 1g 4-6 hourly when needed to a maxi-mum of four doses for 5 days. • **Refer** to health centre	• Treat as CL **AND/OR** • Ascorbic acid 250mg 3 times a day for 5 days • **Refer** to hospital	• Treat as HC **AND/OR** • Scaling and polishing • 0.2% chlorhexidine digluconate mouthwash 2 – 4 times a day for 5 days after brushing and flossing, 15 ml as a mouthwash after brushing and flossing

3.5 Acute necrotising ulcerative gingivitis (ANUG) (Vincent's angina)

Description
Acute necrotising ulcerative gingivitis (ANUG) also known as Vincent's angina is a severe painful form of gingivitis characterised by necrotising inflammation of the marginal interdental gingiva with little or no bone involvement. In HIV infected individuals, this is HIV clinical stage 3 condition.

Signs and symptoms
- Painful red and oedematous interdental papilla
- Spontaneous bleeding
- Greyish membrane between teeth on gums which can be removed

- Possible ulcers on gums (ulcerative gingivitis)
- Fetor Oris (severe halitosis)

Causes

- Fusiform bacilli
- Spirochete

Risk factors

- Poor oral hygiene and pre-existing
- Emotional stress
- Low socio-economic status
- Cigarette smoking, and gingivitis
- Malnutrition
- Immunosuppression

Management

Community level	Health centre level	Hospital level
• Oral Health Education • Improve nutrition • Rinse with salty water (half tea-spoon of salt in half cup of water) • Paracetamol 1g 4-6 hourly when needed to a maxi-mum of four doses for 5 days • **Refer** to health centre immediately.	• Treat as CL **AND/OR** • Gentle removal of the membrane **Adults:** • Amoxycillin 500mg 8 hourly for 7 days **Penicillin allergic patients:** • Erythromycin 500mg every 6 hours after meals for 5 days **OR** • Azithromycin 500mg immediately, then 250mg 12 hourly for 3-4 days **AND** • Metronidazole 400mg every 8 hours for 5 days **AND** • Ascorbic acid suck 250mg 8 hourly for 5 days **AND** • Ibuprofen 200-400mg 8 hourly PRN **AND** • Chlorhexidine digluconate 0.2 % mouthwash after brushing and flossing -15ml as a mouthwash after brushing and flossing. **Children:** • Amoxycillin 20-50mg/kg/day 8 hourly for 7 days **Penicillin allergic patients;** • Erythromycin 30-50 mg/kg/day 8 hourly for 7 days **OR** • Azithromycin 10-20 mg/kg once daily for 3 days **AND** • Ibuprofen 100 – 200mg (5mg/kg, 4 – 6 hourly) • **Refer** to a Hospital if no improvement in 5 days	• Treat as HC • Thorough debridement scaling and polishing is needed • **Refer** to National Referral Hospital for specialist management.

Note:
If untreated, acute necrotising ulcerative gingivitis lesions may progress to the life threatening disease cancrum oris (noma). Noma is a gangrene which starts from the mouth and destroys quickly both the soft and hard tissues of the mouth and the face. Among the earliest features of noma are excessive salivation, marked foetor-oris (severe halitosis), facial oedema, and grayish black discoloration of the skin in the affected area. The cheeks, chin and lips then swell rapidly and develop dark grayish areas which if untreated disintegrate to expose destroyed soft and hard tissues.

3.6 Periodontitis

Periodontitis may be classified as acute or chronic depending on the extent of the damaged involved tissues

3.6.1 Periodontitis (chronic)

This is progressive gingivitis to the point where the underlying bone is eroded. It is due to the same cause as gingivitis. It is also known as pyorrhoea.

Signs and symptoms

- Development of periodontal pockets
- Resorption of alveolar bone
- Gums may be painful
- Inflammation of gum margin
- Teeth may be loose in their sockets
- Gum recession

Causes

Bacterial infection caused by Actinobacillus actinomycetemcomitans and Porphyromonas gingivalis

Risk factors

- Gingivitis
- Heredity
- Poor oral health habits
- Tobacco use
- Diabetes
- Older age
- Decreased immunity, such as that occurring with leukemia, HIV/AIDS or chemotherapy
- Poor nutrition
- Certain medications
- Hormonal changes, such as those related to pregnancy or menopause
- Substance abuse
- Poor-fitting dental restorations
- Problems with the way your teeth fit together when biting

Diagnostic criteria and investigations

- Mobile or loose teeth in their socket
- Halitosis
- Easily bleeding gingiva on gently probing
- Reddened swollen gingiva
- Use a dental instrument to measure the pocket depth (Pockets deeper than 5mm may indicate periodontitis)
- Dental X-rays to check for bone loss

Management

Community level	Health centre level	Hospital level
• Improve oral hygiene • Prevent further disease and preserve teeth to avoid loss • **Refer** to health centre	• Treat as CL **AND/OR** • Paracetamol 1g 4-6 hourly PRN for 5 days **AND** 0.2 % Chlorhexidine digluconate mouthwash 2 – 4 times a day for 5 days after brushing and flossing **OR** • 3% Hydrogen Peroxide mouthwash 3-4 times daily for 5 days • **Refer** all cases to a hospital	• Treat as HC **AND/OR** • Scaling and root planning (professional removal of calculus) • Advanced cases need surgical management • In severe cases and in the evidence of periodontal abscess formation, use antibiotics. **Adults:** • Amoxycillin 500mg 8 hours for 5 days **Penicillin allergic Adult:** • Erythromycin 500mg 6 hourly after meals for 5 days **OR** • Azithromycin 500mg stat, then 250mg 12 hourly for 3-4 days **OR** • Metronidazole 400mg 8 hourly for 5 days **Children:** • Amoxycillin 20-50mg/kg/day every 8 hours for 5 days **OR** **Penicillin allergic Children:** Erythromycin 30-50mg/kg/day 6 hourly for 5 days **OR** • Azithromycin 10-20mg/kg for 3 days **AND** • Metronidazole 7.5mg/kg 8 hourly for 5 days

*prolonged use of chlorhexidine may cause darkening of teeth

3.6.2 Acute periodontitis (Periodontal abscess)

Description

Is a localisation of pus within a periodontal pocket. It occurs either due to introduction of virulent organisms into an existing pocket or decreased drainage potential.

Signs and symptoms

- Painful teeth
- A large swelling along the side of the gums that often appear suddenly
- Bad breath
- Loss of gingiva and supporting bone around teeth

Causes

Bacterial infection caused by *Actinobacillus actinomycetemcomitans and Porphyromonas gingivalis*

Risk factors

- Presence of underlying diseases such as HIV/AIDS and diabetes mellitus
- Smoking
- Impacted foreign body
- Poor oral hygiene

Diagnostic criteria and investigations

- Halitosis
- Gum recession
- Production of pus
- Mobile or loose teeth

Management

Community level	Health centre level	Hospital level
• Oral hygiene • Stop smoking • Regular visits to dental clinics **Adult:** • Paracetamol 1g 4-6 hourly for 5 days; **Children:** • Paracetamol 10-15 mg/kg 6 hourly for 5 days • **Refer** to health centre	• Treat as CL **AND/OR** **Adult:** • Amoxycillin 500mg 8 hourly for 5 days **Penicillin allergic Adults:** • Doxycycline100 mg 12 hourly after meals for 5 days **OR** • Azithromycin 500mg STAT, then 250mg 12 hourly for 3-4 days **AND** • Metronidazole 400mg 8 hourly, orally for 7 days	• Treat as HC **AND/OR** • Incision and drainage • Debridement of the pocket

3.7 Dry socket

Description
Painful complication that may happen after tooth extraction normally due to failure to form clot.

Signs and symptoms
- Severe pain
- Swelling
- Halitosis

Causes
- Severe bone and tissue trauma
- Bacterial contamination of the socket
- Small fragments of roots or bone remaining in the wound

Risk factors
- Smoking after tooth extraction
- Rinsing and spitting after extraction
- Poor oral hygiene

Diagnostic criteria and investigations
- Clinical investigation

Management

Community level	Health centre level	Hospital level
• **Refer** to health centre	• **Refer** to hospital	• Clean the socket with curette • Irrigate with normal saline or hydrogen peroxide (0.1%) • Dress the socket with alvogyl • Amoxycillin 500mg 8 hourly for 5 days **AND** • Metronidazole 400mg 8 hourly for 5 days **AND** • Ibuprofen 400mg 8 hourly for 5 days

3.8 Stomatitis

Description
It is a generalised inflammation of the oral mucosa due to different etiologies. It is a primary infection of what later can become recurrent fever blisters.

Signs and symptoms
- Shallow painful ulcers on the lips, gums and tongue
- Enlarged and tender cervical lymph nodes
- Fever and general malaise

- Excessive salivation
- Halitosis (bad breath)
- Dysphagia (difficulty in swallowing)
- Self-limiting and usually clears within 10 – 14 days

Causes
- Herpes Simplex type I

Risk factors
- Chemical burns
- Radiation
- Allergy

Diagnostic criteria and investigations
- Based on signs and symptoms
- Biopsy

Management

Community level	Health centre level	Hospital level
• Oral hygiene practices • Rinse with warm salty water. • A soft or liquid diet with high fluid intake • Avoid acidic drinks, e.g. orange juice or soft drinks as they may cause pain. • Paracetamol 1g 4-6 hourly when needed to a maximum of four doses for 5 days	• Treat as CL **AND/OR** • Lidocaine gel (2 %) every 3-4 hours, for extensive oral herpes • Chlorhexidine mouthwash 8 hourly for 5 days **OR** • Hydrogen Peroxide 1.5-3% 4-6 hourly per day for 5 days • Acyclovir topical oral gel 2-4 times per day for 5 days • Refer to a hospital when: • the condition is severe • immuno-suppressed patients • no improvement after 10 –14 days of treatment	• Treat as HC **AND/OR** • Severely ill patients with Herpes Simplex type I can be given: **Adults:** • Acyclovir 200-400mg 5 times daily for 5 days. **Children:** • Acyclovir 15mg/kg 5 times a day for 5 days **AND** • Prednisone oral 5mg once a day for 7days • Scaling and polishing

3.9 Aphthous ulcers / canker sores / mouth ulcers

Description
Small acute painful ulcer craters on the oropharyngeal mucosa. The sores are usually found on the tongue, the inside lining of the lips and cheeks and at the base of the gums. May occur singly or in groups. The causes of the ulcers are generally unknown.

Signs and symptoms

- Pain at the site of the ulcer
- The ulcers begin as small oval or round reddish swellings that usually burst within a day leaving a shallow, yellowish ulcer with flat even borders. The borders are surrounded by redness
- Enlargement of regional lymph nodes can occur

Causes

- Are generally unknown

Risk factors

- Poor oral hygiene
- Injuries in the mouth
- Acidic or spicy foods
- Vitamin deficiency
- Hormones
- Stress

Diagnostic criteria and investigations

- Based on signs and symptoms

Management

Community level	Health centre level	Hospital level

• Brush teeth at least twice a day with fluoridated tooth-paste
• Rinse with warm salty water.
• Avoid acidic and spicy foods.
• Avoid abrasive foods such as po-tato chips that can stick in the cheek or gum and aggravate the sores.
• Paracetamol 500mg-1g 4-6 hourly PRN for 5 days
• **Refer** to health centre
	• Treat as CL **AND/OR**
	• Chlorhexidine digluconate (0.2 %) mouthwash 2-4 times daily for 5 days
	• Paracetamol 1g 4-6 hourly PRN daily for 5 days
	• Lidocaine gel (2 %) may be indicated for 3-4 hourly for 3 days
	• Gentian violet solution may be indicated and applied twice daily for 3 days
	• **Refer** to hospital when;
	  • Recurrence
	  • Widespread ulcer
		• Treat as HC **AND/OR**
		• Investigate for immunosuppression and treat accordingly
		• Prednisolone 20mg 8 hourly for 3 days then, 10mg 8 hourly for 2 days then, 5mg 8 hourly for 2 days.

3.10. Ludwig's angina

Description

Is a serious, life threatening generalised sceptic cellulitis of the fascia spaces found on the floor of the mouth and tongue. It is an extension of infection from mandibular molar teeth into the floor of the mouth covering the submandibular spaces bilaterally sublingual and submental spaces.

Signs and symptoms

- Massive cellulites (swelling) affecting submandibular, sublingual and submental spaces which can extend to the neck.
- Pain
- Internal swelling which lead to raising of the tongue
- Weakness, fatigue, excess tiredness
- Fever
- Neck pain
- Dysphagia (difficulty swallowing)
- In severe cases, stridor or difficulty breathing
- Drooling
- Trismus (inability to open the mouth)

Cause

- Ludwig's angina is a bacterial infection. It is usually caused by the bacterium Streptococcus or Staphylococcus, and often follows a mouth injury or infection.

Risk factors

- Pericoronitis
- Poor dental hygiene
- Trauma or lacerations in the mouth
- A recent tooth extraction may also contribute.
- Caries of the third molar

Diagnostic criteria and investigations

- Physical examination
- Clinical observations
- Quick assessment of the airway
- Brawny induration
- Swollen tissues
- Dyspnoea and dysphagia
- Fluid culture

Management

Community level	Health centre level	Hospital level
• **Refer** the patient immediately to Health centre	• Benzyl penicillin 2.4mu intramuscular stat • Then continue with Amoxycillin orally 500mg every 8 hours for 5 days **OR** **Penicillin allergic adults:** • Erythromycin stearate 500mg orally every 6 hours after meals for 5 days **OR** • Azithromycin 500mg immediately, then 250mg 12 hourly for 3-4 days **AND** • Metronidazole 400mg 8 hourly, orally for 7 days **AND** • Paracetamol oral 1g 4-6 hourly for 5 days when needed. • **Refer** immediately to the Hospital	• Immediate incision and drainage using U shaped incision in submandibular area • Tracheostomy is needed • Provide high protein diet and fluid for rehydration. • Intravenous antibiotics should be administered • Gentamycin 80mg iv 8 hourly for 5days **AND** • Metronidazole 500mg iv 8hourly for 5days **OR** • Ceftriaxone 1g IV once a day for 5 days in case of severe infection and immunocompromised patients. • Once the patient is able to swallow orals replace IV drugs • Intravenous hydrocortisone 100mg stat dose • Diclofenac 75mg IM 8 hourly PRN

3.11 Angular cheilitis

Description

Is an inflammatory lesion at the corner of the mouth, and often occurs bilaterally.

Signs and symptoms

- Clinically appears as redness, ulceration, and fissuring, either unilaterally or bilaterally at the corners of the mouth
- In severe cases, the fissures can bleed when the mouth is opened and shallow ulcers or a crust may form.

Causes

- A combination of local irritation, moisture, and overgrowth of microorganisms such as Candida albicans

Risk factors:
- Immunosuppression
- Nutritional deficiency
- Systematic disorder (xerostomia)

Diagnostic criteria and investigations
- Clinical examinations

Management

Community level	Health centre level	Hospital level
• Oral hygiene • Application of petroleum jelly to soften the crusts • Paracetamol 1g 4-6 hourly for 5 days • **Refer** to health centre	• Treat as CL **AND/OR** • Miconazole topical cream 12hourly for 10 days **OR** • Nystatin topical cream 12hourly for 10 days **AND** • Nystatin oral suspension 12 hourly for 10 days OR • Miconazole oral gel if oral thrush is present • **Refer** if condition persists	• Treat as HC **AND/OR** In severe or recurrent cases; • Fluconazole tablets 50-100 mg once daily for 10 days • Investigate immunosuppression and treat accordingly

3.12 Herpes labialis / cold sores

Description

This is an infection, which is produced by the Herpes Simplex Virus. It is characterised by an eruption of small and usually painful blisters on the skin of the lips, mouth, gums, or the skin around the mouth.

Signs and symptoms
- Itching, burning, or tingling may occur about 2 days before lesions appear
- Small blisters filled with a clear yellowish fluid.
- These blisters form on red, painful skin areas. They break and ooze.
- Yellow crusts slough to reveal pink' healing skin.

Causes
- Herpes simplex type II

Risk factors
- Immunosuppression
- Eczema
- Severe burns

Diagnostic criteria and investigations
- Clinical investigation

Management

Community level	Health centre level	Hospital level
• Cool wet compresses can be used to reduce pain • High fluid intake • Resting in bed until the fever goes down is recommended • Paracetamol tablets 1g 6-8 hourly for 5 days • **Refer** if lesions are severe	• Treat as CL **AND/OR** • Acyclovir Cream apply 4 hourly for 5 days • **Refer** to hospital if persistent.	• Treat as HC **AND/OR** **Adult:** • Acyclovir tablets 200-400mg 5 hourly for 7 days **Adolescents 12-18 years** • Acyclovir tablets 200-400mg 6 hourly for 5 days **AND** • Acyclovir cream apply 4 hourly for 5 days

3.13 Traumatic dental injuries

3.13.1. Tooth Concussion

Description

An injury to the tooth-supporting structures without increased mobility or displacement of the tooth, but with pain to percussion and without gingival bleeding.

Signs and symptoms

- Swelling
- Occasional pain

Causes

- Trauma to the tooth

Risk factors

- Accidents
- Assault

Diagnostic criteria and investigations

- Clinical examination

Management

Community level	Health centre level	Hospital level
• Oral hygiene • Avoid injuries • Advice soft diet intake • Rinse with warm salty water • Paracetamol 250/500mg 8 hourly for 5 days • **Refer** to health centre	• Treat as CL **AND/OR** • **Refer** to hospital	• Treat as HC **AND/ OR** • Carry out percussion, mobility, and pulp sensibility test to the tooth • If patients cannot chew, provide supplements such as Nutren Optimum, Ensure, etc.

3.13.2 Tooth Luxation

Description

Displacement of the tooth which is accompanied by comminution or fracture of either the labial or the palatal/lingual alveolar bone.

Signs and symptoms

- Displaced tooth, usually in a palatal/lingual or labial direction
- In most cases of lateral luxation the apex of the tooth has been forced into the bone by the displacement,
- Partial or total separation of the periodontal ligament
- The tooth is frequently non-mobile.

Causes

- Trauma to the tooth

Risk factors

- Accidents
- Assault

Diagnostic criteria and investigations

- Clinical investigations

Management

Community level	Health centre level	Hospital level
• Oral hygiene • Avoid injuries • Soft diet intake • Rinse with warm salty water (1/2 teaspoon in a cup of water) • Paracetamol 1g 6-8 hourly for 5 days • **Refer** to health centre	• Treat as CL **Refer** to hospital	• Treat as HC **AND/OR** • Carry out percussion, mobility, and pulp sensibility test to the tooth • Rinse the exposed part of the root surface with saline before repositioning. • Apply a local anaesthetic • Reposition the tooth with forceps or with digital pressure to disengage it from its bony lock and gently reposition it into its original location. • Stabilise the tooth for 4 weeks using a flexible splint. 4 weeks is indicated due to the associated bone fracture • Control X-ray have to be done after 2 weeks • If patients cannot chew, provide supplements such as Nutren Optimum, Ensure etc.

3.13.3 Tooth Avulsion

Description

Complete displacement of the tooth out of its socket. An avulsed permanent tooth is one of the few real emergency situations in dentistry.

Signs and symptoms

- The tooth is completely displaced out of its socket.
- Clinically the socket is found empty or filled with a coagulum.
- Swelling of the gingiva

Causes

- Trauma to the tooth

Risk factors

- Accidents
- Assault

Diagnostic criteria and investigations

Clinical examination

Management

Community level	Health centre level	Hospital level
• Find the tooth and pick it up by the crown (the white part). • Avoid touching the root. • If the tooth is dirty, wash it briefly (10 seconds) under cold running water and reposition it. • Try to encourage the patient / parent to replant the tooth. Bite on a handkerchief to hold it in position. Use extreme caution in young children (risk of aspiration of the tooth) • If this is not possible, place the tooth in a suitable storage medium, e.g. a glass of milk for an hour. The tooth can also be transported in the mouth, keeping it between the molars and the inside of the cheek. • Avoid storage in water. • Keep the patient calm • **Refer** to the health centre	• Treat as CL • **Refer** to hospital immediately	• Tooth replanted prior to the patient's arrival at the dental surgery • Leave the tooth in place. • Clean the area with saline or chlorhexidine. • Suture gingival lacerations if present. • Verify normal position of the replanted tooth both clinically and radiographically. • Apply a flexible splint for up to 2-6 weeks. • If patients cannot chew, provide supplements such as Nutren Optimum, Ensure etc. **Adults:** • Doxycycline 100mg 12 hourly for 7 days. **Children:** • Amoxycillin 20-50 mg/kg 6-8 hourly for 5 days • If the avulsed tooth has been in contact with soil, and if tetanus coverage is uncertain, refer to physician for a tetanus booster. • Initiate root canal treatment 7-10 days after replantation and before splint removal. • Clinical and radiographic control after 4 weeks, 3 months, 6 months, 1 year and then yearly.

3.13.4 Jaw Fracture

Description

A fracture involving the base of the maxilla or mandible and often the alveolar process. The fracture may or may not involve the alveolar socket.

Signs and symptoms

- Malocclusion
- Bleeding from mouth
- Inability to close mouth properly at times
- Severe pain
- Swelling

Causes

Trauma to the maxilla and/or mandible.

Risk factors

- Accidents
- Assaults

Diagnostic criteria and investigations

Clinical investigations

Management

Community level	Health centre level	Hospital level
• **Refer** immediately to health centre	• Attempt to immobilise fracture and to stop bleeding. • **Refer** immediately to hospital	• Treat as HC **AND/OR** • Identification of where bleeding is from if present stop it immediately by applying pressure and immobilising fracture • If patients cannot chew, provide supplements such as Nutren Optimum, Ensure etc. • Suture if there are any wounds • Place Inter Maxillary Fixation (IMF) for 6 weeks with review every 2 weeks • Patient to be on soft diet **Oral hygiene** • Lateral view, lateral obligue and post anterior view • Amoxycillin orally 500mg 8 hourly for 5-7 days **OR** • Amoxycillin-Clavulanic Acid 500/125 mg 8 hourly 5-7 days **Penicillin allergic Adults:** • Erythromycin stearate 500mg orally 6 hourly after meals for 5-7 days **OR** • Azithromycin 500mg immediately, then 250mg 12 hourly for 3-4 days **AND** • Metronidazole 400mg 8 hourly, orally for 5-7 days **AND**

Community level	Health centre level	Hospital level
		• Ibuprofen 200mg -400mg 6 hourly for 5-7 days OR • Paracetamol1g orally 4-6 hourly for 5-7 days

3.13.5 Tooth Intrusion

Description

This is the displacement of the tooth into the alveolar bone. It is often accompanied by fracture of the alveolar bone.

Signs and symptoms

- Severe pain
- Tooth is immobile

Causes

Trauma to the tooth

Risk factors

- Accident
- Assault

Diagnosis and clinical investigation

- Mobility test
- Percussion test
- Sensibility test
- Periapical X-ray

Management

Community level	Health centre level	Hospital level
• Rinse with warm salty water (1/2 teaspoon of salt in a cup of warm water) • Soft diet • Paracetamol 1g every 8 hours for 5 days • **Refer** immediately to health centre	• Treat as CL • **Refer** immediately to hospital	• Treat as HC **AND/OR** • Teeth with immature roots are likely to erupt and therefore no immediate treatment is required. • Teeth with closed epices need orthodontic treatment to facilitate root canal treatment • Pain management • Surgical repositioning is preferable in the acute phase. **Adult:** • Ibuprofen: 200-400mg 6-8 hourly for 5 days

chapter

4

Ear, Nose and Throat Disorders

4.1 Otitis Externa

Description

It is the inflammation of skin of the external ear canal. It is 5 times more common in swimmers than non-swimmers. There are many types of otitis externa according to the cause.

TYPE	DESCRIPTION
Diffuse otitis externa	Diffuse otitis externa. Usually due to a mixed infection, involving one or more of the following organisms; staphylococcus, streptococcus, P.aeruginosa, Proteas species, E. coli. It may also be fungal or viral. **Signs and symptoms** • Itchy, dry, scaly and painful ear canal • There may be a watery or purulent discharge and intermittent deafness. **Cause** • Mixed infections • Skin allergy (allergic dermatitis, often due to shampoo or soap) **Risk factors** • Scratching the ear with contaminated objects e.g. ear-buds, matchsticks, etc. • Swimming (particularly if frequent), • Foreign bodies left in the ear canal (particularly in children) **Diagnostic criteria and investigations** • Based on signs and symptoms • Clinical investigation
Furunculosis otitis externa	Boils (furuncle) in the external ear canal, usually caused by Staphylococcus aureus. **Signs and symptoms** • Presents as severe pain and swelling of the meatal wall **Causes** • Staphylococcus aureas risk factor: • Poor hygiene • Trauma caused by scratching of the external ear canal Diagnostic criteria/and investigations • Based on signs and symptoms • Clinical investigation
	Inflammation of the external ear canal which involves the temporal bone. Pseudomonas aeruginosa and Staphylococcus aureus are often involved. Needs surgical intervention, hence refer to a specialist.

TYPE	DESCRIPTION
Diffuse otitis externa	**Signs and symptoms** • Severe, unrelenting, deep-seated earache • Temporal headaches • Possibly dysphagia, hoarseness, and/or facial nerve dysfunction • Yellow or green drainage from the ear that is persistent and foul smelling • Hearing loss **Diagnostic criteria and investigations** • Based on signs and symptoms • Clinical investigations which may involve laboratory analysis and neurological examination, CT or MRI scan of the head.

Community level	Health centre level	Hospital level
• **Refer** to health centre	• Aural toilet – Just clean the ear canal to remove debris • Apply acidifying solutions such as hydrogen peroxide 6%. • Acetic acid 2% ear drops 3-4 drops 6 hourly for 5 days **Adult:** • Amoxycillin 500mg 8 hourly for 5 days **Children:** • Amoxycillin orally 80-90mg/kg/day 8 hourly for 5 days • Refer to hospital	**1. Diffuse and malignant otitis externa** **Adult:** • Ciprofloxacin orally 500mg12 hourly for 6 weeks **Child:** • Phenoxymethylpenicillin 50mg/kg 6 hourly for 5 days **Patients allergic to penicillin:** • Erythromycin 50mg/kg 6 hourly for 5 days **OR** • Azithromycin10-20 mg/kg for 3 days **AND** • Ciprofloxacin ear drops 3-4drops 8hourly for 7days or more **OR** • Gentamycin ear drops 3-4 drops 8 hourly for 7 days or more **2. Furunculosis** **Adult:** • Cloxacillin orally 500mg 6 hourly for 5 days **Adults allergic to penicillin:** • Erythromycin 6 hourly 500mg for 7 days **OR** • Azithromycin 500mg immediately, then 250mg 12 hourly for 3-4 days

Community level	Health centre level	Hospital level
		Children: • Cloxacillin 12-25mg/kg per dose **OR** **Children allergic to penicillin:** • Erythromycin 10-15 mg/kg per dose **OR** • Azithromycin 10-20mg/kg for 3 days **Refer** both conditions above to specialist if symptoms do not improve after 48 hours of starting treatment.

4.2 Otitis media

Description

A pyogenic bacterial infection in the middle ear. It usually occurs secondary to upper respiratory tract infections and it is most common in children. The common causative bacteria isolated tend to differ depending on the age of the patient.

4.2.1 Acute Otitis Media

This is caused by infection in the middle ear. Usually associated with upper respiratory tract infections especially in children.

Signs and symptoms

- Throbbing earache
- Fever
- Reduced hearing with or without discharge
- There is loss of the light reflex and bulging of the ear drum.

Causes

- Mixed bacterial infections (*Streptococcus pneumoneae, Haemophilus influenzae, Escherichea coli, Pseudomonas aeruginosa, Staphylococcus aureus*)
- Viral infections
- Immunosuppression
- Genetic predisposition
- History of allergies
- Environmental factors e.g unhygienic infant feeding methods
- Passive smoking exposure

Diagnostic criteria and investigations

- Based on signs and symptoms
- Clinical investigations (pneumatic otoscopy, tympanometry, audiometry)

Management

Community level	Health centre level	Hospital level
• Keep the ear dry • Do not instill anything in the ear • No need to plug the ear with cotton wool. • Refer to health centre **Adult:** • Paracetamol 1g 8 hourly for 5 days **Children:** • Paracetamol 20-50mg/kg orally 8 hourly	• Treat as CL **AND/OR** **Adult:** • Amoxycillin orally 500mg 8 hourly for 5 days **Adults allergic to penicillin:** • Erythromycin 500 mg orally every 6 hours for 5 days **OR** • Azithromycin 500mg immediately, then 250mg 12 hourly for 3-4 days **Children:** • Amoxycillin orally 80-90mg/kg/day 8 hourly **Children allergic to penicillin:** • 50mg/kg orally, 6 hourly for 5 days **OR** • Azithromycin 10-20 mg/kg for 3 days • **Refer** to hospital if no improvement after 72 hours	• Treat as HC **AND/OR** **Refer** to ENT specialist if: • Severe ear ache, fever or vomiting, • no response to treatment after 72 hours • Recurrent otitis media • Painful swelling behind the ear or tenderness over the mastoid area • Signs of meningeal irritation such as neck stiffness

4.2.2 Chronic suppurative otitis media

Description

Chronic suppurative otitis media (CSOM) is a perforated tympanic membrane with persistent pus drainage from the middle ear (ie, lasting > 6 – 12 weeks). This is caused by multiple organism infection, which makes antibiotic treatment ineffective

Patients need referral to an ENT specialist.

4.2.3 Otitis media with effusion (glue ear/ OME)

Description

Presence of fluid in the middle ear without signs or symptoms of ear infection. Most common cause of paediatric hearing loss. Not exclusively a paediatric disease. Frequently follows acute otitis media (AOM) in children. Middle ear effusion have been shown to persist following an episode of AOM for 1 month in 40% of children, 2 months in 20%, and >3 months in 10% (i.e. 90% of children clear the fluid within 3 months – observe for 3 months before considering myringotomy and tubes)

Causes

- Cold and flu
- Allergies
- Air irritants and respiratory tract infections

Signs and symptoms

- Conductive hearing loss ± tinnitus
- Fullness – blocked ear
- ± Pain, low grade fever

Risk factors

- Immunosuppression
- Genetic predisposition
- History of allergies
- Environmental factors e.g unhygienic infant feeding methods
- Passive smoking exposure

Differential diagnostics

- Hearing impairment
- Otitis externa
- Teething
- Nasopharyngeal cancer
- Allergic rhinitis
- Bacterial meningitis

Diagnostic criteria and investigations

- Otoscopy of tympanic membrane
- Discolouration – amber or dull grey with "glue" ear
- Meniscus fluid level behind tympanic membrane
- Air bubbles
- Retraction pockets/tympanic membrane atelectasis
- Most reliable finding with pneumatic otoscopy is immobility

Management

Community level	Health centre level	Hospital level
	• **Refer** to hospital	• 90% resolve by 3 months watchful waiting for 3 months from onset, or 3 months from diagnosis if onset unknown • Recommend against intranasal or systemic steroids, systemic antibiotics, antihistamines, decongestants for OME treatment

Community level	Health centre level	Hospital level
		Referral to ENT for: • Surgery • Complications of OME: • HL, speech delay, learning problems in young children • Chronic mastoiditis • ossicular erosion • Cholesteatoma, especially when retraction pockets involve pars flaccida • Retraction of tympanic membrane, atelectasis, ossicular fixation

4.3 Mastoiditis

Description

Infection (usually subperiosteal) of mastoid air cells, most commonly seen approximately two weeks after onset of untreated or inadequately treated acute otitis media (suppurative). More common in children than adults.

Causes

- Acute mastoiditis is caused by the same organisms as acute otitis media: S. pneumoniae, H. influenzae, M. catarrhalis, S. pyogenes, S. aureus, P. aeruginosa, etc.

Signs and symptoms

- Otorrhea
- Tenderness to pressure over the mastoid
- Retroauricular swelling with protruding ear
- Fever, hearing loss, ± tympanic membrane perforation (late)

Differential diagnosis

Basilar skull fracture, cellulitis, cysts

Diagnosis

- Based on clinical findings associated to radiological findings (preferably CT scan)
  CT radiologic findings: opacification of mastoid air cells by fluid and interruption of normal trabeculations of cells (coalescence)
- Swab and blood culture and sensitivity

Management

Community level	Health centre level	Hospital level
• **Refer** to health centre	• **Refer** to hospital	• Ceftriaxone 2g IV 12hourly for 48 hours. • **Refer** if there is failure of treatment and or surgery

4.4 Hearing impairment

Description

Inability of an individual to hear sounds accurately.

Hearing impairment is classified into:

1. Conductive hearing loss
   - conduction of sound to the cochlea is impaired
   - can be caused by external and middle ear disease
2. Sensorineural hearing loss
   - defect in the conversion of sound into neural signals or in the transmission of those signals to the cortex
   - can be caused by disease of the inner ear (cochlea), acoustic nerve (CN VIII), brainstem, or cortex
3. Mixed hearing loss
   - combination of conductive hearing loss and sensoryneural hearing loss

Signs and symptoms

- Deteriorating hearing ability which can be unilateral or bilateral and of sudden or gradual onset.
- Muffling of speech and other sounds.
- Difficulty in understanding words
- Trouble hearing consonants

Causes

- Impacted wax
- Certain drugs e.g aminoglycosides, loop diuretics, antineoplastic agents (cisplatin)
- Head trauma
- Infections: Meningitis (Cryptococcus neoformans and mycobacterium tuberculosis), syphyllis, mumps
- Autoimmune disorder: systemic lupus erythromatosis (SLE), granulomatosis
- Congenital e.g otosclerosis
- Foreign bodies obstructing the canal especially in children

Risk factors

- Age
- Use of earphones

- Noise pollution
- Use of certain medications

Diagnostic criteria and investigations

- Tuning fork tests: Weber test, Rinne test
- Otoscopy
- FBC
- Culture and sensitivity
- LE cells test
- Audiometry

Management

Community level	Health centre level	Hospital level
• Health education (i.e. family health care system to check for foreign bodies, volume control) • Avoidance of noise pollution • **Refer** to health centre	• In case of compacted wax instill arachis oil 6 drops 8 hourly for 3 days into the affected ear • After 72 hours Refer to hospital if no improvement • **Refer** to hospital	• Treat as HC • Ear syringing for impacted ear wax • Stop ototoxic medication if in use (recommend proper dosage and duration of those medications) • For traumatic tympanic membrane perforation, no medication required, it will resolve on its own • For foreign bodies refer to the chapter on emergencies • For infectious and autoimmune causes refer to relevant management. • **Refer** all cases of sensorineural and mixed hearing impairment to the audiologist, also failure of treatment to ENT specialist.

4.5 Vertigo

Description

Illusion of rotational, linear, or tilting movement of self or environment produced by peripheral (inner ear) or central (brainstem-cerebellum) stimulation important to distinguish vertigo from other potential causes of "dizziness"

Signs and symptoms

Symptoms	Peripheral	Central
Imbalance	Moderate-severe	Mild-moderate
Nausea and Vomiting	Severe	Variable
Auditory Symptoms	Common	Rare
Neurologic Symptoms	Rare	Common
Compensation	Rapid	Slow
Nystagmus	Unidirectional Horizontal or rotatory	Bidirectional Horizontal or vertical

Causes

Peripheral causes	Central causes	Mixed central and peripheral causes
- Verstibular neuritis/labyrinthitis - Meniere disease - Benign paroxysmal positioning vertigo (BPPV) - Ethanol intoxication - Inner ear barotraumas - Semicircular canal dehiscence	- Seizure - Multiple sclerosis - Wernicke encephalopathy - Chiari malformation - Cerebrallar ataxia syndromes	- Migraine - Stroke and vascular insufficiency - Cerebellopontine angle tumors (Meningioma, schwannoma) - Infections (lyme disease, syphilis) - Vascular compression - Endocrinopathies e.g. hypothyroidism

Differential diagnosis

- Benign paraxysmal positional vertigo (BPPV)
- Vestibular migraine
- Meniere's disease
- Vestibular neuritis/labyrinthitis

Diagnostic criteria and investigations

- Based on the clinical evaluation/ assessment
    - Positive Dix-Hallpike maneuver the patient is rapidly moved from a sitting position to a supine position with the head hanging over the end of the table, turned to one side at 45°, and neck extended 20° holding the position for 20s, onset of vertigo and rotatory nystagmus indicate a positive test for the dependent side
    - Romberg testing
- Audiometry
- MRI
- Caloric testing

Management

Community level	Health centre level	Hospital level
• **Refer** to health centre	• **Refer** to hospital	• Refer to hospital • Health education on low salt diet intake • Epley manoeuvre (performed by a physician or the patient alone: start by sitting on the edge of the bed turn the head 45 degree to the right quickly lie back keeping the head turned, turn the head 90 degree from right to the left keep it there for 60 seconds, then turn the whole body 90 degree to the left and sit up) • For acute vertigo attack: promethazine 10mg oral 8hourly or diazepam 5mg oral • Referral for all recurrent cases to ENT specialist.

4.6 Sinusitis

4.6.1 Acute sinusitis

Description

Bacterial infection of one or more sinuses that occurs commonly following a viral infection of the upper respiratory tract (URT) or allergic rhinitis.

Signs and symptoms

- Sudden onset of nasal congestion
- Fever
- Headache
- Purulent nasal discharge
- Facial pain and tenderness over one or more sinuses
- Halitosis
- Snoring
- Hyposmia

Causes

- Viral infections (Rhinovirus, Corona virus, Influenza A and B, Parainfluenza, Respiratory syncytial virus, Adenovirus, Enterovirus).
- Bacterial infections (Streptococcus pneumoniae, Pseudomonas aureginosa, Haemophilus influnzae, Streptococcus pyogenes, Staphylococcus aureus).

- Fungal infections (Aspergillus spp)
- History of occupational or allergic rhinitis
- Immunosuppression
- Rhinitis medicamentosa
- Nasal polyps

Diagnostic criteria and investigations

- Based on signs and symptoms
- Clinical investigation
- Maxilliary X-ray

Management

Community level	Health centre level	Hospital level
• Health education • Steam inhalation • Paracetamol 500mg-1g 6-8 hourly when necessary • **Refer** to health centre	• Treat as CL **AND/OR** **Adults:** • Amoxycillin orally 500mg 8 hourly for 5-7 days **AND** • Sodium chloride 0.9% nasal drops 3-4 hourly for 5 days **Child:** • Amoxycillin 80-90mg/kg 8 hourly for 5-7days **AND** • Sodium chloride 0.9% nasal drops 3-4 hourly for 5 days • **Refer** to hospital if no improvement after 5 days	**Adult:** • Clindamycin orally 150-300mg 6 times a day for 10-14 days **AND** • Oxymetazoline nasal drops 0.05% 2 drops in each nasal cavity 8-12 hourly **Child:** • Clindamycin 3-6mg/kg every 6 hours for 5-7 days. • Oxymetazoline nasal drops 0.025% 2 drops in each nasal cavity 8-12 hourly OR • Xylometazoline 0.05% nasal spray 2 drops in each nasal cavity 8-12 hourly **Note:** Avoid prolonged use as it may result in rebound congestion **Refer** to ENT specialist if: • Not resolving after the above treatment. • Fever lasting longer than 48 hours • Poor response after a week's treatment • Presence of dental focus of infection • Sinusitis proceeded by swelling over the fore-head or periorbital swelling • Recurrent sinusitis • Signs of meningeal irritation or cortical cavernous thrombosis

4.6.2. Chronic sinusitis

Description

Presents with facial pain or headache, nasal congestion and post nasal drip. Offensive nasal discharge may last up to 3 months. It may start suddenly as an upper respiratory tract infection or as acute sinusitis that does not resolve insidiously over months or years.

Signs and symptoms

- Symptoms are similar to that of acute sinusitis except for fever and facial pain which are usually absent in chronic sinusitis. However, low grade fever may be present.

Causes

- Bacterial infection (Staphylococcus aureus, *Haemophilus influenza, Streptococcus pneumonia, Pseudomonas aeruginosa,* anaerobic bacteria)
- Fungal infections *(Aspergillus spp, Candida spp, Cryptococcus neoformans)*

Risk factors

- Allergic rhinitis
- Aspirin sensitivity
- Asthma
- Nasal polyps
- Smoking
- Environmental irritants and pollutants
- Gastroesophagealreflux disease
- Nasogastric intubation

Diagnostic criteria and investigations

- Nasal rhinoscopy
- CT and MRI scan.

Refer such cases for further evaluation by ENT specialist

4.7 Allergic Rhinitis

Description

Recurrent inflammation of the nasal mucosal due to hypersensitivity to inhaled allergens such as, pollen, house dust, cat and dog dander, fleas, cockroaches, grasses and animal proteins.

Signs and symptoms

- Blocked/stuffy nose
- Watery nasal discharge
- Excessive/frequent sneezing
- Nasal itching and irritation, itchy eyes
- Oedematous pale pink/grey nasal mucosa
- Mouth breathing
- Snoring

- Allergen exposure
- Environmental hazard
- Smoking

Risk factors

- Asthma
- Family history

Diagnostic criteria and investigations

- Clinical and physical investigation
- Based on signs and symptoms

Management

Community level	Health centre level	Hospital level
• Encourage plenty of fluids • **Refer** to health centre	• Treat as above **AND/OR** • Identification and control/ removal of potential allergens. **Adult:** • Chlorpheniramine orally 4mg every 6-8hourly for 5 days **OR** • Cetirizine orally10mg 24 hourly for 5days for work and school efficiency **OR** • Loratadine 10mg orally 24 hourly **Child:** • Chlorpheniramine 1-2mg 6-12 yrs every 6-8 hourly for 5 days **OR** • Cetirizine 5mg/5ml once daily for children aged 2-6years school efficiency **OR** • Loratadine 2.5mg-5mg/5ml OD • **Refer** to hospital if symptoms persist	• Treat as above **AND/OR** • Budesonide nasal spray 2 sprays in each nostril 8 hourly for adults and children older than 12 years **OR** • Beclomethasone nasal spray – 1 spray in each nostril 8 hourly a day. **Refer** to ENT specialist: • Patients with chronic persistent symptoms. • Patients with severe symptoms.

4.8 Nose bleed (epistaxis)

Description

Defined as acute haemorrhage from the nostril, nasal cavity or nasopharynx

Signs and symptoms
- Bleeding nose

Causes
- Local or systemic diseases or local trauma.
- Allergies (hay fever/cold)
- Blood disorder
- Renal failure
- Hepatic failure
- Foreign body
- Picking of the nose
- Hypertension
- Bleeding tendency
- Medication (anticoagulants)

Diagnostic criteria and investigations
- Clinical investigations
- Based on signs and symptoms
- Perform CBC, prothrombin time (PT), and partial thromboplastin time in patients with severe or recurrent epistaxis.

Management

Community level	Health centre level	Hospital level
• Pinching the nasal wings (alae) together for 3 minutes without peeking (insert nasal tampons if this fails) • Keep head elevated • Cold compresses • **Refer** to health centre if bleeding does not stop	• Treat as CL and/or • Anterior nasal packing by far posterior as far as possible vaseline gauze or iodine soaked gauzes • Put rolled dry gauze on the nose and plaster it. • For children, give vitamin K (Phytomenadione) 2mg IM. • For adults – Check BP and Refer to hospital. **Refer** to hospital urgently if; • Recurrent nose bleeds • Failed attempt to stop the present bleed	• Treat as HC **AND/OR** remove the packs after 72 hours Amoxycillin 500mg 8 hourly for 5days **AND** Paracetamol 1g 8 hourly for 5days **AND** Tranexamic Acid 500mg 8 hourly for 3 days. • Treat underlying causes

4.9 Foreign bodies in the ear and nasal cavity

Description
Foreign bodies (FB) are common, particularly among children, who often insert objects particularly beads, erasers, and beans, into the ear canal and nose.

Classification

FB are classified into non-living and living FB

- Non-living can be organic or non-organic (e.g. beans)
- Living FB can be insects, ticks and magots

Signs and symptoms

- Foreign bodies in the ear may remain unnoticed until they provoke an inflammatory response, causing:
  - Pain
  - Itching
  - Infection
  - Foul-smelling
  - Purulent drainage
- Foreign body in the nose can cause infection, obstruction, nose bleeding, sneezing

Diagnostic criteria

Otoscopy and use of nose speculum under a good source of light

Management

Community level	Health centre level	Hospital level
• **Refer** to health centre	**Ear foreign body (FB)** • Health education • Living FB: arachis oil or lidocaine to kill, then removal by ear syringing or use of crocodile or tilley's forceps • Non-living non organic FB: use a magnet to withdraw the metallic FB. Use ear syringing for other FB • Non-living organic FB: avoid water because it will swell up, use crocodile or tilley's forceps with good light **Nasal foreign body** • Health education • Close the patient's mouth and other nostril and tell patient to blow or sneeze out the FB • Kiss and blow technique (cover mouth with the lips, block the unaffected nostril then blow forcefully so that the FB is pushed out through the nostril) • If these measures fail **Refer** to hospital.	• Treat as HC • First try to remove with a bent paper clip or hairpin • Try to remove FB with tilley's or crocodile forceps with good light • **Refer** if the foreign body is not removed or is dislodged in the bronchus, trachea or hypopharynx.

4.10 Tonsillitis

Description
Inflammation of the tonsils characterised by fever and painful throat.

Signs and symptoms
- Runny nose
- Dry cough
- Rash
- Painful red throat
- Enlarged inflamed tonsils
- Tender anterior cervical lymphadenopathy
- Fever
- Halitosis
- Dysphagia

Causes
- Betahaemolytic streptococcus (Streptococcus pyogenes)
- Epstein –Barr Virus (EBV)

Risk factors
- Climatic changes (coldness)
- Age especially children

Diagnostic criteria and investigations
- FBC
- Throat swab culture
- Based on signs and symptoms

Management

Community level	Health centre level	Hospital level
• Gargle with warm salty water • Don't give to children under 8 years (can't gargle) • Adequate hydration • Avoid irritants into the nose **Adult:** • Give paracetamol 500mg – 1g 8 hourly for 5 days	Treat as CL **AND/OR** Adult: • Benzathine penicillin 1.2 MU IM stat; **AND** • Phenoxymethylpenicillin oral, 500mg 6 hourly for 10 days; **OR** • Amoxycillin 500mg 8 hourly for 10 days **Adults allergic to penicillin:** • Erythromycin orally 500mg every 6 hourly for 10 days **OR**	• Treat as HC **AND/OR** **Refer** to ENT specialist if: Tonsillitis accompanied by: • Difficulty in opening the mouth. • severe difficulty in breathing and muffled speech • Suspected acute rheumatic fever • Chronic/recurrent tonsillitis (3 or more episodes of tonsillitis in a year) • History of previous rheumatic fever or rheumatic heart disease

Community level	Health centre level	Hospital level
Child: • Give paracetamol 15mg/kg 8 hourly for 5 days • **Refer** to health centre	• Azithromycin 500mg immediately, then 250mg 12 hourly for 3-4 days **AND** • Acetylsalicylic Acid gargles 12 hourly 300 - 600mg of aspirin dissolved in half a glass of water **OR** • Thymol or Chlorhexidine gargle 10ml in 125ml warm water gargle PRN **AND** • Paracetamol, oral 1g 4-6 hourly when required **Child:** • Benzathine penicillin<15 kg 300,000 units, ≤ 27 kg 600,000 units IM stat **AND** • Phenoxymethyl penicillin 11-35 kg 250mg per dose, 35-55 kg 250-500mg for 10 days **OR** • Amoxycillin 11-17 kg 125mg per dose; 17-35 kg 250mg per dose **Children allergic to penicillin:** • Erythromycin 10-15mg/kg per dose for 10 days **OR** • Azithromycin: 10-20mg/kg for 3 days • Paracetamol 15 mg/kg per 4-6 hourly when required.	• Heart murmurs not previously diagnosed

4.11 Peritonsillar abscesss

Description

Peritonsillar abscess or quinsy is a collection of pus lateral to the tonsil, i.e.underneath it, pushing it toward the midline. Infections are often polymicrobial, usually a complication of tonsillitis.

Signs and symptoms

It typically presents with trismus, sore throat and dysphonia (hot potato voice or muffled voice). Other symptoms include:

- Fever and dehydration
- Dysphagia, odynophagia, and drooling
- Extensive peritonsillar swelling but tonsil may appear normal
- Oedema of soft palate
- Uvular deviation

- Unilateral referred otalgia
- Cervical lymphadenitis

Diagnostic criteria

Visually examine the mouth and throat to diagnose a peritonsillar abscess.

Management

Community level	Health centre level	Hospital level
• Gargle with warm salty water • Don't give to children under 8 years (can't gargle) • Adequate hydration • Avoid irritants into the nose **Adult:** • Give paracetamol 500mg – 1g 8 hourly for 5 days **Child** • Give paracetamol 15mg/kg 8 hourly for 5 days • **Refer** to health centre	• Treat as CL and/or Antibiotics total duration of therapy: 10 days. • Amoxycillin/clavulanic acid, oral, 875/125 mg 12 hourly **OR** **Severe penicillin allergy:** • Clindamycin, oral, 450 mg 8 hourly. **For pain:** NSAID, oral: e.g. • Ibuprofen, oral, 400 mg 8 hourly with or after a meal.	Treat as HC **AND/OR** Total duration of therapy: 10 days. • Amoxycillin/clavulanic acid, IV, 1.2g 8 hourly. • Follow with oral therapy as soon as patient can swallow and the temperature is <37.8˚C for 24 hours: • Amoxycillin/clavulanic acid, oral, 875/125mg 12 hourly. **Severe penicillin allergy:** • Clindamycin, IV, 600mg 8 hourly. • Follow with oral therapy as soon as patient can swallow and the temperature is <37.8˚C for 24 hours: • Clindamycin, oral, 450mg 8 hourly. **For pain:** • Ibuprofen, oral, 400mg 8 hourly with or after a meal. • Surgical measures • Secure airway • Drainage of pus is the most important intervention. **There are 3 main methods:** • needle aspiration of pus • incision and drainage of abscess • tonsillectomy, either unilateral or bilateral. • Refer all for ENT and/or anaesthetic review. **Urgent if:** • Signs of airway compromise (e.g. stridor)). • Suspicion of infective spread beyond the peritonsillar space.

4.12 Epiglottitis

Description

Acute inflammation causing swelling of supraglottic structures of the larynx without involvement of vocal cords. This is a medical emergency.

Causes

- H. influenzae type B
- Common causes now include S. pneumoniae and S. aureus
- Non-infectious insults (trauma, chemicals, heat)

Signs and symptoms

- Can affect any age, most commonly 1-4 years
- Rapid onset
- Toxic-looking, fever, anorexia, restlessness
- Cyanotic/pale, inspiratory stridor, slow breathing, lungs clear with decreased air entry
- Prefers sitting up ("tripod" posture), open mouth, drooling, tongue protruding, sore throat, dysphagia

Diagnostic Criteria

- Diagnosis is often clinical but examining the throat may lead to potential laryngospasm and airway compromise; ensure an anesthesiologist/otolaryngologist is present and make preparations for intubation or tracheotomy prior to any manipulation
- WBC (elevated), blood, and pharyngeal cultures after intubation
- Lateral neck radiograph (only done if patient stable) shows "thumb sign"

Management

Community level	Health centre level	Hospital level
• Epiglottitis must be treated in the hospital as a medical emergency. **Refer** to hospital	• Epiglottitis must be treated in the hospital as a medical emergency. **Refer to hospital**	• Secure airway • IV access with hydration • Humidified oxygen. • extubate when leak around tube occurs and afebrile • watch for meningitis **Antibiotic therapy** Total duration of therapy: 10 days. • Ceftriaxone, IV, 1 g daily. For paediatric 80mg/kg/dose once daily • Follow with oral therapy as soon as patient can swallow and the temperature is <37.8˚C for 24 hours, to complete the 10-day course:

Community level	Health centre level	Hospital level
		• Amoxycillin/clavulanic acid, oral, 875/125mg 12 hourly. For paediatric 30mg/kg/dose of the amoxycillin component 8 hourly **Severe penicillin allergy to amoxycillin/clavulanic acid, oral:** • Azithromycin, oral, 500mg daily for 3 days. For paediadric 10mg/kg daily maximum 500mg **Acute stage : Imminent airway obstruction:** • Hydrocortisone, IV, 100mg immediately as a single dose **AND** • Adrenaline (epinephrine) 1:1 000, 1 mL nebulised. • Dilute to 5 mL with sodium chloride 0.9% and administer 4–6 hourly

4.13 Laryngitis

Description

An infectious or non-infectious, acute or chronic inflammatory condition of the larynx

4.13.1. Acute laryngitis

This is infection of the larynx, usually caused by viruses.

Signs and symptoms

- Hoarseness of voice
- Sore throat
- Painful dry cough

Causes

- Fungi
- Viruses (rhino virus, para-influenza virus, respiratory syncytial virus, adeno-virus, influenza virus, measles virus, mumps virus, varicella-zoster virus)
- Lanryngeal reflex disease
- Trauma
- Thermal injuries e.g. drinking hot water

Risk factors

- Accidents
- Change in the environmental pollutants
- Cigarette smoking

Diagnostic criteria and investigations

- Based on signs and symptoms

Management

Community level	Health centre level	Hospital level
• Drink plenty of water and strict vocal rest. • Rest the voice • Steam inhalation • Honey and lemon with warm water **Adult:** • Paracetamol 1g 8 hourly for 5 days **Child:** • Paracetamol 15mg/kg 8 hourly • Refer to health centre if no improvement in 3 days	• Treat as CL **AND/OR** **Adult:** • Amoxycillin orally 500mg every 8 hours for 7 days **Adults allergic to penicillin:** • Erythromycin 500mg 6 hourly for 7days **OR** • Azithromycin 500mg immediately, then 250mg 12 hourly for 3-4 days **Child:** • Amoxycillin 15mg/kg 8 hourly for 7 days **Children allergic to penicillin:** • Erythromycin 30mg-50mg/kg/day 6 hourly for 7 days **OR** • Azithromycin 10-20 mg/kg for 3 days	• Treat as HC **AND/OR** refer to specialist **Chronic laryngitis** • If the symptoms including hoarseness persist for more than one month, direct laryngoscopy is required refer to an ENT specialist

chapter

5

Endocrine Conditions

5.1 Diabetes mellitus

Description

Type II Diabetes Mellitus (T2DM) is a clinical syndrome characterised by hyperglycemia (persistently higher blood glucose values than the normal range) due to deficiency or diminished effectiveness of insulin.

Type I diabetes (about 5-8% of cases)	Type II Diabetes Mellitus (T2DM) (90-95% of all cases)
An autoimmune condition in which the immune system destroys the cells in the pancreas that produce insulin	A metabolic condition in which the body fails to produce insulin and the body cells resist insulin action
Prevention	
No known prevention or cure	Genetic predisposition, but evidence indicates weight loss can prevent it
Onset	
Usually develops in childhood and adolescence	Usually develops in adulthood but increasingly being diagnosed in children under 15 years
Lifestyle	
Unrelated to lifestyle	Usually associated with poor diet and excess body weight
Self-Management	
Requires daily, often multiple insulin injections or a continuous delivery of insulin with a pump. Meticulous attention to blood glucose levels Healthy lifestyle choices contribute to effective management	Good weight control, nutrition and monitoring of blood glucose levels. As the condition progresses, people may require oral medication and insulin therapy.
Complications and life expectancy – both types:	
Blindness and nerve damage Heart disease, stroke, kidney disease, periodontal disease	Amputation of a foot or lower leg, dialysis, kidney transplants, loss of teeth Reduced life expectancy

Other classes of diabetes

There are other main clinical classes of diabetes: gestational diabetes and specific types due to other causes such as genetic defects or cystic fibrosis. Gestational diabetes occurs when women during pregnancy develop a high blood glucose level. While the condition usually resolves after the birth of the baby, the mother is at a higher risk of developing type 2 diabetes in the future and needs ongoing screening.

Pancreatic diabetes - a form of secondary diabetes specifically that is associated with disease of the exocrine pancreas. The most common disease of the exocrine pancreas associated with the development of diabetes is chronic pancreatitis.

Pre-diabetes is a condition with elevated blood sugar levels not yet reaching the diabetic threshold. It may precede the development of T2DM.

Signs and symptoms

Diabetes is often asymptomatic. Therefore, screening should be conducted in patients at risk even if no symptoms are present.

Symptoms of diabetes	
• Thirst • Frequent urination • Blurring of vision • Fatigue	• Nocturia • Polydypsia • Wounds on skin that do not heal quickly • Passing frothy urine
Signs of diabetes	
• Unintentional weight loss • Signs of acute metabolic deterioration (signs of severe dehydration, kussmaul's respiration, vomiting, altered level of consciousness or coma, confusion, convulsions • Clinical signs of chronic complications (acute coronary disease, stroke, kidney disease, vision loss, diabetic foot)	

Risk factors

Type 1

Mostly young people
Genetic causes/autoimmune conditions

Type 2

- Age
- Obesity
- Smoking, alcohol
- Family history
- Hypertension
- History of gestational diabetes
- Medication (e.g. glucocorticosteroids)

Screening Criteria

For blood glucose screening and diagnosis, venous or capillary blood may be used interchangeably

- Screen all patients that are presenting with symptoms of diabetes
- Screen asymptomatic patients with one or more of the following criteria:
  - BMI of 25 or above
  - Aged 40 years or above
  - First-degree relative with diabetes
  - Dyslipidemia (elevated cholesterol)
  - Hypertension
  - Polycystic ovary syndrome
  - Prior gestational diabetes

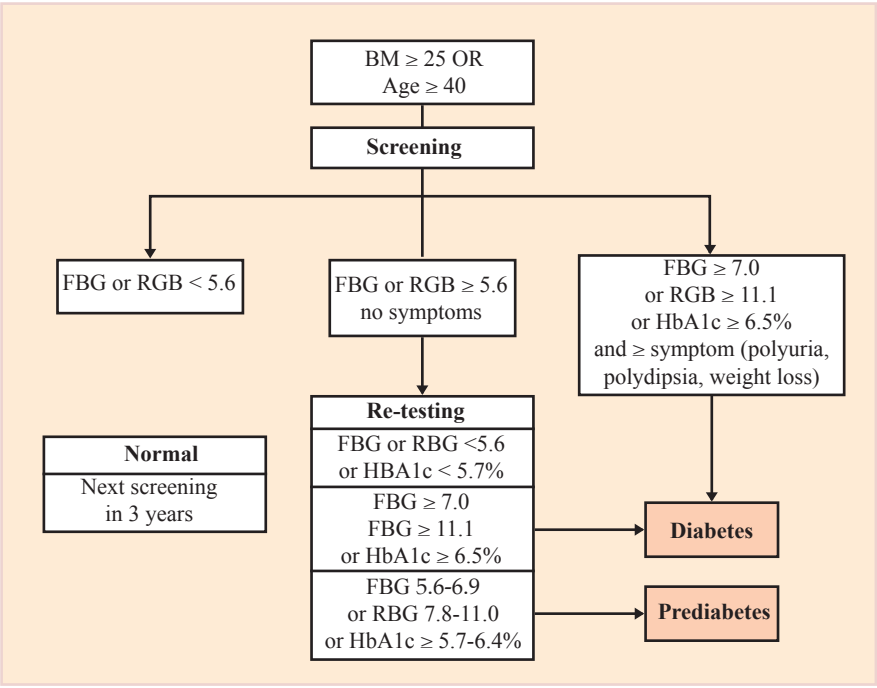


Figure 5.1 Screening and diagnosis for (pre)diabetes BG: Blood Glucose, FBG: Fasting BG, RBG: Random BG, BMI: Body-Mass Index. Preferably use FBG or HbA1c for diagnosis of Pre-diabetes, as RBG might not always be accurate.

Criteria for diagnosis

Measurement	Threshold	Comments
Random blood glucose (RBG)	≥11.1 mmol/l	Only in the presence of classic symptoms (polyuria, polydipsia, weight loss)
Fasting blood glucose (FBG)	≥7 mmol/l	Fasting is defined as no calorie intake for 8 hours or more
HbA1c	≥6.5%	

Diagnostic criteria pre-diabetes

Measurement	Threshold	Comments
Fasting blood glucose (FBG)	5.6 – 6.9 mmol/l	Fasting is defined as no calorie intake for 8 hours or more
HbA1c	5.7 – 6.4%	Fasting is defined as no calorie intake for 8 hours or more

Investigations after diagnosis

- Urine analysis (multistick)
- Ketones to check for ketoacidosis
- Proteins to check for kidney damage plug microalbumin
- Glucose
- Blood tests
- Lipid profile
- Creatinine to estimate GFR
- Urea and electrolytes
- Body weight and height to calculate BMI
- Blood pressure for hypertension screening

Monitoring at every visit

Enquire about

- Symptoms of hypoglycaemia and, symptoms of microvascular and macrovascular complications
- Changes in medication
- Changes in weight, physical activity, diet, smoking and alcohol
- Mood and symptoms of depression
- Impact of diabetes on occupation, driving
- Results of self-monitored blood glucose if available

Examination

- Blood glucose (finger prick)
- Eye examination
- Weight, height, BMI
- Blood pressure and cardiovascular examination
- Inspect insulin injection sites, inspect feet and look for signs of peripheral neuropathy

Measure HbA1c if available

- 6-monthly in patients who meet treatment goals, and
- 3-monthly in patients whose control is sub-optimal or if therapy has changed, until stable.

Note: Monitoring of HbA1c implies that active clinical management will be implemented if the level is sub-optimal.

Annually

Examination:

- Examine visual acuity and conduct fundoscopy to screen for retinopathy and cataract (bi-annualy if no retinopathy in previous fundoscopy)
- Examine the cardiovascular system for signs of macrovascular disease (i.e. pulse status)
- Examine for peripheral neuropathy. Laboratory tests:
- Creatinine for eGFR estimate (do twice per year if eGFR 30-60ml/min or if urinary albumin >300mg/g creatinine
- Spot urine albumin/creatinine ratio microalbuminuria is defined as 2.5 to 25mg/mmol in men, and 3.5 to 35mg/mmol in women) or multistick if ACR not available

Non-glycaemic targets: - Body mass index ≤ 25 kg/m2. - BP ≤ 130/80 mmHg

Management of Type 1 Diabetes

i. Hospital Level

Treatment targets

HbA1c	< 7% (53mmol)[a]
	< 8% (64mmol/mol) for patients with history of severe hypoglycermia or comorbid diseases[a]
	< 65% (48mmol/mol) for selected patients (shot duration of diabetes, long life expectancy, or no significant cardiovascular disease) if it can be achieved withour significant hypoglycemia or adverse events[a]
FPG or preprandial PG	4.4–7.2mmol/L (80–130mg/dL)
Peak postprandial PG[b]	<10mmol/L (180mg/dL)

Figure 5.2 Treatment targets for Type 1 and Type 2 Diabetes

Community level	Health centre level	Hospital level
• Adherence support for patients under treatment • Be aware of the signs of hypoglycemia as patients under insulin treatment are at high risk for hypoglycemia (see chapter Hypoglycemia) • Give sweetened beverage or sugar to patients with signs of hypoglycemia and refer to the health centre • Regular home glucose monitoring where possible Education on insulin therapy: • Adherence counselling • Types of insulin • Injection technique and sites of injection • Insulin storage • Recognition of treatment complications, especially hypoglycemia • Dietary modifications relative to insulin therapy • Include healthy snacks (i.e. fruits, plain yogurt) between meals • Always have a sugared snack or drink with you to take in case of symptoms of hypoglycemia	• Treat as CL and/or • If blood glucose ≥15 mmo/L rehydrate with normal saline 0.9% IV 1 litre in first hour then 1 litre over the next 2 hours. **Refer** to hospital: • Patients with chronic kidney disease • Suspected secondary gout	**Insulin therapy (for T1DM)** Type 1 diabetes always requires insulin treatment. There are two main regimens for insulin therapy in type 1 diabetes. **Intensified insulin therapy** The intensified regimen consists of once or twice daily injections of a long (or intermediate)-acting basal insulin (i.e. insulin degludec, glargine, detemir or NPH) and injections of a short-acting insulin (i.e. insulin aspart, lispro, glulisine or shortacting: regular/neutral) three times per day 0-15 minutes before meals. The intensified therapy allows for meal to meal dose adjustments depending on food intake, and pre-prandial blood glucose levels. The intensified therapy is the preferred option, as it leads to better blood glucose control, but it requires good patient education and adherence. • About 40% of the insulin requirements should be covered by the long-acting basal injections and about 60% by the short-acting boluses • Start with 0.34 IU/kg per day of long-acting basal insulin, adjust according to table • Short-acting boluses are calculated based on carbohydrate content of the meals (1 IU for every 10 grams of carbohydrate) and adjusted according to pre-prandial blood glucose levels (see table)). If the dose calculation is not feasible, fixed doses of short-acting insulin can be dose) and evening dose (1/3 of total dose)

Community level	Health centre level	Hospital level
• Managed with insulin injections that are adjusted according to each patient's individual needs.	• Treat as CL and/or • If blood glucose ≥15 mmo/L rehydrate with normal saline 0.9% IV 1 litre in first hour then 1 litre over the next 2 hours. **Refer** to hospital: • Patients with chronic kidney disease • Suspected secondary gout	• Inject about 30 minutes prior to the meal • Use HbA1c, fasting blood glucose, self-monitored blood glucose or random blood glucose (if the other options are not available) for monitoring and dose adjustments (refer to table above for dose adjustments based on fasting plasma glucose) **Children:** used. • Long-acting basal insulin should be adjusted according to the fasting plasma glucose (see table) Initiation and monitoring at a tertiary institute is preferable. **Conventional insulin therapy** If the intensified therapy is not possible, then the conventional insulin therapy may be used. The conventional therapy consists of injections of mixed insulin (i.e. actraphane/protaphane) in the morning and in the evening. The conventional therapy is easier to handle for patients and providers, but glycemic control is usually not as good as with the intensified therapy. • Start with 0.6 IU/kg per day divided in morning dose (2/3 of total Total daily insulin requirement is around 0.3 units /kg body weight/ day (aprox. 40% basal and 60% meal time bolus, higher doses probably are needed in pubertal children)

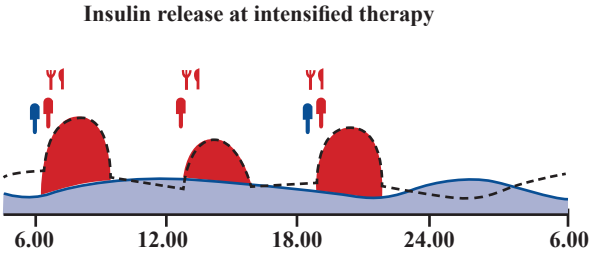


Figure 5.3 Intensified insulin therapy with long-acting basal insulin (blue) and short-acting bolus insulin before the meals (red)

Pre-prandial blood glucose (mmol/l)	Adjustment of bolus insulin (IU)
<4.4	-2
4.5-5.5	No change
5.6-7.7	+2
7.8-9.9	+4
>9.9	+6

Adjustment of bolus insulin according to pre-prandial blood sugar levels

Pre-prandial blood glucose (mmol/l)		Adjustment of bolus insulin (IU)
> 8.9		-2
7.8-8.8		No change
6.7-7.7		+2
5.6-6.6		+4
4.4-5.5		
3.3-4.3	-2	
<3.3	-4	

Table 5.4 Dose adjustment of basal insulin depending on morning fasting blood glucose

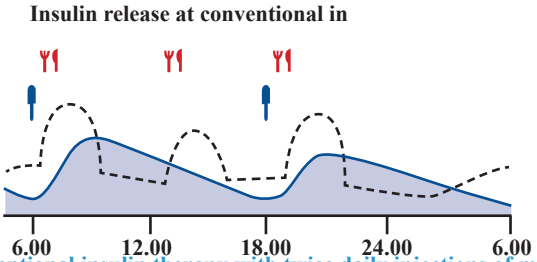
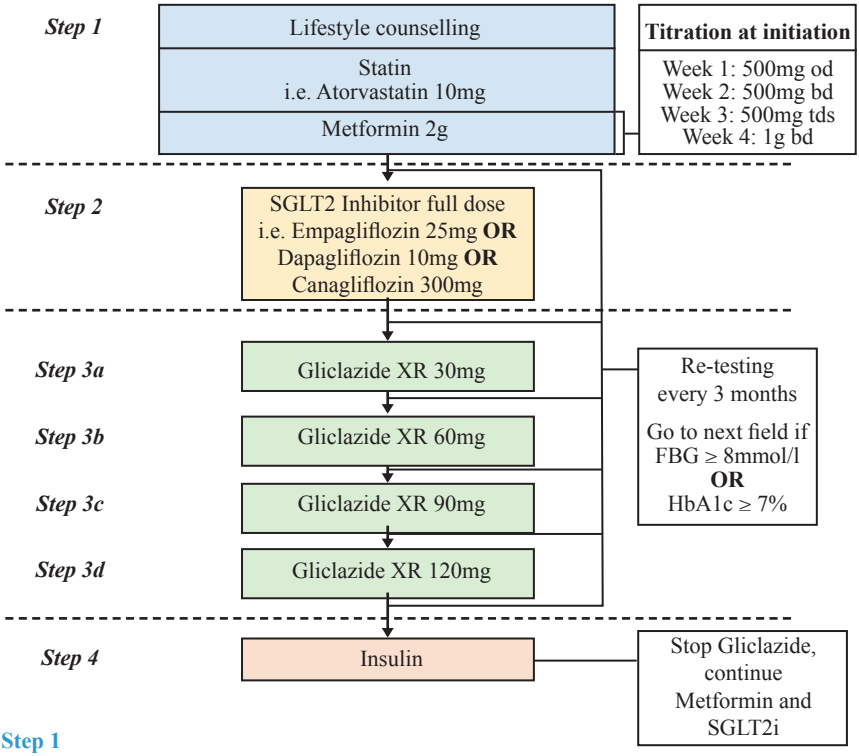


Figure 5.5 Conventional insulin therapy with twice daily injections of mixed insulin (blue). Glucose peaks (dashed line) are sub-optimally covered.

Preparation	Onset of action (min)	Peak onset of action (hr)	Duration of action (hr)	Dosing
Short-acting	0-30	2-5	5-8	Up to 8 hourly (30 min before meals)
Intermediate–acting	60-180	1-3	10-16	Daily requirement in 12-24 hourly
Long-acting	0-30	2-12	20-24	24 hourly

Management of diabetes mellitus type 2



Step 1

Lifestyle counselling according to the following principles:

- Abstain from smoking
- Avoid excess alcohol intake
- Adhere to a healthy diet:
  - limit daily calorie intake to maintain a healthy bodyweight (BMI 20-25)
  - avoid sugar, sweets and sweetened beverages
  - choose high-fibre and low-glycemic index foods

- eat 3-5 daily portions of vegetables AND/OR fruits
- avoid fried food and fatty meat

- Increase physical activity
  - start with physical aerobic activity for 30 minutes at least every second day
  - if possible increase to a more intensive physical activity programme
- Reduce salt intake
- Avoid snacking between the meals

Statin: See instructions below (management of comorbidities)
Metformin: Titrate in weekly steps to 2g per day (no BG measurements needed in between). Counsel patients on common side effects (nausea, stomach ache, diarrhoea that usually improve within a few days). If 1g pills are not available, give 500mg qds or 850mg tds instead.

Metformin
Metformin is contraindicated in:
- people with chronic kidney disease (estimated glomerular filtration rate (eGFR) <30 mL/minute/1.73m2)
- people with severe reduced liver function
- people with acute cardiac insufficiency
- people with respiratory insufficiency
- people who abuse alcohol
- people with history of lactic acidosis

Step 2
Maintain step 1 and add SGLT2 inhibitor if blood sugar after 3 months remains above target (i.e. FBG >7.2mmol/l).
*If SGLT2 inhibitor is not available go to step 3. Prioritise patients with CKD, CVD or heart failure for treatment with SGLT2i inhibitors if availability is limited.

Step 3
Maintain step 1 and 2 and add 30mg of Gliclazide XR if blood sugar after 3 months remains above target. Measure FBG or HbA1c every three months and increase Gliclazide XR in steps of 30mg daily if blood sugar remains above target. Use Gliclazide 40mg MR instead of 30mg XR, if XR is not available. Use Gliclazide XR 60mg pills if available to reduce pill burden for daily doses of 60mg and higher.

Step 4
If glycemic targets are not met after step 3, insulin treatment is required. It is recommended to continue with metformin and SGLT2i to reduce the dose of insulin required. Discontinue Gliclazide when starting with insulin. Use a basal supported therapy (BOT) with once daily application of long-acting insulins (i.e. glargin, degludec or detemir). Start with 10-12 IU and titrate dose in steps of 2-4 IUs according to FBG levels to reach treatment target. Alternatively, a conventional insulin regimen with twice daily application of mixed insulin or a basis-bolus regimen with multiple daily injections (see management of Type 1 diabetes for details)

CAUTION

Sick day rule: Oral antidiabetics (metformin, gliclazide and SGLT2 inhibitors) should be paused if patients present with an acute illness (i.e. fever or severe diarrhoea). Patients requiring hospital admission should be switched to insulin therapy in case of acute illness.

Hypoglycemia: Patients receiving gliclazide or insulin are at risk of potentially life-threatening hypoglycemia. Patient education, monitoring and dose adjustment are essential.

Severe hyperglycemia: Patients with very high sugar levels at baseline (FBG >14 mmol/l, RBG > 16.7 mmol/l) and/or symptoms (polyuria, polydipsia and weight loss) should receive initial insulin treatment.

Community level	Health centre level	Hospital level
• Adherence and life-style counselling • Assistance with home-based blood sugar measurement	• Initiate step 1 of the treatment algorithm below (lifestyle counselling, metformin, statin) • Refer all new cases with fasting blood glucose ≥14 mmol/l or random blood glucose ≥16.5 mmol/l and/or relevant ketonuria to hospital for initiation of insulin treatment.	Treat as CL and HC and follow all steps

In the elderly, the increased risk of hypoglycaemia must be weighed against the potential benefit of reducing microvascular and macrovascular complications. In patients with severe target organ damage, therapy should be tailored on an individual patient basis and should focus on avoiding hypoglycaemia.

Management of co-morbidities

Diabetic patients are 2 – 4 times likely to develop cardiovascular disease than people without. Good control of cardiovascular Risk factors is of utmost importance.

- **Hypertension**
  - Target <130/80 mmHg (not <120 systolic)
  - Always use an ACE inhibitor or an angiotensin-receptor blocker to prevent kidney damage if no contraindications (i.e pregnancy). Also give ACE inhibitor or angiotensin-receptor blocker if proteinuria without hypertension
- **Blood lipids**
  - Target: LDL < 1.8 mmol/l
  - All diabetes patients should receive a statin (prefer atorvastatin, otherwise use pravastatin or simvastatin)
  - If LDL measurement is not available, prescribe statin in the following doses: atorvastatin 10mg, simvastatin 20mg, pravastatin 40mg)
- **Acetylsalicylic acid**
  - Give acetylsalicylic acid to patients with known cardiovascular disease. (Use clopidogrel in case of contraindication against aspirin)

Management of pre-diabetes

Patients with pre-diabetes are at increased cardiovascular risk and at risk to develop diabetes.

- Investigate and treat comorbidities as above
- Lifestyle counseling as above
- 3-monthly check-ups with weight control to check adherence to lifestyle changes and blood glucose control (fasting blood glucose at every visit, HbA1c yearly) for early detection of progression to diabetes
- Consider metformin in presence of additional risk factors such as hypertension, hyperlipidemia, obesity or family history of diabetes

Chronic complications

- Cardiovascular disease
- Peripheral vascular disease e.g. foot gangrene
- Retinopathy
- Nephropathy
- Neuropathy
- Recurrent infections

Acute complications: Diabetic keto-acidosis
Refer to specialist if not controlled.
Women of child-bearing age: Good glucose control is essential for reducing the risk of diabetes complications during pregnancy and of congenital abnormalities. Specific counselling including family planning should be provided.

5.2 Hypoglycaemia

Description

A clinical condition due to reduced levels of blood sugar (glucose). Hypoglycemia primarily occurs in patients with diabetes under treatment with insulin or sulfonylureas (i.e. glibenclamide or gliclazide) due to overdosing of medication or reduced calorie intake without dose adjustment.

Definition

Blood sugar level (BSL) < 3.9 mmol/l.
Significant hypoglycemia: BSL < 3.0mmol/l
Severe hypoglycemia: Any BSL accompanied by cognitive dysfunction and need for external assistance to correct hypoglycemia.

Signs and symptoms

- Profuse sweating
- Nervousness
- Fainting
- Palpitations
- Poor sight
- Weakness
- Excessive hunger

- Abdominal pain
- Vomiting
- Convulsions
- Loss of consciousness

Causes and risk factors

- Overdose of insulin or sulfonylureas (glibenclamide or gliclazide)
- Excessive alcohol intake
- Starvation
- Tumours of the pancreas (insulinomas)
- Hormone deficiencies (cortisol, growth hormone)

Diagnostic criteria and investigations

- Blood sugar
- Specific investigations- to exclude other causes of hypoglycemia

Management

Community level	Health centre level	Hospital level
• Educate patients at risk of hypoglycaemia e.g. diabetics, on recognition of symptoms of hypoglycemia. • Advise patients at risk to have regular meals and always to have glucose or sugar with them for emergency treatment of hypoglycaemia. • Oral glucose or sugar (before coma sets in)10-20g in 200ml water (2-4 teaspoons) is usually taken initially and repeated after 15 minutes if necessary • **Refer** all patients with severe hypoglycemia (see definition above) to health centre.	Treat as CL and/or If patient is unconscious, glucose 50% 20- 50mL IV, followed by 10 % dextrose solution by drip at 5-10 mg /kg/min until patient regains consciousness, then encourage oral sugary drinks. Where possible, treat the cause of the hypoglycemia. • If I.V. access is not possible, give 1mg of glucagon I.M. or S.C. • **Refer** to hospital	• Treat as HC **AND/OR** Investigate and treat the cause of hypoglycaemia

5.3 Diabetic ketoacidosis (DKA)

Description

It is an acute metabolic complication of diabetes mellitus, may present with a decreased level of consciousness due to hyperglycaemia. It affects diabetic patients who are not adequately treated (i.e. before initial diagnosis or after treatment failure). Most common in younger Type 1 patients.

Signs and symptoms

- Nausea/vomiting
- Thirst/polyuria
- Altered mental function
- Abdominal pain
- Shortness of breathing
- Dehydration
- Drowsiness
- Confusion and coma
- Acetone/fruity smelling breath
- Fever
- Lethargy/obtundation/erebral oedema/possible COMA

Diagnostic criteria and investigations

- Check blood glucose
- Urine for ketones
- Arterial blood pressure
- Urea, creatinine, and electrolyte
- Use DKA chart to guide treatment and monitor the patient

Management

Community level	Health centre level	Hospital level
Refer immediately to hospital	**Refer** immediately to hospital	• Admit to ICU • Insert naso gastric tube for feeding **Fluid replacement:** • First litre of NS in first hour at rate of 1000ml/l • Next litre of NS at rate of 500ml/hour • Next litre of NS at rate of 250ml/hour • Next litre of NS at rate of 125ml/ hour **Potassium** Use ringer's solution if KCl is not available

<table>
<tr><th>Community level</th><th>Health centre level</th><th>Hospital level</th></tr>
<tr><td>Refer immediately to hospital</td><td>Refer immediately to hospital</td><td>
<table>
<tr><th>Serum potassium</th><th>Action</th></tr>
<tr><td>< 3.0 mmol/</td><td>40mmol KCl per litre of fluid, hold insulin</td></tr>
<tr><td>3.1 – 4.0 mmol/l</td><td>30mmol KCl per litre of fluid</td></tr>
<tr><td>4.1-5.0 mmol/l</td><td>20mmol KCl per litre of fluid</td></tr>
<tr><td>5.1 - 5.9 mmol/l</td><td>Omit KCl</td></tr>
</table>

Consider oral substitution (if required via nasogastric tube) if IV KCl is not available.

Insulin Therapy:
Start with hourly boluses of 0.1 IU/kg fast-acting (i.e. actrapid) IM or IV.

When blood glucose is <14mmol/l the fluid should be changed to 5% Dextrose plus 20 mmol/l of KCl to be repeated six-hourly.

Thereafter reduce insulin to 0.05 IU/kg if insulin pump is available or 10 IU SC 4-hourly and titrate according to blood sugar levels, which should be measured 2-hourly. Continue until the patient is able to eat again, then change to 8 hourly or 12 hourly.

Note: Acidosis correction with severe acidosis (ph < 6.9) NaHCO3 50mmol should be given under doctor's instruction.

CAUTION: Diabetic Ketoacidosis (DKA) is a medical emergency. All patients should be admitted in Intensive care unit (ICU), kept under the care of a registrar or consultant.

Give broad spectrum antibiotic if infectious cause for DKA is suspected.

Give high-dose proton-pump inhibitors to all.
Consider prophylactic low-molecular weight heparins for in-patients.</td></tr>
</table>

5.4 Non-Ketotic Hyperosmolar State (NKHS)

Description

Most common in patients with untreated type 2 diabetes mellitus.

Signs and symptoms

- Profound dehydration
- Polyuria
- Orthostatic hypotension
- Altered mental state
- Lethargy, obtundation, seizures, possible coma
- Weight loss
- Diminished oral intake of fluids
- Mental confusion
- Lethargy or comatose
- Tachycardia
- Hypotension
- Differentiated from DKA (No nausea and vomiting, no abdominal pain, and Kussmaul breathing)

Note: Try to identify precipitating factors;

- Poor oral fluid intake
- MI
- Stroke
- Sepsis
- Pneumonia, and other serious infection must be sought
- Drugs: Thiazides diuretic, glucocorticoids, phenytoin

Diagnostic criteria and investigations

- Check blood glucose (May be > 55.5mmol/L (1g/dl)
- Check electrolytes (K+, Na+, Cl-)
- Check renal function (urea and creatinine)
- Check osmolarity (usually >330 mosmol/L)
- Serum osmolarity = 2 (Na+ + K+) + glucose + urea (glucose and urea in mmol/L) (normal is < 310 as calculated)
- For Hyperosmolar Non Ketotic Coma (HNC/HONC) osmolarity is usually over 330mosmol/L.

Management

In this case principle management as in case of DKA:

- IV fluids should be replaced as half-normal saline (0.45%) if hypernatremia,
- Normal saline if serum sodium is normal. There is a frequent intercurrent illness usually sepsis, CVA, or cardiac and these must be diagnosed and treated. Prophylactic heparin may be used (monitor bleeding indices-PT, PTT, platelets count).

5.5 Gestational Diabetes Mellitus

Description

Gestational Diabetes Mellitus (GDM) is any degree of glucose intolerance first recognised in pregnancy. GDM is associated with significant risk of adverse perinatal outcomes.

Risk factors

Underlying patient factors	Patient from ethnic group with high prevalence of diabetes (e.g. Indian)
	No change
	Obesity (patient BMI≥35)
	Age ≥40 years
Previous History	Previous history of gestational diabetes (diabetes in previous pregnancy)
	First degree relative with diabetes
	Previous unexplained intrauterine foetal death
	Previous macrosomic baby (birth weight ≥4 kg)
Current pregnancy	Polyhydramios
	Foetus large for gestational age
	Glycosuria (glucose 1+ or more on urine dipstick)

Screening for Gestational Diabetes Mellitus (GDM)

All women with one or more of the above Risk factors should be screened for GDM at the first antenatal visit and if normal again between 24-28 weeks of gestation.

An oral glucose tolerance test (OGTT) is the preferred screening option, if not available fasting plasma glucose may be used.

Diagnostic criteria and investigations

Glucose Test	Gestational diabetes	Diabetes mellitus in pregnancy/ overt diabetes
Fasting plasma glucose (FPG)	≥5.1-6.9mmol/l	≥7mmol/l or
1 hour post-glucose load (75g) plasma glucose	≥8.5-11mmol/l	11.1mmol/l

One or more of these criteria must be satisfied for the diagnosis of GDM to be made

Management

Treatment Targets
- Fasting: <5.3mmol
- 1 hour postprandial: <7.8mmol/l
- 2 hours postprandial: < 6.7mmol/

Treatment monitoring
Regular blood glucose controls are required as insulin sensitivity is highly fluctuating during pregnancy. Home-based monitoring is highly recommended.

Lifestyle
Consider diet recommendations as for diabetes type 2.

Insulin
Start insulin if diet changes do not lead to sufficient control (see targets).
Starting dose of 0.3-0.5 IU/kg per day. Individual dose titrations required.

A combined health-care team (obstetrician, diabetologist or internist, diabetes educator, paediatrician/neonatologist) is required.
Follow-up patients with blood glucose screenings as they are at elevated risk to develop type 2 diabetes.

5.6 Surgery and the diabetic patient

Correct pre-operative management depends on:
- Type of surgery: major or minor
- Type 1 or Type 2 DM
- Recent diabetic control

Note
- Diabetic patient should be first on the operation list.
- Minor surgery: does not involve general anaesthesia or fasting
- Major surgery: Involve general anesthesia and therefore a period of fasting

Type 1 DM and surgery
- Once meal is missed it is better to start an I.V. regimen irrespective of the size of the procedure.
- Maintain interrupted insulin administration (hourly) to prevent DKA
- Administer 5% dextrose in maintenance IV fluids to avoid lipolysis and ketoacidosis in patients with restricted oral intake
- Blood glucose monitoring 1- 4 hourly (aimed reading 6 – 10 mmol/L)
- Measure electrolyte and urine for ketones hourly.
- Patients using conventional therapy may be given a dose of intermediate-acting insulin (at least half of the usual dose)
- Hyperglycemia may be managed with regular insulin, given 4 - 6 hours and continued until oral intake is resumed. Mixed insulin may be given

- Patients receiving intensified insulin therapy (basal-bolus therapy) should receive pre-operative basal insulin dose without interruption in the peri-operative period. When oral intake is restricted, regular insulin may be given 4-6 hours to control hyperglycemia according to sliding scale. When a diet is tolerated, the regimen should be resumed.
- Post operatively –give IV 1 litre of 5 – 10% dextrose + 20ml KCl + 2/3 of total daily dose of Insulin over 8 hours and repeat until able to take orally.
- Check Na+ levels (Caution-hyponatraemia)

Management

Table: Insulin dosage after surgery

Blood glucose	Short acting insulin - units
<11.1mmol/l6	0
11.1-13.9mmol/l	2
14.0 – 16.7mmol/l	4
16.8 – 19.4mmol/l	6
19.5 – 22mmol/	8
>22	10

NOTE: Insulin infusion pump

An intravenous infusion pump is essential in the management of DKA, major illness or major surgery in the patient with DM. The advantages are:

- Ability to tightly control the blood glucose levels.
- Separation of insulin and fluid regimen. Use 50 Units of short acting insulin in 50ml of normal saline (0.9%). (Thus unit/hr=ml/hr)

Blood glucose(mmol/L)	Short acting insulin - units
0-4	0.5
4-6	1.0
6-8	1.5
8-10	2.0
10-12	4.0
12-14	5.0
14-16	6.0
16-18	8.0
18-20	10 or more

Check blood glucose hourly initially and 2 hourly when stable. Continue IV regimen until patient

is taking normal diet post-operatively. Calculate SC. dose from IV insulin requirement in previous 24 hours. The first dose of SC insulin is given thirty minutes (unless a short-acting analogue) prior to stopping the IV insulin infusion. The patient then eats a normal diet.

T2DM and surgery

Pre-operatively

Delay surgery if possible if glycaemic control is poor

- HbA1C >9%
- FBG >10mmol/L
- RBG >13mmol/L

  Note: Optimise the glycaemic control if uurgery is elective. Screen for complication that may affect surgical risk: nephropathy, cardiac disease, proliferative retinopathy. Inform surgical team of the complication.

If on diet and/or oral antidiabetics and well controlled and surgery is minor:

- Omit dose on the morning of surgery
- Resume therapy when eating normally

If on oral antidiabetics and major surgery

- Pause oral antidiabetics one day prior until one day after surgery
  - Risk of lactic acidosis with metformin
  - Risk of hypoglycemia with sulfonylureas
  - Risk of ketoacidosis with SGLT2 inhibitors
- Ensure adequate glycemic control by bridging with insulin according to instructions below.

If on insulin therapy

- See instructions for Type 1

5.7 Diabetes in children

The common type in paediatrics is Type 1 Diabetes mellitus with few children having Type 2 diabetes mellitus (due to childhood obesity)

Signs and symptoms

- Often present with diabetic ketoacidosis (see section on DKA)
- Similar symptoms as adults (see section on DKA)
- Typical presentation in children:
  - Any child presenting with impaired consciousness and acidosis
  - Pneumonia-tachypnoea and hyperventilation
  - Acute abdomen-abdominal pain and tenderness
  - Secondary nocturnal enuresis. (due to polyuria)

Diagnostic criteria

- Same as for adults (see section for T1DM and T2DM)

Investigations after diagnosis

- Blood gas measurements if suspicion of DKA
- Serum electrolytes, urea and creatinine concentration
- For children with signs of infection (blood and urine cultures, radiography)

Management

- Hospitalisation
  Those in DKA, with electrolyte imbalance and dehydration (see treatment for DKA)
- Outpatient:
  Insulin 0.35IU/kg/day SC; approximately 40% of the dose given as basal insulin and 60% as a meal bolus. Then dose adjusted according to blood glucose control, stage of growth- (e.g. puberty). Regular (soluble) insulin given pre-meals for the main meals (breakfast, lunch and supper), long acting insulin at bedtime. (See T1D treatment table above) screenings as they are at elevated risk to develop type 2 diabetes.

Table 5.9: Insulin regimens

Regimen 1		
Breakfast	Intermediate/long acting (2/3) + short acting (1/3)	2/3 of daily dose
Supper	Intermediate/long acting	1/3 of daily dose
Regimen 2		
Breakfast	Intermediate/long acting + short acting	2/3 of total daily dose
Supper	Short acting	
Bedtime	Intermediate/long acting + short acting	1/3 of total daily dose
Regimen 3		
Breakfast	Short acting	20% of daily dose
Lunch	Short acting	20% of daily dose
Supper	Short acting	20% of daily dose
Bedtime	Intermediate/long acting	40% of daily dose

Table: Insulin adjustment (how to adjust insulin)

	Blood glucose-High/low	Insulin dose to adjust- ↑/↓
Twice daily injection regimen	Before breakfast or overnight Before lunch Before dinner Before bed	Evening intermediate-acting Morning short acting Morning intermediate Evening short acting
Three-times daily injection regimen	Before breakfast or overnight Before lunch Before dinner Before bed	Evening intermediate- acting Morning short-acting Morning intermediate- acting Evening short-acting
Basal-bolus (multiple injection) regimen	Before breakfast or overnight Before lunch Before dinner Before bed	Evening intermediate acting Morning short acting Lunchtime short acting Evening short acting

Give education on

- What diabetes is
- Insulin
- Diet
- Complications: hypoglycemia, cerebral oedema

Complications

- Acute- DKA, hyperglycemia and hypoglycaemia
- Chronic- retinopathy, nephropathy, neuropathy, cataract
- Growth failure, delayed puberty

5.8 Hypothyroidism

Description

A condition that results from the underproduction and under secretion of thyroid hormones

Symptoms and signs

- May be asymptomatic
- Goitre
- Fatigue
- Weakness
- Cold intolerance
- Weight gain
- Depression
- Constipation
- Dry, cold skin
- Hair loss
- Secondary amenorrhoea

Causes

- Iodine deficiency
- Hashimoto thyroiditis
- Post-irradiation

Diagnostic criteria and investigations

- TSH and fT4
  - Latent hypothyroidism: Elevated TSH, normal fT4
  - Manifest hypothyroidism: Elevated TSH, low fT4
- Ultrasound of the neck
- Anti-TPO and thyroglobulin-antibodies

Management

Community level	Health centre level	Hospital level
• **Refer to hospital** in case of suspicion	• **Refer to hospital** in case of suspicion	Treatment target is to maintain normal TSH levels D: **Manifest hypothyroidism:** • Start with levothyroxine 1.5µg/kg daily in the morning, round dose to the nearest 25 mcg. **Latent hypothyroidism:** • Start with 25 – 50 mcg in the morning **Note:** Measure TSH after 2 months of levothyroxine or if dose change • Adjust dose based on TSH value. Treatment target is TSH in the normal range • Symptoms relief at 3 to 6 months ater normal TSH • Follow up TSH yearly once TSH levels are normal Women in reproductive period should be euthyroid before conceiving, as the hypothyroidism is associated with neural development. • Dose may be doubled during pregnancy and returned to normal dose after delivery. **Refer to specialist**

5.9 Hyperthyroidism

Description

Hyperthyroidism results from an excess of circulating thyroid hormones

Causes

- Graves disease (autoimmune)
- Thyroid hyperplasie (unifocal or multifocal), toxic nodular goitre
- Medication (i.e. amiodarone, levothyroxine overdose)
- Thyroid cancer
- Hashimoto disease (early stage)

Signs and symptoms

- Goitre (evt. with thyroid bruit on auscultation)
- Tachycardia
- Hypertension
- Hyperreflexia
- Heat intolerance and sweating
- Trembling
- Insomnia
- Weight loss
- Diarrhoea
- Exophthalmus -> sign of Grave's disease

Diagnostic criteria and investigations

- TSH and fT4 (use TSH for screening -> normal TSH rules out hyperthyroidism)
  - Low TSH, high fT4: Manifest hyperthyroidism
  - Low TSH, normal fT4: Latent hyperthyroidism
- Measure Thyroid Receptor Antibodies (TRAb) and Thyreoperoxidase-Antibodies (TPO)
    - TRAb positive: Grave's disease
    - TRAb negative, TPO positive: Hashimoto disease
- Ultrasound:
  - Enlarged gland
  - Hypervascularisation typical for Grave's disease
  - Check for adenoma and carcinoma

Management

Community level	Health centre level	Hospital level
• **Refer to hospital**	• **Refer to hospital**	**Graves' disease:** Carbimazole 40mg (O) once daily for 3 weeks then 20mg daily for 3 weeks. Maintenance dose 5mg for up to 18 months. Then stop treatment. If disease is coming back, refer for thyroidectomy, radioiodine therapy. **Toxic nodular goitre:** Initiate treatment with carbimazole as above to reach normal thyroid hormone levels. Thereafter refer for thyroidectomy or radioiodine therapy **CAUTION:** Carbimazole may induce bone marrow suppression. Patients should be told to report any type of infection. The drug should be stopped immediately if neutropenic. Check iodine function at 5-6 weeks. **Special considerations in pregnancy:** Use propylthiouracil instead of carbimazole during pregnancy. Start with 200-400mg daily until normal thyroid hormones are reached, maintenance dose is 50-150mg. (1mg of carbimazole is equivalent to 10mg of propylthiouracil) **Symptomatic treatment** Use propranolol in case of palpitations or tachycardia (>100BPM). Start with 10mg tds, titrate in weekly steps until asymptomatic and HR < 100 BPM. Max. dose 40mg qds. If propranolol is not available, use another beta-blocker.

5.10 Thyrotoxicosis

Description

Acute life-threatening exacerbation of hyperthyroidism

Signs and symptoms

- Pyrexia with vasodilation
- Marked tachycardia

- Vomiting, diarrhoea -> dehydration
- Trembling, agitation
- Confusion
- Loss of consciousness
- Cardiovascular dysfunction (atrial fibrillation, cardiac failure)
- Jaundice

Diagnostic criteria

Clinical diagnosis with elevated T3 and T4 and suppressed TSH

Management

Community level	Health centre level	Hospital level

• **Refer to hospital**	• **Refer to hospital**	• Carbimazole 40-60mg daily orally or by nasogastric tube
		• Propranolol 10mg qds, increase in weekly steps as long as tachycardia or palpitations persist, maximum dose 40mg qds
		• Lugol's Iodine: 10 drops 8 hourly orally one hour AFTER initiation of carbimazole
		• Dexamethasone (8mg 8 hourly iv or orally)
		• Supportive therapy
		  • ICU monitoring
		  • Fluid replacement
		  • Caloric support (oral nutrition or via NG tube, plus 100mg thiamine daily)
		  • Paracetamol or ibuprofen against pyrexia
		  • Haloperidol (e.g. 5mg 8 hourly of psychotic)

5.11 Acute adrenal insufficiency (Addisonian crisis)

Potentially fatal condition associated mainly with an acute deficiency of the glucocorticoid cortisol and, to a lesser extent, the mineralocorticoid aldosterone. Occurs commonly in people with long-term adrenal insufficiency.

Causes

- Primary adrenal insufficiency (autoimmune)
- Secondary pituitary insufficiency including steroid-induced adrenal suppression

Triggering factors

- Infections
- Surgery
- Injury
- Over-exertion/dehydration
- Abrupt withdrawal of steroids

Signs and symptoms

- Malaise
- Fatigue
- Nausea and vomiting
- Abdominal pain
- Fever
- Muscle pains and cramps
- Dehydration leading to hypotension and hypovolemic shock
- Confusion, loss of consciousness

Diagnostic criteria and investigations

- Urea and electrolytes
  - Sodium usually moderately decreased
  - Potassium slightly increased or normal
  - Creatinine may be raised
- Blood for cortisol and ACTH should be taken (but not delay treatment)

Management

Community level	Health centre level	Hospital level
• **Refer to hospital**	• **Refer to hospital**	**Urgent admission** Immediate administration of hydrocortisone IV or IM • 100mg for adults • 50mg for children • 25mg for infants • Rehydration with normal saline • Following rehydration, administration of 100-200mg hydrocortisone in 5% glucose over 24 hours IV • Treat underlying precipitating factors • Reduce steroids after stabilisation and replace with oral therapy **Prevention** • Do not stop steroids suddenly if used for more than two weeks • Increase steroid replacement dose in patients with chronic adrenal insufficiency in case of infection, injury or surgery

5.12 Cushing's syndrome

Description

Cushing's syndrome is caused by prolonged exposure to elevated levels of either endogenous or exogenous glucocorticoids. Because of the significant morbidity and mortality of Cushing's syndrome, early diagnosis and prompt treatment are essential

Causes

- Exogenous:
  - Excess glucocorticoid administration -> Most important cause!
- Endogenous:
  - Excess ACTH production by pituitary gland (Morbus cushing)
  - Adrenal adenomas/carcinomas

Signs and symptoms

- Truncal obesity, buffalo hump, weight gain
- Facial fullness, moon faces
- Proximal muscle wasting and weakness
- Diabetes or impaired glucose tolerance
- Gonadal dysfunction, reduced libido
- Skin atrophy, striae, hirsutism, acne
- Depression
- Irregular menses

Diagnostic criteria and investigations

- 24-hour urinary free cortisol
- 1mg overnight dexamethasone suppression test
  - Give 1mg of dexamethasone at 11pm
  - Measure serum cortisol at 8am the next morning -> in Cushing syndrome the normal suppression of serum cortisol after intake of dexamethasone is not observable
- Additional investigations to identify cause of Cushing syndrome
  - Plasma ACTH
  - CRH test
  - High-dose dexamethasone test
- Cranial MRI to check for pituitary adenoma

Management

<table>
<tr><th>Community level</th><th>Health centre level</th><th>Hospital level</th></tr>
<tr><td>• Refer to hospital</td><td>• Refer to hospital</td><td>Depending on cause, i.e. resection or radiotherapy of pituitary or adrenal adenoma, pharmacological reduction of cortisol effect if operation is not possible (i.e. with ketoconazole). Tapering of steroids if exogenous cause.
Prevention
Try to avoid long-term (3 weeks) steroid therapy above the cushing threshold (7.5mg per day of prednisolone). Try to lower steroid dose below the cushing threshold, for example by using disease-modifying anti-rheumatic drugs.
If steroids have been administered above the cushing threshold for more than 3 weeks, abrupt discontinuation is contraindicated. Use the following tapering scheme:
<table>
<tr><th>Daily dose of prednisolone</th><th>Tapering scheme</th></tr>
<tr><td>>20mg</td><td>Reduce daily dose by 5-10mg every 7-14 days</td></tr>
<tr><td>10-20mg</td><td>Reduce daily dose by 2.5mg every 7-14 days</td></tr>
<tr><td>5-10mg</td><td>Reduce daily dose by 1mg every 7-14 days</td></tr>
</table>
</td></tr>
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chapter

6

Eye Conditions

6.1 Conjunctivitis

Description
Conjunctivitis is inflammation of the conjunctiva

Different subtypes

6.1.1 Allergic conjunctivitis

Description
Inflammatory condition of the conjunctiva caused by:
- Allergens such as pollen, grasses, animal fur etc. It is sometimes called hay fever conjunctivitis
- Cosmetics, especially eye make-up

Signs and symptoms
- Burning sensation
- Normal visual acuity
- Itching, lacrimation and photophobia
- Conjunctiva may appear normal or slightly red
- Chemosis (conjuctival swelling)
- May be associated blepharitis (inflammation of eye lid margin) if the allergy is due to scratching
- Presence of mucoid watery discharge indicates allergic conjunctivitis

Causes and risk factors
- Presence of allergens

Diagnostic criteria and investigations
- History and clinical investigations
- Based on the signs and symptoms

Management

Community level	Health centre level	Hospital level
• Cold compresses • Clean with cooled boiled water • Avoid allergens **Adult** • Paracetamol 500mg – 1g 8 hourly **Child** • Paracetamol 15mg/kg 8 hourly • **Refer** to health centre	• Treat as CL **AND/OR** • Reassure the patient • Antazoline-tetrahydrazoline eye drops 0.4mg/0.5mg/ml 8 hourly for 5 days • **Refer** to the hospital.	• Treat as HC **AND/OR** • Dexamethasone 1 % eye drops 6-8 hourly for 5 days **OR** • Fluorometholone 1.0 mg 1-2 drops 6-12 hourly for 5 days **OR** • Sodium cromoglycate 2-4% 8 hourly for 5 days **OR** • Promethazine 25 mg 24 hourly **OR** • Chlorpheniramine 4mg 12 hourly **OR** • Adult: loratadine 10mg orally 24 hourly • Children: loratadine 5-10mg/kg orally 24 hourly **Refer to ophthalmologist if:** • No improvement after 5 days • Person using contact lenses

6.1.2 Bacterial conjuctivitis

Description

Inflammation of the conjunctiva caused by causative bacteria

Signs and symptoms

- Painful gritty sensation
- Follicles or papillae on the inflamed conjunctiva
- Discharge which is more purulent than in viral conjunctiva
- Enlarged preauricular lymph node
- Eyelid oedema

Causes

- Chlamydia trachomatis
- Neisserria gonorrhoeae
- Staphylococci
- Streptococci

Risk factors

- Poor hygiene
- Untreated gonorrhoea and syphilis
- Contact lenses
- Sinusitis
- Proximity to infected subjects

Diagnostic criteria and investigations

- Pus swab
- Based on the signs and symptoms

Management

Community level	Health centre level	Hospital level
Health education on eye care: • Cold compresses **Adult** Paracetamol 500mg – 1g 8 hourly **Child** Paracetamol 15mg/kg 8 hourly • **Refer** to health centre	• Treat as CL **AND/OR** • Cleanse the eyes • Chloramphenicol eye ointment 1% 12 hourly for 7 days **OR** • Tetracycline eye ointment 1% 12 hourly for 7 days • **Refer** to the hospital.	• Treat as HC **AND/OR** • Ceftriaxone IM 50mg/kg single dose • Sodium Chloride 0.9% eyewash stat **AND/OR** then hourly • Treat the underlying causes

6.1.3 Viral conjunctivitis

Description

Inflammatory conditions caused by infection of the conjunctiva by a virus. Many upper respiratory tract viral infections are accompanied by conjunctivitis. These conditions are highly contagious and often spread through whole communities. Both eyes are affected.

Signs and symptoms

- Photophobia
- Watery eyes
- Sticky eyes, especially in the morning
- Conjunctiva reddened, swollen and oedematous, and may become haemorrhagic
- Palpebral conjunctiva also involved
- Watery discharge is yellow when a secondary bacterial infection has occurred
- There may be swelling of the eyelids
- The cornea, iris and pupil are completely normal
- Normal visual acuity

Causes

- Viral infection (adeno virus, herpex simplex, varicella zoster virus, picona virus, pox virus, HIV

Risk factors

- Sharing of the same eye drops
- Iritis
- Foreign body
- Trauma
- Phlyctenular conjunctivitis
- Keratitis
- Acute glaucoma

Diagnostic criteria and investigations

- Clinical investigation
- Based on the signs and symptoms

Management

Community level	Health centre level	Hospital level
• Encourage the use of sun glasses. • Personal hygiene – Wash hands with clean water before touching the eye and after instilling medicine. • Encourage use of own towels • Wash face and cleanse the eyes frequently with cooled boiled water • Discourage the use of home remedies like milk, urine, saliva etc as this will cause secondary infection • Avoid spread of infection to the other eye and persons • Teach patients and care givers how to instil eye medication (ointment/drops) • Cold compress • **Refer** to health centre	• Treat as CL • Sodium Chloride 0.9% instilled into the eye • **Refer** all cases to hospital.	• Oxymetazoline 0.025 % eye drops 1 - 2 drops instilled in the eyes 6 hourly for 7 days **OR** • Topical corticosteroids; Dexamethasone 1% eye drops every 6 hours maybe given up to a maximum of 14 days. **Note*** Patients must not share the same eye drops. **Caution*** Steroids should not be used on corneal ulcers **Refer if:** • Unilateral disease • Corneal ulceration • Corneal opacification (clouding) • Pupil irregularity • Diminished vision • Severe pain • Poor/no response after 7 days

6.1.4 Conjunctivitis of the newborn (ophthalmia neonatorum)

Description

Inflammation of the conjunctiva in the neonatal period, presenting with purulent discharge, inflamed conjunctiva with oedema. Most infections are acquired during delivery. It could be caused by gonococcal or chlamydial infection or reaction to medicine application to the eye e.g. silver nitrate. The condition is preventable if antibiotic eye drops are applied soon after birth.

Signs and symptoms

- Eyes are sticky, discharging and oedematous.
- Purulent conjunctivitis in the new-born marked by purulent discharge and local inflammation and swelling of the eyes.

- Corneal involvement including diffuse epithelial oedema and ulceration may progress to perforation of the cornea
- Patients may have systematic manifestations including rhinitis, stomatitis, arthritis, meningitis, anorectal infections, septicaemia

Causes
- Infectious agents (chlamydial, gonococcal, staphylococcal and herpetic infections)

Risk factors
- Maternal history of a purulent vaginal discharge
- Onset within 4 days of birth
- Onset after the 4 days of birth
- Slight watery or mildly purulent discharge
- Mildly inflamed conjunctiva

Diagnostic criteria and investigations
- Based on the signs and symptoms
- Potassium hydroxide
- TORCH

Management

Community level	Health centre level	Hospital level
• Cold compresses • Clean with cooled boiled water • Avoid allergens **Adult** • Paracetamol 500mg – 1g 8 hourly **Child** • Paracetamol 15mg/kg 8 hourly • **Refer** to health centre	• Treat as CL **AND/OR** • Reassure the patient • Antazoline-tetrahydrazoline eye drops 0.4mg/0.5mg/ml 8 hourly for 5 days • **Refer** to the hospital.	• Oxymetazoline 0.025 % eye drops 1 – 2 drops instilled in the eyes 6 hourly for 7 days **OR** • Topical corticosteroids; dexamethasone 1 % eye drops every 6 hours may be given up to a maximum of 14 days. **Note*** Patients must not share the same eye drops. **Caution*** Steroids should not be used on corneal ulcers **Refer** if: • Unilateral disease • Corneal ulceration • Corneal opacification (clouding) • Pupil irregularity • Diminished vision • Severe pain • Poor/no response after 7 days

6.1.5 Phlyctenular conjunctivitis

Description
Inflammation of the conjunctiva and cornea induced by microbial antigens

Signs and symptoms

- Presents as small, yellow or white nodule on the limbus
- There are localised inflamed blood vessels radiating away from the nodule
- Foreign body sensation
- Photophobia
- Irritation and tearing
- Immunological response (cell mediated) to Mycobacterium TB elsewhere in the body
- It is seen most commonly in children with primary tuberculosis (non-cavitating type)
- Hypersensitivity

Causes

- Staphylococcal infection
- Seborrhoeic dermatitis
- Chlamydia
- Candida albicans

Risk factors

- TB

Diagnostic criteria and investigations

- Clinical investigation
- Testing for TB
- Scraping of conjuctiva

Note: All cases should be referred for TB investigation.

Management

Community level	Health centre level	Hospital level
• **Refer** all cases to health centre	• **Refer** to the hospital.	• History • Examination • Treat TB For non-TB cases sodium cromoglycate 2 – 4% **OR** • Dexamethasone 0.1 % eye drops 6 hourly may be given for a maximum of 14 days **AND** antibiotics for different causes as eyedrops and systemic administration • **NOTE:** Phlyctenular conjunctivitis is strongly suggestive of tuberculosis • Start anti-tuberculosis treatment unless there is good evidence of another cause for the phlyctenulum.

6.2 Corneal ulcer

Description

A corneal ulcer is an erosion or open sore in the outer layer of the cornea. It is often caused by infection. Corneal ulcers are most commonly caused by an infection with bacteria, viruses, fungi or parasites.

Signs and symptoms

- Gray spot on the cornea
- Watery purulent discharge

Causes

- Bacterial infection
- Viral infections
- Fungal infections
- Parasitic infections
- Trauma
- Vitamin A deficiency

Diagnostic criteria and investigations

- Clinical investigations
- Based on signs and symptoms
- Pus swab

Management

Community level	Health centre level	Hospital level
• **Refer** to health centre **Adult:** Paracetamol 500mg – 1g 8 hourly **Child:** Paracetamol 15mg/kg 8 hourly	• Treat as CL • Reassure the patient • **Refer** to hospital	• Treat as HC **AND/OR** • Treatment for corneal ulcers and infections depends on the cause. Treatment should be started as soon as possible to prevent scarring of the cornea. • Gentamycin eye drops 0.3% hourly or 2 hourly depending on the eye condition for 3-14 days. **AND** • Chloramphenicol eye ointment 0.5% given hourly or 2 hourly depending on the eye condition **OR** • Ciprofloxacin 0.3% eye drops given hourly or 2 hourly depending on the eye condition for 3-14 days **OR** antifungal • Tobramycin hourly or 2 hourly depending on the eye condition for 3-14 days **OR** • Econazole 1% given hourly or 2 hourly depending on the eye condition for 3-14 days.

Community level	Health centre level	Hospital level
		Treatment can be changed depending on corneal scrapping results: • Give antiviral if viral cause is suspected after the examination of the eye. • Acyclovir 3% eye ointment 4 hourly. Continue treatment for at least 4 days after healing. Give dilating drops to all corneal ulcer patients: • Cyclopentolate 1% 12 hourly **OR** atropine once per day • If severe ulcers, refer to the ophthalmologist

6.3 Eye injuries

6.3.1 Chemical injuries

Description

Damage to the eye caused by contact with irritating chemical substance, e.g. acids, alkalis.

Signs and symptoms

- Ocular irritation
- Pain
- The affected eye appears smaller and feels tender
- Blurred vision
- Excessive tearing
- Photophobia
- Red eyes

Causes

- Cleaning products e.g. ammonia
- Fertilisers especially those containing ammonia
- Drain cleaners e.g. lye
- Cement, plaster or mortar e.g. lime
- Airbag rupture e.g. sodium hydroxide
- Fireworks e.g. magnesium hydroxide
- Potash e.g potassium hydroxide
- Common sources of acids e.g. battery acid (sulphuric acid), bleach (sulphuric acid), glass polish e.g. hydrofluoric acid, vinegar (acetic acid), hydrochloric acid

Risk factors

- Exposure to the causes

Diagnostic criteria and investigations

- Clinical examination based on signs and symptoms
- History of exposure

Management

Community level	Health centre level	Hospital level
• Irrigate liberally with clean water • Paracetamol 500mg-1g 6-8 hourly for 5 days • Refer immediately to Health centre	• Treat as CL **AND/OR** • Irrigate liberally with water **OR** • 0.9% sodium chloride and repeat several times. • Cover with eye pad • **Refer** to hospital immediately.	• Treat as HC **AND/OR** • Fluorescein 1% instilled in the eyes for diagnosis of local or diffuse damage. • If diffuse damage, atropine 1% eye drops instilled immediately • Chloramphenicol 1% eye ointment instilled 12 hourly for 5-7 days • Cover with eye pad and refer to ophthalmologist

Refer All patients with chemical burns affecting the eyes should be referred to the hospital

6.3.1 Physical injury

Description
Physical injury is a trauma to the eye which can range from minor injury to complete rupture of the globe.

Signs and symptoms
- Pain
- Red eye
- Bleeding
- Tearing
- Blurred vision
- Photophobia
- Double vision
- Sensation of foreign body

Causes
Injuries by blunt or sharp forces (stick, metallic object, blown tyre, fist, etc)

Risk factors
- Accidental injuries (road traffic accident, games, etc.)
- Intentional injuries (fights)

Diagnostic criteria and investigations
- Take proper history
- Check visual acuity
- Fluoroscein stain to confirm the extent of injuries
- Slit lamp
- Orbital X-ray

Management

Community level	Health centre level	Hospital level
• Paracetamol 500mg to 1g tds • **Refer** to health centre	• Treat as CL **AND** • Eye pad • **Refer** to hospital.	• Treat as HC **AND** For superficial injuries: • Atropine 1% eye drops **AND** • Chloramphenicol 1% eye ointment 6 times daily for 7 days If pain does not improve, refer to ophthalmologist For large injuries: • Atropine 1% eye drops **AND** • Chloramphenicol eye ointment - eye pad • **Refer** to ophthalmologist

6.4 Foreign body in the eye

Description

A foreign body may be embedded in conjunctiva or cornea or deeper. Conjunctival or eyelid foreign body may cause corneal abrasion. May cause serious disturbance of vision.

Signs and symptoms

- Pain
- Irritation
- Reddening of the eyes
- Tearing

Causes

- Foreign body into the eyes

Risk factors

- Accidental exposure

Diagnostic criteria and investigations

- Take proper history
- Check visual acuity first, before testing with fluorescein
- Stain with fluorescein for corneal foreign body or complication (abrasion)

Fluorescein confirms:

- An embedded foreign body or rust ring
- Multiple foreign bodies
- Check after removal of foreign body
- Orbital X-ray

Management

Community level	Health centre level	Hospital level
• Paracetamol 500mg-1g stat • **Refer** to health centre immediately	• Treat as CL **AND/OR** • Remove foreign body by washing • Irrigation with clean water **OR** • 0.9% normal saline then **Refer** to hospital	• Treat as HC **AND/OR** For superficial foreign bodies • Remove foreign body if visible on the sclera or conjunctiva with cotton bud • 1% atropine ophthalmic drops stat **AND** • 1% chloramphenicol eye ointment instilled 6–8 times daily for 7 days • Review daily and refer to ophthalmologist if pain persists For deep embedded foreign bodies; • 1% atropine eye drops stat **AND** • Instil 1% chloramphenicol eye ointment • Pad the eye and refer to ophthalmologist Refer the following complications to ophthalmologist • Hyphaema (blood in the anterior chamber of the eye) • Diffuse corneal damage after applying 1% atropine ophthalmic drops • Scleral and corneal laceration • Lid oedema • Subconjunctival bleeding persisting for more than 24 hours • Post-traumatic dilatation of the pupil • Persistent corneal defect or corneal opacity

6.5 Glaucoma

Description

Glaucoma is an eye disorder caused by increased intraocular pressure resulting in loss of vision. Glaucoma is acute or chronic disease and takes months to years before symptoms and signs show.

NB: Eye ointment may act as foreign body to abraded eye tissue
Do not use an eye pad with ecchymosed lid oedema
Allow free drainage

6.5.1 Open angle glaucoma

Signs and symptoms

- Acute onset of extremely severe, bursting pain in one eye
- Nausea and vomiting in severe cases
- Blurred vision

- A unilateral, temporal headache, after being exposed to a period of darkness e.g. cinema
- Haloes around lights (bright rings)
- Oedema of the conjunctiva with congestion around the cornea
- Oedema of the cornea giving a hazy or cloudy appearance rather like steam behind a window
- Congested blood vessels around the cornea
- The anterior chamber depth is decreased i.e. shallow
- The pupil is dilated and inactive
- The eye feels hard, compared with the other eye, when measured with finger palpation
- Chronic glaucoma
- Central vision normal, peripheral vision absent
- Eyeball is tense

Causes

- Drugs (e.g. sympathomimetics, anticholinergics, cocaine, anticonvulsants, sulphonamides, antidepressants, botulinum toxin, steroids)
- Persistent dim light
- Rapid management of hyperglycaemia

Risk factors

- Family history

Diagnostic criteria and investigations

- Slit lamp examination of the anterior segment of the eye
- Fundoscopy
- Tonometry
- Gonioscopy
- Pachymetry
- Laboratory tests including CBC count, ESR, Serology for syphilis
- Imaging studies (fundus photography, retinal nerve fibre layer imaging, scanning lasser polarimetry)

Management

Community level	Health centre level	Hospital level
• Reassure and **Refer** to health centre	• Reassure **and Refer** to hospital	• Treat as HC **AND/OR** • Acetazolamide 500mg stat orally or intravenously and 250-375mg 6 hourly, it must never be given IM. If pupil is dilated, instill • Pilocarpine 4% drops every 15 minutes, starting 1 hour after giving acetazolamide. • **Refer** to ophthalmologist immediately.

NB: Glaucoma is a silent cause of blindness and should be managed in a hospital setting.

6.5.2 Closed angle glaucoma

Signs and symptoms

- Usually presents acutely with sudden onset of severe eye pain and redness, associated with nausea, vomiting and hemicranial headache
- Loss of vision in the affected eye
- Coloured haloes or bright rings around lights
- Hazy-looking cornea
- Fixed, semi-dilated pupil
- Shallow anterior chamber
- Severely elevated intra-ocular pressure. When measured with finger palpation, the affected eye feels hard, compared to the other eye
- If intra-ocular pressure (IOP) rises more slowly, patients may be asymptomatic with gradual loss of vision

Causes

- Cataracts
- Ectopic lens (when your lens moves from where it should be)
- Diabetic retinopathy
- Ocular ischemia (narrowed blood vessels to the eye)
- Uveitis (eye inflammation)
- Tumors

Risk factors

- Women are 2 to 4 times more likely to get it than men
- Asian
- Farsighted
- Between 55 and 65 years
- Family history
- Medications that dilate pupils
- Other medications that cause iris and cornea to come together, e.g. sulfonamides, topiramate, or phenothiazines

Management

Community level	Health centre level	Hospital level
• Reassure **and Refer** to health centre	• Reassure **and Refer** to hospital	Try to achieve immediate reduction in IOP: • Acetazolamide, oral, 500mg immediately as a single dose. Followed by 250mg 6 hourly **AND** • Timolol 0.25–0.5% ophthalmic drops, instil 1 drop 12 hourly. • Also treat patient for associated pain and nausea. • Perioperative analgesics (refer to section on anaesthesiology) Where those measures fail, for short-term use only: • Mannitol, IV 1.5–2 g/kg as a 20% solution over 30–60 minutes **OR** • Glycerol, oral, 1 g/kg of 50% solution as a single dose immediately. • **Refer** to opthalmologist

6.6 Trachoma

Description

A chronic keratoconjuctivitis which primarily affects the superior and inferior tarsal conjunctiva and cornea.

Signs and symptoms

In early stages:

- Reddening of the eye
- Itching
- Eye discharge
- Blurred vision
- Follicles (grain-like growth) on the conjunctiva

In the later stages:

- Scar formation on the eyelids causing the upper eyelid to turn inwards (entropion) and causing the eyelashes to scratch the cornea
- The scarring of the cornea leads to blindness

Causes

- Chlamydia trachomatis

Risk factors
- Poor hygiene
- Socio-economic factors
- Age

Diagnostic criteria and investigations
- Clinical examination
- Based on signs and symptoms

Management

Community level	Health centre level	Hospital level
• **Refer** to health centre immediately	• Treat as CL **AND/OR** • Apply tetracycline eye ointment 1% every 12 hours 4-6 weeks (until the infection/ inflammation has gone) **AND** **Adults:** • Cotrimoxazole 960mg 12 hourly for 14 days **OR** • Erythromycin 500mg 6 hourly for 14 days **Children:** • Cotrimoxazole 24mg/kg per dose **OR** • Erythromycin 10-15mg/kg per dose • **Refer** to hospital.	• Treat as HC **AND/OR** **Adults**: • Azithromycin 500mg immediately then 250mg hourly for 3-4 days **Children:** Azithromycin 10-20mg/kg immediately for 3 days • **Refer** to specialist if there are any complications

6.7 Vernal catarrh (spring catarrh, vernal keratoconjuctivitis)

Description
A recurrent bilateral and self-limiting inflammation of the conjunctiva having a periodic seasonal incidence

Signs and symptoms
- Marked burning and itchy sensations which may be intolerable
- Mild photophobia
- Lacrimation
- Stingy discharge and heaviness of eyelids
- Round white nodules at the edge of the cornea are often seen
- Conjunctiva may have a brownish or milky discoloration on the exposed parts

Causes
- Complex allergic reaction to atmospheric allergen or pollutant
- Age and gender

- Season: more in summer/spring
- Hay fever
- Asthma
- Eczema
- Papillae that give the conjunctiva a cobblestone appearance

Diagnostic criteria and investigations

- Clinical investigation

Management

Community level	Health centre level	Hospital level
• Reassure and **Refer** to health centre	• Re-assure the patient or parent that the condition is not serious. • Patient must wear dark glasses when outside. • **Refer** to hospital.	• Sodium cromoglycate 2-4% eye drops – 1-2 drops 6 hourly daily • Give for 6 weeks initially. If symptoms recur, this treatment must be continued for the reminder of the spring and summer season. Patients with severe itching will also need a short course of steroid eye drops: • Dexamethasone 1 % 1-2 drops 8 hourly for 5 days **AND** • Promethazine 25mg once daily to twice daily for 5 days **AND** • Prednisolone 40 mg once daily for 5 days for severe cases **OR** **Adult:** Loratadine 10mg orally 24 hourly for 5 days **Children:** Loratadine 5-10mg/kg 24 hourly for 5 days

6.8 Uveitis

Description

Uveitis is the inflammation of the uvial tissues (iris, choroid and cilliary body). Usually only one eye is affected. Blindness will occur if not treated promptly.

Signs and symptoms

- Marked pain in one eye
- Photophobia
- Vision is blurred
- Clear, watery discharge
- Conjunctiva red, especially around cornea
- Cornea is clear
- Pupil is small, irregular and responds poorly to light

Causes

- Idiopathic, may be secondary to autoimmune diseases (rheumatoid arthritis, TB, leprosy, syphillis)
- Genetic predisposition
- Traumatic or infectious mechanism

Diagnostic criteria and investigations

- Clinical investigations (slit lamp examination of the anterior chamber)

Management

Community level	Health centre level	Hospital level
• **Refer** to hospital.	• **Refer** to the hospital.	• Cyclopentolate 1% ophthalmic drops, instil 1-2 drops 8 hourly for 4 weeks **OR** • Homatropine 2% ophthalmic drops, instill 1–2 drops 3–4 hourly **OR** • Atropine 1%, ophthalmic drops, instill 1 drop 12 hourly **AND** • Dexamethasone 0.1%, ophthalmic drops, instill 1–2 drops 4–6 hourly.

6.9 Stye (external hordeolum)

Description

Abscess of a sebaceous gland (internal stye) or a hair follicle (external stye) along the margin of the eyelid.

Signs and symptoms

- Pain and swelling in the eyelid
- Tender lump on the eyelid
- Epiphora
- It is situated at the other edge of the eyelid -it differs from a meibomian abscess which is situated in the body of the eyelid
- Red, tender swelling at margin of the eyelid (external stye)
- Red, tender swelling on the inside of the eyelid (internal stye or cyst)
- The swelling is tender to touch
- Occasional multiple abscesses that involve the entire eye

Causes

- Bacterial infection of the eyelashes, follicle and its associated gland or zeis or moll or meibomian gland *(Staphylococcus spp)*
- Diabetes mellitus
- Hyperlipidaemia
- Chronic blepharitis

Diagnostic criteria and investigations

- Clinical investigations
- Based on signs and symptoms

Management

Community level	Health centre level	Hospital level
• Warm compress • **Refer** to health centre	• Re-assure the patient or parent that the condition is not serious. • Patient must wear dark glasses when outside. • **Refer** to hospital.	If patient presents with hordeolum: • Cloxacillin 500mg 6 hourly orally for 5-7 days • Tetracycline 1% or chloramphenicol 1 % eye ointment 8 hourly until abscess drains **OR** • Perform drainage with stab incision at the site of pointing

chapter

7

Alimentary Tract Conditions

7.1 Diarrhoea in Adults

7.1.1 Acute Diarrhoea

Description

Diarrhoea is defined as passing of loose stool more than 3 to 5 times per day. It can be acute (lasting only a few days) or chronic and persistent (continuous for more than 14 days), and it can lead to dehydration and loss of electrolytes.

Signs and symptoms

- Frequent loose/watery stool 3 or more times in a day
- Malaise/fatigue
- Sometimes associated with vomiting
- Reduced urine output
- Dehydration (sunken eyes, poor skin turgor)
- Fever
- Blood/mucus on the stool

Causes

Acute diarrhoea

- Infections (viral, bacterial, protozoal)

Risk factors

- Side effects of medications e.g broad spectrum antibiotics
- Food poisoning
- Poor hygiene
- Climate change
- Contaminated water (eg with toxin)
- Intolerance to certain food such as food containing lactose, gluten or fat, poor nutrition.

  Chronic diarrhoea
- Chronic infections: amoebiasis, tuberculosis, opportunistic infections
- Underlying coditions: irritable bowel syndrome, ulcerative colitis, colon cancer
- Drug induced: laxatives

Diagnostic criteria and investigations

- Stool culture and microscopy
- FBC, CRP, urea/electrolytes, blood gas
- Based on signs and symptoms

Management

Community level	Health centre level	Hospital level
• Home-based fluid replacement (1L of boiled and cooled water, 8 teaspoons of sugar and ½ teaspoon salt) **Health education** • Keep surroundings clean • Improve personal hygiene e.g. hand washing after toilet and before handling food **Fluid replacement:** • Oral Rehydration Salt (ORS) Adult 1000ml over 24 hours and/or 200-400ml after every loose stool passed	• Treat as CL **AND/OR** • IV drip: Normal saline 0.9 % **OR** • Ringer's lactate **Refer** if not resolving	• Treat as HC • Treat as per cause of diarrhoea **AND** • Loperamide 4mg immediately and 2mg after every passage of stool **OR** • Diphenoxylate-atropine 2.5/0.025 mg 2 tablets immediately and 1 tablet after every stool passage. In case of unresponsive diarrhoea, give Nutren fibre **OR** peptamen

7.2 Dysentery

Description

Infection of the intestines resulting in severe diarrhoea with the presence of blood and mucus in stool. There are two types:

7.2.1. Amoebic dysentery

Description

A condition characterised by loose stools or diarrhoea caused by protozoa, Entamoeba histolytica.

Signs and symptoms

- Loose stools or diarrhoea usually with
- Blood
- Mucus
- Unpleasant odour
- May alternate with constipation
- Usually there is no fever
- Tenesmus
- Small volume of stool
- Sick looking
- Patient may be dehydrated

Causes
- Entamoeba histolytica

Risk factors
- Ingestion of contaminated food and water
- Oral-anal sexual practices

Diagnostic criteria and investigations
- Based on signs and symptoms
- Laboratory investigations

Management

Community level	Health centre level	Hospital level
• Home-based fluid replacement Keep surroundings clean • Improve personal hygiene e.g. hand washing after toilet Provide Health education **Fluid replacement: Oral Rehydration Salt (ORS)** **Adult:** 1000ml over 24 hours and/ or 200-400ml per every loose stool passed **Child:** 500ml to 1000ml stat and then 100ml to 200ml per every extra stool passed **Refer** to health centre	• Treat as CL	• Treat as above **AND/OR** **Adult:** Metronidazole 400mg orally 8 hourly for 5days. **Children:** Metronidazole 7.5mg/kg orally 8 hourly for 5days • Treat the underlying cause after laboratory investigations

7.2.2 Bacillary dysentery (shigellosis)

Description
Dysentery is an inflammation of the colon and the rectum, and it is characterised by the frequent passage of loose stool with blood and temperature above 39^{o}C.

Signs and symptoms
- Diarrhoea often with blood.
- Lower abdominal pain; cramping in nature
- Often there is fever
- There is ill- defined lower abdominal tenderness.
- Painful defecation

Causes
- Shigella dysenteriae

Risk factors

- Poor hygiene and sanitation
- Flies (mode of transmission)

Diagnostic criteria and investigations

- Stool microscopy
- Based on signs and symptoms

Management

Community level	Health centre level	Hospital level
• Home-based fluid replacement • Keep surroundings clean • Improve personal hygiene e.g. hand washing after toilet and before handling food. Manage as below • Oral Rehydration Salt (ORS) **Adult:** 1000ml over 24 hours and/or 200-400ml per every loose stool passed. **Children:** 500ml to 1000ml stat and then 100ml to 200ml per every extra stool passed. **Refer** to health centre	• Treat as CL **AND/OR** • **Refer** all cases to the hospital for further investigation ***NB:*** *if it becomes an epidemic, report cases to the environmental health officers.* *It should be well flagged that the diarrhoea couldn't be stopped*	• Treat as HC/ or according to laboratory findings. **AND/OR** • Ciprofloxacin 500mg orally 12 hourly for 5 days **OR** • Nalidixic Acid 1g 6 hourly for 7 days **OR** • Cotrimoxazole **Adult:** 960mg p.o. every 12 hours for 5 days **Children:** Ciprofloxacin (where the benefit outweighs the risk; 5-10mg/kg/ dose. Maximum dose is 500mg 12 hourly for 5 days **OR** • Nalidixic acid for children over 3 months old; 12.5mg/dose 6 hourly for 7 days **NB:** Nalidixic acid is neurotoxic so should be used with caution in older patients; it is contraindicated in epilepsy and renal failure.

7.3 Anal conditions

7.3.1 Anal fissures

Description

An anal fissure is a crack in the skin lining the lower half of the anal canal. It is an extremely painful condition and is usually produced by the combination of straining and constipation.

Signs and symptoms

- Severe pain during and after (defaecation) often associated with bright red streaks of blood on outside of the faeces

- The crack will be seen on separating the anal margins gently
- Constipation, may follow diarrhoea (laxative abuse)
- The fissure is usually in the midline posterior, but may be anterior, especially in females
- It is often present in addition to a sentinel pile (an area of hypertrophied skin at the outer end of the fissure)

Causes

- Constipation, hard stool
- Anal intercourse and foreign bodies inserted in rectum

Differential diagnosis

Rule out haemorrhoids and cancers

Diagnostic criteria and investigations

- Clinical investigations (visual and digital examination of anal area)

Community level	Health centre level	Hospital level
• Dietary advice to promote soft stools • Personal hygiene • Advice against anal intercourse • Warm baths. Sit for 5 minutes twice a day. • **Refer** to health centre	• Treat as CL **AND/OR** • Paracetamol 1g 8 hourly 3 – 5 days **AND** **Children:** • Liquid paraffin 5ml orally at bedtime may be indicated in some patients for short-term use (3-5 days) **Adults:** • Liquid paraffin 15 – 25 mL at bedtime may be indicated in some patients for short-term use (3-5 days) OR • Lactulose orally 20ml 12 hourly **Refer** if: • Severe pain • Recurrent episodes • Poor response to symptomatic management • The anus is very tight (PR not possible)	• Treat as HC • Glycerine suppositories nocte for 3-5 days **AND** • Bismuth subgallate compound applied twice daily and after every stool passage **OR** • Lidocaine jelly 2% applied 8-12 hourly on the anal area with frequent seat baths reduces sphincter spasm **OR** • Lactulose orally 20ml 12 hourly

7.3.2 Haemorrhoids

Description

Haemorrhoids are enlarged veins in the rectum, which prolapse on defaecation. They are the most frequent cause of rectal bleeding.

Signs and symptoms
- Itching
- Small prolapse easily pushed back through anal sphincter
- Pain
- Bleeding-fresh blood seen on toilet paper

Causes
- Constipation

Risk factors
- Drugs e.g opiods
- Sexual deviation
- Pregnancy

Differential diagnosis
Underlying carcinoma in older patients

Diagnostic criteria and investigations
- Based on signs and symptom
- Proctoscopy (gold standard for diagnosis)
- Flexible sigmoidoscopy is performed to exclude protimal disease
- Full Blood Count

Management

Community level	Health centre level	Hospital level
• High fibre diet to prevent constipation • Drinking of clean water, minimum of 2L per day • Counsel against chronic use of laxatives • Avoid straining at stool • Physical exercises. • **Refer** to health centre	• Treat as CL **AND/OR** • Liquid paraffin 15 – 25 ml oral at bedtime for 3-5 days **OR** • Petrolatum/shark liver/phenylephrine rectal cream applied after every stool passage **OR** • Bismuth subgallate/zinc oxide/ Bismuth oxide suppositories inserted 12-24 hourly **OR** • Bismuth subgallate rectal cream applied after every stool passage **OR** • Lidocaine HCL acetate-hydrocortisone rectal cream applied after every stool passage • **Refer** to hospital: When a patient experiences severe pain, recurrent episodes, poor response to symptomatic treatment	• Treat as HC **AND/OR** • Consider haemorrhoidectomy in recurrent episodes, poor response to symptomatic treatment **NB:** surgery for pregnant women should be done after delivery

7.4 Appendicitis

Description

Appendicitis is an acute infection of the appendix. At first the infection is confined to the appendix. If the appendix ruptures, the infection can spread to the rest of the abdomen resulting in generalised peritonitis. Inflammation of the appendix is a common problem in children and young adults.

Signs and symptoms

- Pain in the abdomen: first it may be noticed around the umbilicus and later the pain shifts to the right lower quadrant
- Pain is worse when coughing or walking
- Nausea and vomiting
- Fever
- At times, the pain usually localises tenderness in the right lower quadrant (rebound tenderness may not be present)
- Bowel sounds present or diminished
- In babies, small children, pregnant women and old people, the signs may not be typical
- Constipation is usual or diarrhoea
- Tenderness on rectal exam may be present.
- Abdominal bloating
- Loss of appetite
- Cramps on the right leg

Causes

- Blockage of the hollow portion of the appendix by a calcified stone made of faeces
- Inflamed lymphoid tissue from a viral infection, parasites, gall stones or tumours
- Low intake of fibre diet

Risk factors

- Age
- Gender
- Race
- Prior antibiotic use

Diagnostic criteria and investigations

- Clinical examination
- Full Blood Count
- Ultrasound
- Alvarado score table

Management

Community level	Health centre level	Hospital level
NB: This condition is an emergency and referral to hospital should be made immediately appendicitis is suspected **Refer** to hospital	• **Refer** to hospital	• Pethidine 50-100 mg I.M stat. • Withhold oral fluids and food and start an I.V. • Inform surgeon immediately

7.5 Peptic ulcer disease

Description

The condition whereby the lining of the stomach or duodenum slowly begins to erode as a result of excessive acid secretion and/or diminished mucosal protection.

Signs and symptoms

- Epigastric pain 1-2 hours after eating, or with an empty stomach, acute epigastric pain, often radiating to shoulder, epigastric tenderness on palpation
- Pain that awakens the person in the early hours of the night
- Pain relieved with food or antacid
- Coffee ground vomitus
- Black stools (melaena)
- Shock- rapid feeble pulse, clammy skin and low B.P, if complicated by bleeding
- Tenderness in the middle of the abdomen on palpation from the umbilicus to the epigastric area
- When perforated: sick looking patient, lying as still as possible, elevated temperature, abdomen-board like rigidity, rebound tenderness, absent bowel sounds
- Weight loss (investigate for malignancy)
- Diet (spicy foods, carbonated drinks and alcohol)

Causes

- Emotional stress,
- Medicine side effect(s), such as indomethacin and aspirin, ibuprofen (NSAIDs)
- Infection (H. pylori), and it varies with people

Risk factors

- Excessive caffeine intake
- Cigarette smoking
- Excessive alcohol intake
- Stress or psychogenic conditions

Differential diagnosis

- Refer all children to hospital to rule out gastro-oesophageal reflux

Diagnostic criteria and investigations

- H. pylori antigen detection
- Endoscopy (upper GIT)
- X-ray (Barium meal)

Management

Community level	Health centre level	Hospital level
• Provide health education • Advice on diet (spicy foods, carbonated drinks) • Reduce alcohol intake • Smoking cessation • Paracetamol 500mg-1g 8 hourly for 5 days • **Refer** to health centre	• Treat as CL **AND/OR** • Magnesium trisilicate suspension 15ml orally 8 hourly for 5-7 days **OR** • Magnesium trisilicate tablets 500mg orally 8 hourly for 5-7 days **OR** • Aluminium hydroxide-Magnesium hydroxide antacid 10-15 ml when necessary for 5-7 days • **Refer** to hospital when perforation and/or other complications are suspected	• Treat as HC **AND/OR** • Ranitidine 150mg orally 12 hourly daily for 4 weeks **OR** • Omeprazole 20mg orally 24 hourly (1 hour before meals) for 7 days **OR** • Pantoprazole IV 40mg over 15 minutes **OR** • Lansoprazole 30mg 24 hourly for 14 days Triple therapy for eradication of *H. pylori* (Triple Therapy): • Clarithromycin 500mg orally 8 hourly for 7 days **OR** • Amoxycillin 500mg 8 hourly for 7 days **AND** • Metronidazole 400mg orally 8 hourly for 7 days **AND** • Omeprazole 20mg orally 24 hourly (1 hour before meals) for 7 days • **Refer** to a specialist if there is presence of persistant symptoms or new onset compli-cations.

7.6 Constipation

Description

A condition characterised by a change in the usual bowel habits, hardened stools and difficulty emptying the bowels and decreased frequency of bowel action.

Signs and symptoms

- Abdominal discomfort
- Small hard stools passed irregularly under strain

Causes

- Dietary (low fibre diet)

- Inadequate fluid intake
- In infants - concentrated feeds
- Lack of exercise
- Patients being bedridden - especially the elderly
- Certain drugs, e.g. narcotic analgesic
- Cancer of the bowel
- Metabolic disease (diabetes mellitus)
- Pregnancy
- Endocrine disease (hypercalcaemia)
- Lower bowel abnormalities
- Chronic use of laxative
- Neurogenic (Parkinson's disease)

Risk factors

- Related to the causes

Diagnostic criteria and investigations

- X-ray: after barium enema
- Based on signs and symptoms
- Clinical examination

Management

Community level	Health centre level	Hospital level
• Provide health education (Encourage excercise, fluid intake, high fibre diet, discourage abuse of laxatives) • **Refer** to health centre if no improvement	• Treat as CL **AND/OR** • Liquid paraffin 15 – 25 ml oral at bedtime for 3-5 days **OR** • Glycerine suppositories inserted 24 hourly for 3-5 days **OR** • Bisacodyl suppositories inserted 24 hourly for 3-5 days **OR** **Adult:** • Bisacodyl 10mg orally at night 24 hourly for 3 days10mg **Children:** • 5-12 years: bisacodyl 5mg orally at night 24 hourly for 3 days • **Refer** to hospital for investigations if there is no response to treatment	• Treat as HC **AND/OR** • Treat the underlying cause **Children over 12 months:** • Lactulose 0.5ml/kg once or twice daily In case of unresponsive constipation, give - Nutren Fibre

7.7 Giardiasis

Description

It is the infection of the upper small intestine caused by the flagellate protozoan Giardia lamblia (or G. intestinalis). It results in clinical pictures ranging from asymptomatic colonisation to acute or chronic diarrhoea illness.

Signs and symptoms

- Abdominal cramps
- Bloating
- Diarrhoea
- Belching

Causes

- Flagellate protozoan Giardia lamblia (or G. intestinalis)

Diagnostic criteria and investigations

- Microscopic stool examination of Giardia intestinalis trophozoites or cysts of infected patient, sensitivity increases on serial 3 samples examination.
- More specific tests include stool duodenal ELISA or duodenal biopsy.

Management

Community level	Health centre level	Hospital level
• Home fluid rehydration • Oral rehydration salt (ORS) **Adult:** • 1000ml over 24 hours and/or 200-400ml after every loose stool passed • **Refer** to health centre	• Treat as CL **AND/OR** • IV drip: Normal saline 0.9 % **OR** Ringer's lactate **Refer:** any child with drowsiness following dehydration. • Put an I.V. drip and refer a patient if condition does not improve or gets worse	• Treat as HL **AND** **Metronidazole:** Adult and children over 10 years: 2g orally once daily for 2 days **OR** 400mg 8 hourly for 5 days. **Children below 10 years:** 15mg/kg/day in 3 divided dosing for 5- 7days. 1-3 years: 500mg/day; 3-7 years: 600-800 mg/day; 7-10 years: 1g/day for 3 days **OR** **Tinidazole:** **Adult:** 2g orally as a single dose **Children:** 50-75mg/kg body weight as a single dose **CAUTION:** Patients on metronidazole and tinidazole; reduce dosing to 50% in significant liver disease.

7.8 Ascariasis

Description

It is an intestinal infection caused by Ascaris lumbricoides. Also known as a roundworm; It is a long pink/white worm with sharp ends ranging from 20-30cm in length. Predominates in areas of poor sanitation and is associated with malnutrition, iron-deficiency anaemia, and impairments of growth and cognition.

Signs and symptoms

- Most patients are asymptomatic
- When symptoms occur, they are divided into 2 categories: early (larval migration) and late (mechanical effects)
- In the early phase (4-16 days after egg ingestion): fever, non-productive cough, dyspnea, wheezing.
- In the late phase (6-8 weeks after egg ingestion): Passage of worms (from mouth, nares, anus); diffuse or epigastric abdominal pain, nausea, vomiting; pharyngeal globus, "tingling throat" frequent throat clearing, dry cough;
  Complications - biliary and intestinal obstruction, appendicitis, pancreatitis and malnutrition.

Causes

- Ascaris lumbricoides

Risk factors

- Poor sanitation and hygiene
- Malnutrition

Diagnostic criteria and investigations

- Stool microscopy
- Rectal swab
- FBC

Management

Community level	Health centre level	Hospital level
• Wash hands with soap and water especially after passing stools and before working with food or eating • Keep finger nails short. • Wash food and vegetables well before eating or cooking. • Keep toilets seats clean. • Dispose off faeces properly. • **Refer** to health centre	• Mebendazole: adult and children above 2 years 100mg 12 hourly for 3 days **OR** 500mg as a single dose **OR** • Albendazole 400mg as a single dose **Refer** to hospital level if: • Signs of intestinal obstruction • Abdominal tenderness • Pain • Persistent vomiting	• Treat as HC • Treat as per complications

7.9 Cestodiasis

Description

Tapeworms disease is acquired from eating raw or undercooked beef infected with *Cysticercus bovis,* the larval stage of *Taenia saginata* (beef tapeworm) or undercooked food containing *Cystercercus cellulosae*, the larval stage of Taenia solium (pork tapeworm). Less commonly cestode includes *Diphyllobohrium latum* (poorly cooked fish) and *Hymenolepsis nana* (faecal oral contamination by both human and animals especially dogs).

Signs and symptoms

- T. saginata
  - Usually asymptomatic, its live segments may be passed in stool
  - Epigastric pain, diarrhoea, sometimes weight loss
- T. solium
  - Usually asymptomatic, its live segments may be passed in stool
  - Have larvae infestation causes cysticercosis (muscle pain, weakness, or fever)
  - CNS involvement may occur as a rare complication
- D. latum
  - Megaloblastic anaemia may occur as a rare complication

Causes

- Taenia saginata
- Taenia solium
- Diphyllobohrium latum
- Hymenolepsis nana

Risk factors

- Poor sanitation and hygiene
- Malnutrition

Diagnostic criteria and investigations

- Macro and microscopic stool examination for ova and parasites. It is indicated for some of the cestodes that release eggs or worm segments directly into the stool
  Collecting 2-3 stool samples increases the sensitivity
- Ultrasonography, CT, MRI
- Stool antigen
- ELISA tests are valuable in detecting and confirming other forms (i.e. *Cystercercosis, Echinococcosis*)

Management

Community level	Health centre level	Hospital level
• Avoid under-cooked or uncooked beef, pork or fish • Handle feacal matter with care • **Refer** to health centre level	Treat as CL **AND** Mebendazole 500mg OD Adults; Child <2 years: 250mg OD **Refer** if • Abdominal tendeness or pain • Abdominal masses • Vomiting	• **Taenia solium, taenia saginata and diphyl-lobothrium latum** **Adults and children over 6 years:** • Niclosamide 2g (PO) as a single dose after a light breakfast, followed by a purgative (e.g. Magnesium sulphate) after 2 hours. • Children 2-6 years, 1g as a single dose after a light meal, followed by a purgative after 2 hours; • Children under 2 years, 500mg as a single dose after a light meal, followed by a purgative after 2 hours **For Hymenolepsis nana** **Adults and children over 6 years** • Niclosamide 2g as a single dose on the first day, • Children 2-6 years niclosamide 1g on the first day as a single dose, then 50 days. • Children under 2 years, 500mg on the first day as a single daily for 6 days **OR** Praziquantel 40mg/kg body weight as a single dose **For T. Solium, T. Saginata, D. Latum** **Adults and children over 2 years** • Niclosamide 5- 10mg/kg as a single dose. **For H. nana** **Adults and children over 2 years** • Niclosamide 25mg/kg as a single dose. **For hepatic echinococcosis** Echinococcosis is treated with albendazole and surgery or albendazole aspiration, injection, and re-aspiration. **Note:** Albendazole 400mg every 12 hours is recommended for surgical intervention. Administer parenteral vitamin B-12 if evidence of vitamin B-12 **CAUTION:** Avoid niclosamide during the first trimester of pregnancy.

7.10 Schistosomiasis

Description

Parasitic disease caused by blood flukes (trematodes) of the genus Schistosoma. Infection is through the larval forms of the parasite which is released by freshwater snails. The parasite then, penetrates the skin during contact with infested water. In the body, the larvae develop into adult schistosomes. Others become trapped in body tissues, causing an immune reaction and progressive damage to organs.

Signs and symptoms

Schistosoma mansoni
- There may be abdominal pain and frequent blood stained stool
- Palpable liver (hepatomegaly); signs of portal hypertension and haematemesis

Schistosoma hematobium
- Painless terminal hematuria
- In chronic and complicated situations can lead to renal failure due to obstructive uropathy, pyelonephritis, or bladder carcinoma (10-20 years after the initial infection) immune complexes that contain worm antigens may deposit in the glomeruli, leading to glomerulonephritis and amyloidosis.

Causes
- Schistosoma mansoni
- Schistosoma hematobium

Risk factors
- Poor sanitation

Differential diagnosis
- Cancer of the bladder *(S. haematobium)*
- Dysentry *(S. mansoni)*

Diagnostic criteria and investigations
- Perform stool or urine analysis to identify and specify the eggs in the stool or urine. Thick faecal smear technique is needed for chronic disease stage of the intestine and liver. Diagnostic yields are improved by repeated stool samples and from biopsies at sigmoidoscopy.
- Schistosomal ELISA confirms exposure and if negative reliably excludes infection.

Management

Community level	Health centre level	Hospital level
• Avoid urinating or defaecating in or near water • Avoid washing or stepping in contaminated water • Refer to health centre	• Treat as CL and refer	• Treat as HC AND • Praziquantel: 40mg/kg as a single dose or in 2 divided doses. **NOTE:** High doses (20mg/kg) as single dose for 2 days for heavy S. Mansoni infections • Medicines will usually arrest progression of clinical features, but will not reverse them • Surgical interventions may be necessary.

7.11 Cholera

Description

Cholera is an acute gastrointestinal infection caused by Vibrio cholerae organisms (El Tor and classical biotypes). Infection occurs through ingestion of contaminated water or food by human faeces leading to severe diarrhoea and emesis associated with body fluid and electrolyte depletion. Incubation period is 24-48 hours.

Signs and symptoms

- The sudden onset of painless watery diarrhoea that may quickly become severe with profuse watery stools (rice water)
- Vomiting
- Severe dehydration and muscular cramps leading to hypovolemic shock and death
- The stool has a characteristic "rice water" appearance (non bilious, gray, slightly cloudy fluid with flecks of mucus, no blood and inoffensive odor)

Causes

- Vibrio cholerae

Risk factors

Poor hygiene and sanitation

Diagnostic criteria and investigations

- Dark field microscopy on a wet mount of fresh stool for identification of motile curved bacillus.
- Isolation through stool culture is best done through TCBS agar. Vibrio serotype can be discerned by immobilisation with specific antiserum.

Management

Community level	Health centre level	Hospital level
• Rehydrate with plenty of fluids • Boil all water for drinking • Wash hands before preparing food and after using the toilet • Wash all vegetables well before cooking or eating • Avoid undercooked food • Use latrines wherever possible • **Refer** for health centre	• Treat as CL and refer	**General information** • Rehydration, electrolytes and base correction is the most important step • Management of severely dehydrated patient, IV fluid replacement is preferable • Oral rehydration is indicated in moderate forms of dehydration but is ineffective in the presence of significant vomiting **In moderate dehydration** • Give oral rehydration, approximately 75-100ml/kg in the first four hours Reassess after four hours; if improved, continue giving ORS, in quantity

Community level	Health centre level	Hospital level
		corresponding to losses (eg after each stool) or 10 to 20ml/kg. If not improved, treat as severe **For severe dehydration** • Administer intravenous (I.V) fluid immediately to replace fluid deficit; Use lactated Ringer solution or, if that is not available, isotonic sodium chloride solution. • For patients older than 1 year, give 100mls/kg I.V in 3 hours—30 mls/kg as rapidly as possible (within 30 min) then 70mls/kg in the next 2 hours. For patients younger than 1 year, administer 100mls/kg IV in 6 hours—30 mls/kg in the first hour then 70mls/kg in the next 5 hours. Monitor the patient frequently. • After the initial 30mls/kg has been administered, the radial pulse should be strong and blood pressure should be normal. If the pulse is not yet strong, continue to give I.V fluid rapidly. Administer ORS solution (about 5 mls/kg/h) as soon as the patient can drink, in addition to I.V fluid. • If the patient can drink, begin giving oral rehydration salt solution (ORS) by mouth while the drip is being set up; ORS can provide the potassium, bicarbonate, and glucose that saline solution lacks. • Reassess the hydration status after 3 hours (infants after 6 hours), In the rare case that the patient still exhibits signs of severe dehydration, repeat the I.V therapy protocol. If signs of some dehydration are present, continue as indicated below for some dehydration. If no signs of dehydration exist, maintain hydration by replacing ongoing fluid losses. • Start antibiotics (see regimen below) after the patient is rehydrated and vomiting has stopped usually after 4-6 hours. Although the disease is self limiting, an effective antibiotic will reduce the volume of diarrhoea and shorten the period during which Vibrio cholera is excreted. Antibiotic prophylaxis may be given to all close contacts in the same dosage as for treatment. • Start feeding 3-4 hours after oral rehydration begins. Preferably, give antibiotics with food to minimise vomiting.

Community level	Health centre level	Hospital level
		If no signs of dehydration • For patients who have no signs of dehydration when first observed can be treated at home • Give these patients ORS packets to take home, enough for 2 days Demonstrate how to prepare and give the solution Instruct the patient or the caretaker to return if any of the following signs develop; increased number of watery stools repeated vomiting or any signs indicating other problems (eg, fever, blood in stool). • Doxycycline: Adult and child above 12 years; 300 mg as a single dose or 5mg/kg single dose **OR** • Erythromycin: Adult 500mg 8 hourly for 5 days Children: 40mg/kg/day given in 3 divided doses for 5 days **OR** • Ciprofloxacin: Adult: 30mg/kg single dose (not to exceed 1g) or 15mg/kg 12 hourly for 3 days **NOTE:** A home made ORS equivalent is 6 teaspoons of sugar and one half teaspoon of salt in a litre of water; a half cup of orange juice or some mashed banana can provide potassium. Urine output decreases as dehydration develops and may cease. It usually resumes within 6-8 hours after starting rehydration. Regular urinary output (i.e., every 3-4 hours) is a good sign that enough fluid is being given. In all suspected cases notify Ministry of Health immediately.

7.12 Inflammatory Bowel Disease

Description

Inflammatory bowel disease (IBD) is an idiopathic disease, probably involving an immune reaction of the body to its own intestinal tract. The 2 major types of IBD are ulcerative colitis (UC) and Crohn's disease (CD). As the name suggests, ulcerative colitis is limited to the colon. Crohn's disease can involve any segment of the gastrointestinal tract from the mouth to the anus

7.12.1 Ulcerative colitis

Description

Inflammatory condition that affects the rectum extends proximally to affect a variable amount of the colon. It is marked by remissions and relapses.

Signs and symptoms

- Rectal bleeding and tenesmus
- Bloody diarrhoea
- Abdominal cramps and pain
- Fever
- Nausea and vomiting
- Rebound tenderness

Causes

- Low fibre diet
- Genetic family history
- Smoking
- Inappropriate use of antibiotics

Risk factors

- Smoking appears to worsen the disease condition.

Diagnostic criteria and investigations

- FBC (for anaemia; thrombocytosis, leukocytosis), Diff WCC, ERS
- C-reactive protein
- Stool culture, occult blood
- Abdominal X-ray
- Abdominal ultrasound
- Barium enema
- Colonoscopy
- Abdominal CT

Management

Community level	Health centre level	Hospital level
• **Refer** to health centre:	• Pain relief (avoid NSAIDs) • Paracetamol 1g PO Stat • **Refer** to hospital	• Goals of therapy are to induce and maintain remission • Prescribe medication according to culture sensitivity tests • Sulphasalazine: • **Adults:** 1 gram four times a day for acute disease, reducing to 500mg four times a day for maintenance; • **Children** over 2 years for acute attack use 40-60mg/kg body weight daily. Maintenance dose 20-30mg/kg body weight daily **AND** • Prednisolone 30-60mg once daily for severe, acute and extensive disease; reduces gradually according to disease severity.

Community level	Health centre level	Hospital level
		• Correction of fluid deficit and/or blood is important in acute severe forms which may necessitate hospitalisation • Nutritional therapy should target to replenish specific nutrient deficits • Life long surveillance is required due to risk of bowel cancer • **Refer** patient to specialist

7.12.2 Crohn's Disease

Description

Crohn's disease is an idiopathic, chronic, transmural inflammatory process of the bowel that often leads to fibrosis and obstructive symptoms and can affect any part of the gastrointestinal tract from the mouth to the anus.

Signs and symptoms

- Mainly abdominal pain and diarrhoea; weight loss, anorexia, and fever may be seen
- Growth retardation in children
- Gross rectal bleeding or acute hemorrhage is uncommon
- Anaemia is a common complication due to illeal disease involvement
- Small bowel obstruction, due to stricturing
- Perianal disease associated with fistulization
- Beyond the gut symptoms: clubbing, skin, joint and eye problems

Causes

- Low fibre diet
- Genetic family history
- Smoking
- Inappropriate use of antibiotics

Risk factors

- Genetic family history
- Smoking
- Inappropriate use of antibiotics

Diagnostic criteria and investigations

- Endoscopy
- Barium
- Capsule enterescopy
- Immunological makers
- Tests: FBC, iron and folate studies, liver functions test, electrolytes/micronutrient deficiency assessment (calcium, magnesium, zinc). Blood culture, stool microscopy

Management

Community level	Health centre level	Hospital level
• **Refer** to health centre:	• Pain relief (avoid NSAIDs) • Paracetamol 1g PO Stat • **Refer** to hospital	• Goals of therapy are to induce and maintain remission • Prescribe medication according to culture sensitivity tests • Sulphasalazine: **Adults:** • 1 gram four times a day for acute disease, reducing to 500mg four times a day for maintenance; **Children** over 2 years for acute attack use 40-60mg/kg body weight daily. Maintenance dose 20-30mg/kg body weight daily **AND** • Prednisolone 30-60mg once daily for severe, acute and extensive disease; reduces gradually according to disease severity. • Correction of fluid deficit and/or blood is important in acute severe forms which may necessitate hospitalisation • Nutritional therapy should target to replenish specific nutrient deficits • Life long surveillance is required due to risk of bowel cancer • **Refer** patient to specialist

7.12.3. Pseudomembranous colitis

Description
Inflammation of the large intestines due to an overgrowth of Clostridium difficile

Signs and symptoms
- Diarrhoea and abdominal cramps occurs during first week, but can be delayed up to six weeks
- Nausea, fever, dehydration can accompany severe colitis
- Abdominal examination may reveal distension and tenderness

Causes
Clostridium difficile

Risk factors
- Prior antibiotic exposure remains the most significant risk factor for development of disease Antibiotics first seen with clindamycin, but amoxycillin and the cephalosporins are now most frequently implicated
- Geriatrics
- Recent GI surgery

- Malignancy
- Prolonged hospital stay

Diagnostic criteria and investigations

- Stool examination
- Enzyme immunoassays
- Sigmoidoscopy

Management

Community level	Health centre level	Hospital level
• **Refer** to health centre	• **Refer** to hospital	• Metronidazole 400mg 8 hourly for 5-days **OR** • Vancomycin (PO/IV) 125mg – 500mg 6 hourly for 5- 10days **Children:** • 1 month-12 years metronidazole 7.5mg/kg (max. 400mg) every 8 hours **OR** • Children > 1 month vancomycin 40mg/kg/day in divided doses.

7.13 Malabsorption syndrome

Description

Malabsorption is a clinical term that encompasses defects occurring during the digestion and absorption of food nutrients and infections of the gastrointestinal tract

Signs and symptoms

Depending on aetiology, presentation may collectively include:

- Diarrhoea a commonest symptom which is frequently watery
- Steatorrhea due to fat malabsorption; characterised, by the passage of pale, bulky, and malodorous stools. Stools often float on top of the toilet water and are difficult to flush
- Weight loss and fatigue
- Flatulence and abdominal distention
- Oedema due to hypoalbuminemia, and with severe protein depletion ascites may develop
- Anaemias which can either be microcytic iron deficiency (celiac disease) or macrocytic vitamin B-12 deficiency (Crohn's disease or illeal resection)
- Bleeding disorders (Ecchymosis, melena, and hematuria) due to vitamin K malabsorption and subsequent hypoprothrombinemia
- Metabolic defects of bones (osteopenia or osteomalacia) due to vitamin D deficiency.
- Bone pain and pathologic fractures may be observed. Malabsorption of calcium can lead to secondary hyperparathyroidism
- Neurologic manifestations: Electrolyte disturbances, such as hypocalcaemia and hypomagnesaemia, can lead to tetany. Vitamin malabsorption can cause generalised motor weakness (pantothenic acid, vitamin D) or peripheral neuropathy (thiamine), a sense of loss for vibration and position (cobalamin), night blindness (vitamin A), and seizures (biotin)

Causes

- Damage to the intestine from infection
- Inflammation
- Trauma (injury)
- Surgery
- Medication

Risk factors

- Prolonged use of antiobitics
- Other conditions like celiac disease, Crohn's disease
- Family history of cystic fibrosis
- Intestinal surgery

Diagnostic criteria and investigations

- Stool tests
- Blood test for nutrients
- Breath tests
- Imaging test
- Biopsy

Management

Community level	Health centre level	Hospital level
• **Refer** to hospital	• **Refer** to hospital level	• Patients should be referred to specialists for proper evaluation and definitive management • Two basic principles underlie the management of patients with malabsorption, follows: • The correction of nutritional deficiencies • When possible, the treatment of causative diseases

Nutritional support

- Supplementing various minerals, such as calcium, magnesium iron and vitamins, which may be deficient in malabsorption, is important
- Caloric and protein replacement also is essential
- Medium-chain triglycerides can be used as fat substitutes because they do not require micelle formation for absorption and their route of transport is port rather than lymphatic
- In severe intestinal disease, such as massive resection and extensive regional enteritis, parenteral nutrition may become necessary. Also give peptamen

Treatment of causative diseases

- A gluten-free diet helps treat celiac disease
- A lactose-free diet helps correct lactose intolerance; supplementing the first bite of milk-containing food products with Lactaid also helps
- Protease and lipase supplements are the therapy for pancreatic insufficiency
- Antibiotics are the therapy for bacterial overgrowth
- Corticosteroids, anti-inflammatory agents, such as mesalamine, and other therapies are used to treat regional enteritis.

7.14 Pancreatitis

Description

Pancreatitis is an inflammatory process in which pancreatic enzymes auto digest the gland. It may present as acute pancreatitis, in which the pancreas can sometimes heal without impairment of function or any morphologic changes, or as chronic pancreatitis, in which individuals suffer recurrent, intermittent attacks that contribute to the functional morphologic loss of the gland.

7.14.1 Acute Pancreatitis

Signs and symptoms

- Severe, unremitting epigastric pain, radiating to the back
- Nausea and vomiting
- Signs of shock may be present
- Ileus is also common
- Local complications: inflammatory mass, obstructive jaundice, gastric outlet obstruction
- Systemic complication: sepsis, acute respiratory distress syndrome, acute renal failure
- Hypocalcaemia

Causes

- It is due to sudden inflammation of the pancreas due to pancreatic enzymes auto digestion
- Idiopathic
- Gallstones
- Ethanol
- Trauma
- Steroids
- Mumps
- Autoimmune

Risk factors

- Associated with causes

Diagnostic criteria and investigations

- Serum amylase /serum lipase
- Complete blood counts, urea and electrolytes, bicarbonate levels, liver transaminases and albumin, LDH, glucose, calcium, CRP, and lipid profile for modified Glasgow criteria to disease severity and outcomes.
- Abdominal ultrasound, plain abdominal X-ray, chest X-ray, CT abdomen

Management

Community level	Health centre level	Hospital level
• **Refer** to hospital	• **Refer** to hospital	Principles of management include expertise supportive therapy: • Intravascular volume expansion (colloids/crystalloid) • Opiates analgesia (morphine IV maximum dose of 10mg) and antiemetics usually required.

Community level	Health centre level	Hospital level
		Prophylactic antibiotics in severe state, useful when there is evidence of sepsis (IV) • Ceftriaxone 1g 12hrly + metronidazole 500mg 8hrly or meropenem 1g 8hrly • ERCP + sphincterotomy when gallstones are present in the CBD. • In acute hypocalcaemia give calcium gluconate 10% IV infusion as a bolus over 10 minutes, dilute 60-120ml in 0.9% sodium chloride administered over 12-24 hours. Monitor serum calcium at least 12 hourly. • Prompt referral to specialised centres with intensive care facilities is recommended

7.14.2 Chronic Pancreatitis

Description

Chronic pancreatitis is long-term (chronic) inflammation of the pancreas that leads to permanent damage. The most common cause for such a condition is long-term excessive alcohol consumption.

Signs and symptoms

- Upper abdominal pain that may be accompanied by nausea, vomiting and loss of appetite
- Diarrhoea
- Exocrine insufficiency
- Steatorrhoea (oily stool)
- Jaundice
- Gastro intestinal bleeding is rare
- Diabetes

Risk factors

- Drinking alcohol or eating a large meal high in fats
- Gallstones

Diagnostic criteria and investigations

- Abdominal X-ray, for evidence of pancreatic calcifications
- CT, MRCP, ERCP, and endoscopic ultrasound are complementary
- Biochemical; Glucose tolerance test, serum vitamins (ADEK), hemoglobin and calcium levels
- Pancreatic function tests: Secretin /CCK – secretory test, faecal elastese concentrations

Management

Community level	Health centre level	Hospital level
• Avoid alcohol intake • Do not self-medicate	• Treat as CL • **Refer** to hospital	Because chronic pancreatitis cannot be cured, direct the treatment towards: • Relieving pain with pain-killers- Avoid NSAIDS • Improving food absorption - The patient should be recommended to follow a low- carbohydrate, high-protein diet that also restricts some types of fats. Another way is by giving the patient pancreatic supplements containing digestive enzymes. • Treating diabetes – Give insulin injections and other diabetic medications • In rare cases, surgery/ ERCP to open blocked ducts or remove part of the pancreas may be done to relieve pain. • Referral to specialist is recommended for expertise evaluation and management

7.15 Peritonitis

Description

Refers to inflammation of the peritoneum; it may be localised or diffuse in location, acute or chronic in natural history, infectious or aseptic in pathogenesis.

Acute peritonitis is most often infectious usually related to a perforated viscus (secondary peritonitis); primary or spontaneous peritonitis refers to when no intraabdominal source is identified. Acute peritonitis is associated with decreased intestinal motility, resulting in distention of the intestinal lumen with gas and fluid. The accumulation of fluid in the bowel together with the lack of oral intake leads to rapid intravascular depletion with effects on cardiac, renal, and other systems.

Chronic peritonitis refers to longstanding inflammation of the peritoneum.

Signs and symptoms

- Acute abdominal pain and tenderness
- Dehydration
- Fever
- Hypotension
- Nausea and vomiting
- Tachycardia
- Constipation
- Complications include abscess formation, oliguria and shock
- Similar features may be seen in spontaneous bacterial peritonitis (SBP), which occurs in cirrhotic patients with ascites

Diagnostic criteria and investigations

- Blood cultures due to bacteremia
- Scanning procedures (ultrasound and/or CT scan) facilitates the diagnosis, abdominal having the highest diagnostic yield
- Peritoneal fluid analysis for microscopy, microbiology, culture and sensitivity
- Macroscopic evaluation of the peritoneal fluid will exclude hemoperitoneum in trauma cases

Management

Community level	Health centre level	Hospital level
		• Supportive treatment • Antimicrobial therapy is adjunctive to surgical correction of underlying lesion or process and treatment will depend on causative agent. Where cause is not known antibiotics of choice are: • Ampicillin (I.V) 1g every 6 hours for 5-10 days **AND** • Gentamycin (I.V) 4 mg/kg/24 hours in 3 divided doses for 5-10 days **AND** • Metronidazole (I.V)/ orally 400-600mg every 8 hours for 5-10 days Surgery remains a cornerstone of peritonitis treatment

chapter

8

Gynaecology and obstetrics

8.1 Anaemia in pregnancy

Description

Anaemia in pregnancy is a haemoglobin concentration of < 11 g/ dL in first and third trimester and less or equal to 10.5g/dL in second trimester

Signs and symptoms

- Headache
- Dizziness
- Fatigue
- Mucosal pallor
- Jaundice (may or may not be present)
- Hepato-splenomegaly (may or may not be present)
- Heart failure in severe cases

Causes

- Haemodilution of pregnancy
- Decreased dietary intake of iron containing foods
- Chronic blood loss e.g. hook worm infestation
- Physiological (due to blood volume expansion in pregnancy)
- Poor dietary intake of iron, folate and vitamin B12
- Haemolytic disorders (e.g. sickle cell disease, G6PD defect)
- Infestations with hookworm, ascaris, schistosomes
- Chronic infections e.g. TB, UTI, HIV
- Bleeding complications in pregnancy

Risk factors

- Multiple pregnancies
- Short inter pregnancy intervals
- Low socio economic status
- Malnutrition pica
- History of heavy menses
- Maternal conditions (such as chronic diseases - HIV & AIDS, diabetes, hypertension)
- Maternal habits (alcohol and soil consumption)
- GIT disease affecting absorption

Diagnostic criteria and investigations

- FBC
- Iron studies
- Stool analysis
- HTC
- Electrophoresis of Hb

Management

Community level	Health centre level	Hospital level
Health education on nutrition and FP	• Prevention • All antenatal patients are given routine iron and folic acid supplementation as follows: • Ferrous sulphate oral 200mg daily **AND** • Folic acid oral 5mg daily **AND** • Vitamin B complex 1 tablet daily **AND** • Ascorbic acid 250mg daily throughout pregnancy • Iron and folic acid supplementation should be continued during lactation • Treatment of anaemia • Ferrous sulphate 200mg two times daily with food. Continue throughout period of breast feeding. • Folic acid oral 5mg daily **AND** • Vitamin B complex 1 tablet daily **AND** • Ascorbic acid 250mg daily throughout pregnancy • Refer to hospital if: • Hb less than 8g/dL at any gestational age. • Hb less than 10g/dL in patients over 34 weeks of gestation. • Non-responding Hb (-a rise in the Hb of less than 1.5g/dL over 2 weeks or -less than 2g/dL over 3 weeks in early pregnancy) • Pallor (anaemia) plus signs of chronic disease e.g. suspicion of TB, or the presence of hepatosplenomegaly • Evidence of cardiac failure • Anaemia of sudden onset • Any low Hb with an obstetric complication • Signs and symptoms of acute or chronic blood loss occur	Erythropoietin Identify the cause and treat accordingly Blood transfusion

8.2 Hypertension in pregnancy

Description

Hypertension in pregnancy is diagnosed when BP is equal or above 140/90 mm Hg measured on two occasions 4 hours apart or diastolic BP above 110 mmHg or an increase of 30 mm Hg systolic and 15 mm Hg diastolic in the earliest recorded blood pressure or pre pregnancy blood pressure measured on one occasion.

Hypertensive disorders of pregnancy can be classified as:

- Chronic hypertension: hypertension diagnosed before pregnancy or before 20 weeks of pregnancy

- Gestational hypertension: hypertension without proteinuria, detected from 20 weeks of pregnancy to 6 weeks post partum
- Pre-eclampsia: Hypertension with proteinuria after 20 weeks of pregnancy
- Mild pre-eclamsia – Proteinuia+- ++, diastolic pressue 90-110mm Hg, gestation beyond 20 weeks
- Severe pre-eclampsia–Proteinuria +++, systolic pressure 160mm Hg and diastolic pressure of 110 and above
- Eclampsia: seizures in women with pre-eclampsia

Note: All patients with hypertension in pregnancy should be managed at hospital level.

Signs and symptoms

- Elevated blood pressure
- Rapid weight gain
- Oedema
- Eminent signs: headache, blurred vision, epigastric pain, dizziness

Risk factors

- Primigravida
- Extremies of age (below 18 years and above 35 years)
- Obesity
- D/M and renal disease

Diagnostic criteria and investigations

- Based on the signs and investigations
- Elevated BP
- Proteinuria
- Oedema
- FBC
- LFT
- U & E

Management

Community level	Health centre level	Hospital level
Refer to health centre	**Refer** to hospital	Admit to hospital if proteinuria develops for delivery. Admit at 37 weeks for delivery if blood pressure has been controlled Drug treatment for mild to moderate pre- eclampsia: • Methyldopa 500mg 8 hourly **AND/OR** • Nifedipine, slow release 10mg 24 hourly

8.12.1 Severe pre-eclampsia

Description

Is present when systolic BP is ≥160mm Hg and diastolic BP is ≥110mm Hg or increase of 25mm Hg of diastolic blood pressure associated with 3+ protein in urine. This is a hypertensive condition of pregnancy which may result in maternal fits. Should be managed in a hospital setting.

Management

Community level	Health centre level	Hospital level

Refer to health centre	• Reduce diastolic BP to less than 110 mm Hg.
	• Preload with:
	  • Sodium chloride 0.9%, IV, 300 mL unless in cardiac failure **AND**
	  • Nifedipine, oral, 10 mg as a single dose.
	  • Magnesium sulphate 5g IM in each buttock
	• **Refer** immediately to hospital. If there is delay in referral, repeat nifedipine in 30 minutes if diastolic BP remains above 110mm Hg
	
	• **Refer** to hospital
		Set up an IV drip
		• Give magnesium sulphate as follows:
		Loading dose
		• Give 4g of 20% magnesium sulphate solution IV over 10 minutes.
		• Follow promptly with 10g of 50% magnesium sulphate solution: administer 5g in each buttock deep IM with 1 ml of 2 % lignocaine in the same syringe.
		Maintenance dose:
		• Give 5g of 50 % magnesium sulphate solution with 1 ml of 2 % lignocaine in the same syringe by deep IM injection into alternate buttocks every 4 hours. Continue treatment for 24 hours after delivery or last convulsion, whichever occurs last.
		• If 50 % solution is not available, give 1g of 20 % magnesium sulphate solution IV every hour by continuous infusion.
		Monitor for signs of magnesium toxicity:
		Decrease in respiratory rate, patellar reflexes and urinary output. If signs of toxicity: *give antidote for magnesium sulphate:*
		• Calcium gluconate 1-2g slow IV & repeat as needed until respiratory rate increases
		Stop magnesium sulphate if:
		• Urine output is less than 100mL in 4 hours, 25ml per hour **OR**
		• Respiratory rate is less than 16 breaths per minute, **OR**
		• If reflexes are absent
		Lower the BP using:
		• Nifedipine 10mg orally (not sublingual) as a single dose
		• Repeat nifedipine in 30 minutes if diastolic BP remains above 110mm Hg **OR**
		• Hydralazine 5mg slowly over 5 minutes until the blood pressure is lowered. Repeat hourly as needed **OR**
		Rectal administration of diazepam

8.12.2 Eclampsia

If the patient develops convulsions: Treat as for severe pre-eclampsia above.

Community level	Health centre level	Hospital level
Refer to health centre	• Stabilise the patient prior to urgent referral to hospital • Ensure safe airway • Turn woman onto left lateral position • Administer oxygen Initiate magnesium sulphate loading dose and infusion before referral • Lower BP • Insert a Foley's catheter • Monitor vital signs while awaiting transport • **Refer** to hospital	If BP is >110mm Hg diastolic or >160mm Hg systolic give: • Hydralazine 10mg IV bolus and repeat Hydralazine dose every 15 minutes until diastolic BP is down to 100mm Hg, but not below 90 mm Hg **OR** • Nifedipine 20mg orally every 12 hours for 1-2 doses until delivery. **Note:**Aim to deliver within 8 hours for unconscious patient, for conscious patients aim for 12hours For active management of the third stage of labour, **Ergot-containing drugs are contraindicated in hypertensive women, including preeclampsia.**

8.3 Vaginal discharge

Description

Abnormal increase of vaginal discharge; normal discharge is small in quantity and white to colourless

Signs and symptoms

- Gonorrhoea produces a thin mucoid slightly yellow pus discharge with no smell
- Trichomoniasis causes a greenish-yellow discharge with small bubbles and a fishy smell accompanied by itching of the vulva
- Candida albicans causes a very itchy, thick white discharge like sour milk
- Mycoplasma, chlamydia may cause a non-itchy, thin, colourless discharge

Causes

Trichomonas vaginalis, candida albicans, bacterial vaginosis or chlamydia trachomatis

Risk factors

- Certain hygiene practices, such as douching or using scented sprays or soaps
- Cervical cancer
- Pregnancy
- Rectovaginal fistula
- Vaginal atrophy (genitourinary syndrome of menopause)
- Vaginal cancer

Diagnostic criteria and investigations

- Speculum examination, especially in older multiparous women
- Pus swab: microscopy, Gram stain, C&S
- Blood: syphilis tests (RPR/VDRL)

Management

Health centre	Short acting insulin
If there is clinical evidence of vaginal candidiasis:	• Clotrimazole pessary inserted in the vagina, 500mg at night as a single dose **OR** • Nystatin pessaries 100 000 i.u 2 times a day for 14 days
Bacterial vaginosis & Trichomoniasis	• Metronidazole 400mg pessary OD for 5 days **Caution:** Metronidazole is contraindicated in the first trimester of pregnancy.
Partner with Gonorrhoea	• Doxycycline 100mg PO 12hourly for 7 days

8.3.1 Pelvic inflammatory disease (PID)

Description

This is any infection and resultant inflammation of the female genital tract. It is usually caused by N. *gonorrhoeae*, Chlamydia and anaerobes. It is basically a surgical condition as the early stages are usually asymptomatic.

Signs and symptoms

- Abdominal pain
- Pain during sexual intercourse
- Abnormal vaginal discharge which can be offensive sometimes
- Abnormal uterine bleeding
- Pain during urination
- Fever, nausea, vomiting

Causes

- Gonorrhoeae
- Chlamydia infections. These bacteria are usually acquired during unprotected sex

Risk factors

- Women with sexually transmitted diseases especially gonorrhoea and chlamydia are at greater risk for developing PID
- Women who have had a prior episode of PID are at higher risk for another episode
- Sexually active teenagers are more likely to develop PID than are older women

- Women with many sexual partners are at greater risk for sexually transmitted diseases (STDs) and PID

Diagnostic criteria and investigations

- Ultrasound
- Laparoscopy

Management

Community level	Health centre level	Hospital level
Paracetamol 1g stat **Refer** to health centre	• Treat as above • **Refer** to hospital	• All patients with stage II–IV should be hospitalised for parenteral antibiotic therapy. • Frequent monitoring of general abdominal and pelvic signs is essential. • Remove IUCDs. • Rule out surgical emergencies i.e. appendicitis, pelvic abscess and ectopic pregnancy • In stage III, surgery is indicated if: • There is no adequate response after 48 hours of appropriate therapy • Rupture seems imminent • The patient deteriorates on treatment • After 4–6 weeks there still is a large or symptomatic pelvic mass. Drug treatment is as follows: **Stage I to II** • Ciprofloxacin 500mg immediately as a single dose **AND** • Metronidazole 400mg suppository 24 hourly for 7 days • Doxycycline 100mg 12 hourly for 7 days **Stages III to IV** **Surgical management**

8.3.2 Genital ulcer disease (GUD) syndrome

Description

Ulcerative, pustular or vesicular genital lesion(s), with or without regional lymphadenopathy, caused by a number of sexually transmitted infections (STIs) and non–STI-related conditions.

Signs and symptoms

- Primary syphilis: the ulcer is at first painless and may be on the fold between labia majora and labia minora or on the labia themselves or on the penis. (bacterial)
- Secondary syphilis: multiple, painless ulcers on the penis or vulva. (Bacterial)
- Granuloma inguinale: an irregular ulcer which increases in size and may cover a large area. (Bacterial)
- Chancroid: multiple, large, irregular ulcers with enlarged painful suppurating lymph nodes. (Bacterial)
- Herpes: small, multiple, usually painful blisters, vesicles or ulcers. (viral)

Causes

A number of conditions may produce genital sores in men and women e.g.

- Syphilis caused by *Treponema pallidum* bacteria
- Genital herpes caused by Herpes simplex virus
- Granuloma inguinale caused by *Donovania granulomatis*
- Chancroid caused by *Haemophilis ducreyi*

Risk factors

- History of inflammatory disease (e.g. psoriasis) and exposure to trauma or medications such as non-steroidal anti-inflammatory drugs, antimalarials, angiotensin-converting enzyme inhibitors, beta blockers, lithium, salicylates, or corticosteroids
- Lack of male circumcision
- Multiple sex partners, lifetime or current
- Non-recognition of ulcers in prodrome stage
- Sero-discordant sex partners (i.e. one partner with herpes simplex virus and one without)
- Unprotected sexual contact
- Unprotected skin-to-skin contact with ulcers

Diagnostic criteria and investigations

- Swab for microscopy
- Blood for VDRL/TPR

Management

Community level	Health centre level	Hospital level
Refer to health centre	• Advice on genital hygiene (shave around the ulcer, protect the ulcer with clothing) • **Refer** to hospital	• If blisters or vesicles are present: • Paracetamol 1g Po tds 5/7 • Non pharmacological as in primary health care • Ciprofloxacin 500mg every 12 hourly for 3 days **AND** • Benzathine penicillin 2.4 MU IM single dose **OR** • In pregnancy or penicillin allergic patients:

Community level	Health centre level	Hospital level
		• Erythromycin 500mg every 6 hourly for 7 days **OR** • Azithromycin 500mg immediately, then 250mg 12 hourly for 3-4 days • Refer for specialist Management • If ulcer persists for >10 days and partners were treated. • If blisters or vesicles persist. **Note:** Genital ulcers may appear together with enlarged and fluctuating inguinal lymph nodes (buboes) which should be aspirated through normal skin and never incised.

The Rhesus negative woman

General measures

Maternal serum antibodies absent

Prevention

Test for maternal serum antibodies at 'booking', 28 and 34 weeks' gestation.

During pregnancy, give prophylactic anti-D immunoglobulin to the mother within 72 hours of a potentially sensitising event.

Management

After a termination of pregnancy (TOP), miscarriage, ectopic pregnancy or amniocentesis <20 weeks at a hospital:

- Anti-D immunoglobulin, IM, 50mcg.

After external cephalic version or potentially sensitising event ≥20 weeks:

- Anti-D immunoglobulin, IM, 100mcg.

Ante partum haemorrhage

Description

Ante partum haemorrhage (APH) is defined as bleeding per genital after the 28 week of pregnancy. APH is an emergency.

APH signs and symptoms

	CAUSE OF BLEEDING	
Signs and symptoms	**Placenta Praevia**	**Abruption Placenta**
Bleeding	Always present	Not always present
	Bright red	Dark red
Abdominal pains	Absent	Present
Tender uterus	Absent	Present
Presenting part	Not engaged	Engaged
Abdomen	Often appropriate for gestational age	May be larger than gestation age (if concealed)
	Easy to feel foetal parts	Foetal parts difficult to palpate

Causes

- Placental
  - Placenta praevia
  - Abruptio placentae
  - Vasa previa

- Non-placental
  - Vaginal or cervical lesions e.g. cancer
  - Cervical infections
  - Trauma
  - Unknown

**Do not attempt to do a vaginal examination. You may precipitate torrential bleeding.

Risks factors:

- High parity
- Polyhydramnios
- Abnormal uterus

Diagnostic criteria and investigations

- A short umbilical cord
- Beta HCG
- USS; preferably with Doppler where possible
- FBC
- Blood grouping and cross match

Management

Community level	Health centre level	Hospital level
Refer urgently to next level of care or nearest health facility	• Put up an IV infusion of plasma expanders (normal saline or ringers lactate) with two large bore cannula. • Take some blood sample, keep in the syringe and send with the patient • Refer to hospital for further management **NB:** do no attempt to do vaginal examination	• Manage shock • Blood transfusion • Investigate the cause • Terminate pregnancy in case of abruption • Expedited birth if at term (if the foetus is alive • **Refer** to the next level if need arises (such as disseminated intravascular coagulation)

8.4 Post-partum haemorrhage

Description

Post partum hemorrhage (PPH) is defined as blood loss per vaginum after delivery in excess of 500ml (NVD) and 800ml (C/S) or less if it affects the general condition of the patient cumulatively in 24 hours.

Classification of PPH

- Primary PPH, occurs in the first 24 hours
- Secondary PPH, occurs between 24 hours to six weeks

Signs and symptoms

- Bleeding per vaginum which is often >500ml cumulatively in 24 hours
- The uterus may be still large, soft and not contracted especially in primary PPH
- Tarchycardia
- Low blood pressure
- High temperature
- Air hungry and restless

  In secondary PPH, there may be signs of infection, e.g. fever, abdominal tenderness

Causes

- Tonic-uterine atony, distended bladder, inverted uterus
- Tissue-retained products of conception and blood clots
- Trauma-lacerations of the uterus, cervix and perineum
- Thrombin - coagulopathy
- Precipitated labour
- APH
- Over-distended uterus (multiple pregnancy, fibroid, polyhydramnios)
- Grande multiparity
- Obstructed labour

Risk factors

- Previous history of PPH
- Antipartum and intrapartum haemorrhage
- Maternal anaemia (Hb less than 9g/dl)
- Assisted and surgical deliveries
- HIV
- Uterine atony
- Obstetric trauma
- Retained placenta

Diagnostic criteria and investigations

- FBC
- Blood grouping and X-Match
- Clotting time
- Ultra Sound Scan
- HIV Testing Services

Management

Community level	Health centre level	Hospital level
Refer urgently to health centre	Prevention of PPH • Ensure active management of 3rd stage of labour by skilled staff • Giving oxytocin injection 10 IU after ensuring that there is no second twin • Controlled cord traction with contraction of the uterus (do not wait for lengthening of the placenta) • Rub up contraction **Management** • Rub up the uterus to expel clots and ecilit uterine. • Insert two IV infusions with large bore canula with Oxytocin 20- 40 IU in 1L□Ringer's lactate solution to run at 60 drops per minute • Administer misoprostol 800mcg rectally/sublingually once • Suture lacerations • Manual removal of the placenta (in cases of retained placenta) • Bi manual compression of the uterus • If the uterus is inverted, cover it and refer **Refer** to hospital if not responding to treatment	• Rub up the uterus to contract and expel clots • Ensure the bladder is emptied • Check if placenta has been expelled and complete – if yes, expel any clots in the birth canal • Establish and treat the case of the bleeding – look for local causes is bleeding continues • Oxytocin 20 -40 IU in 1L Ringer Lactate to run at 60 drops per minute **If necessary, add** • Ergometrine 0.2-0.4mg IV or IM immediately **OR** • Misoprosol 800 microgram; *Sublingually* **If there is an infection give** • Amoxycillin 500mg 8 hourly for 7 days and • Metronidazole 500mg IV 8 hourly for 3 days then 400mg 8 hourly for 4 days • In cases of penicillin allergy give azithomycin 500mg 24 hourly for 3- days

8.5 Abnormal labour/ complications of labour

8.5.1 Obstructed labour

Description

It means that, in spite of strong uterine contractions in labour, the foetus does not descend through the pelvis due to mechanical factors. Obstruction usually occurs at the pelvic brim, but occasionally it may occur in the pelvic cavity or at the outlet of the pelvis.

Signs and symptoms

- Maternal and/or foetal distress
- Dehydration and ketoacidosis (sunken eyes, thirsty, dry mouth, dry skin identified by skin pinch going back slowly)
- Fever (raised temperature)
- Shock characterised by: rapid, weak pulse (100 per minute or more)
- Diminished urinary output
- Cold clammy skin, pallor
- Low blood pressure (systolic less than 90mmHg)
- Rapid respiratory rate (30 per minute or more)
- Anxiety, confusion, or unconsciousness

Causes of obstructed labour

- **Passage:**
  Cephalopelvic disproportion (small pelvis or large foetus)
  Abnormalities of the reproductive tract, e.g. pelvic tumour, cervix or vagina
- **Passenger:**
  Abnormal presentations, e.g transverse lie, brow, shoulder, face with chin posterior, locked twins*
- Foetal abnormalities, e.g. hydrocephalus, conjoint multiples

Risk factors

- Maternal pelvic abnormalities
- Young age of mother (under 17 years of age)
- Delay in accessing skilled help (distance, lack of transport, cultural beliefs and practices, lack of communication, community distrust of health care personnel, failure to act on Risk factors, delay in referral to higher level of care (e.g. for caesarean section) staff untrained to recognise obstructed labour
- Early pregnancies

Diagnostic criteria and investigations

Abdominal

- Non engagement of the presenting part
- Strong uterine contractions (frequent and $\geq$ 40 sec in 10 mins)
- Uterus may go into the tonic state
- Bundl's ring-is a sign of eminent uterine rupture

Fetal distress
- Fetal heart rate ≥ 160 or ≤ 100
- Absence of fetal heart beat-fetal death due to anoxia

Pelvic examination
- Sacral tipped on pelvic examination
- Reduced inter-spinous diameter

Meconium stained liquor-grade II-III (may be foul smelling)
- Fresh vaginal bleeding (in case of uterine rupture)
- Concentrated blood stained urine
- Vulval oedema
- Vagina hot and dry
- Poor progress or stationery cervical dilatation
- Large caput succedeneun and excessive moulding
- Receeding head

Partogram analysis
- Cervical dilatation crossing the alert and /action line
- Poor or no decent of PP
- Maternal and foetal well-being compromised

Management

Community level	Health centre level	Hospital level
• Early booking and consistant attendance at the ANC • Encourage all pregnant mothers to deliver at the health facility • Encourage mothers to book at waiting mother's lodge/ or ealier transport arrangements	• Proper initial patient assessment • Proper use of partogram and prompt reaction at abnormal findings • Put up an IV infusion with large bore canula (18) • **Refer** to the hospital for MO to review (Risk factors and emergency cases) • Monitor maternal and fetal condition throughout the referral	• Identify the cause and manage accordingly • Investigation (FBC, Blood grouping and X-match, USS) • Assisted vaginal delivery (outlet obstruction when cervix fully dilated) • Caesarian section/laparotomy (emergency) • Manage signs of shock • **Refer** to specialist if necessary

8.6 Cracked nipples during breastfeeding

Description

The areola and nipple are protected by the secretion of a lubricant from Montgomery's glands. Excessive mopping e.g. a towel, elaborate nipple handling and removing the baby from the breast before suction is broken are causes of cracked nipples. The cracks may cause infection and abscess in the breast.

Signs and symptoms
- Pain
- Swelling
- Cracked nipple that may be bleeding

Causes
- Vigorous rubbing
- Poor breast feeding techniques
- Poor breast pump techniques
- *Candida albicans* infections
- Severe dry skin
- Eczema of the nipples and breast
- Poor nipple hygiene

Risk factors
- Breast feeding techniques
- Cosmetics

Diagnostic criteria and investigations
- Based on the signs and symptoms
- Physical examination

Management

Community level	Health centre level	Hospital level
• Clean with mild soap and water. • Warm water compresses on the breast • Use emollient, e.g. hindmilk • If too painful, the milk should be expressed and the baby nursed on the other breast until improvement. • Educate on good breast feeding techniquies • **Refer** if there is redness, swelling,	• Treat as above **Refer** if there is tachycardia, fever, hypotension	• Treat as above

Drug	Dosage	Frequency	Duration	Code
Paracetamol	1g	8 hourly	3 days	C
Zinc oxide		Apply after every breast feeding	3 days	C
Add: If infected				
Cloxacillin	500mg	6 hourly	7 days	C

8.7 Breast abscess

Description

Breast infections usually occur when a woman is breastfeeding. The infection is caused by bacteria gaining entry through a cracked nipple. This can progress to abscess formation.

Symptoms and signs

- Pain in the affected breast
- Warm, tender, red swelling
- Infected area becomes fluctuant (filled with pus or soft in the centre)
- Fever and chills

Management

Community level	Health centre level	Hospital level
• Apply warm, wet compresses for 15 minutes for 3 days. • Express milk, and continue feeding. • Empty the breast completely after feeding	• Treat as above • Phenoxymethylpenicillin po 500mg four times a day 5 days **OR** • Cloxacillin po 500mg four times a day 5 days • In cases of penicillin allergy Erythromycin po 500mg four times a day 5 days • **Refer** if there is no improvement or drainage of abscess	• Treat as above

8.8 Puerperal sepsis

Description

Puerperal sepsis is defined as the infection of the genital tract occurring at any time between the onset of rapture of membranes and or labor and the 42nd day post-partum.

Signs and symptoms

- Fever
- Offensive PV discharge
- Lower abdominal pain
- Continuous lochia (>7days)
- Delay in the rate of reduction of uterus size
- Signs of infection during the first 42 days post delivery

Causes

Ascending infection from contamination during delivery. Bacteria include: *Staphylococcus aureus,* and Gram negative bacteria from the gut, e.g. *Escherichia coli*, Bacteroides, Streptococcus pyogenes.

Risk factors

- Genital tract infections during pregnancy repeated
- Unhygienic labor practices
- Prolonged rapture of membranes
- Caesarian section
- Birth in non-hygienic conditions
- Low socioeconomic status
- Poor nutrition, anaemia
- First birth
- Prolonged labour
- Multiple pelvic exams during labour
- Instrumentation during delivery
- Retention of placental fragments in the uterus
- Postpartum hemorrhage

Diagnostic criteria and investigations

- Blood cultures
- Vaginal swab for microscopy, culture and sensitivity
- Full blood count
- White blood cell count (may show leukocytosis)
- ESR, CRP
- Urea and electrolytes
- Urine culture and microscopy

Management

Community level	Health centre level	Hospital level
• **Refer** to health centre	• Put up 1L Ringer's lactate or normal saline • Metronidazole 500mg IV stat • **Refer** to the hospital	• History and examination to identify cause • If septic episiotomy remove sutures and allow it to drain • Sitz baths with normal saline • Continue IV fluids as above • Monitor vital signs • Monitor urine output • Co-amoxiclav 1.2g iv 8 hourly for 7/7 plus • Gentamycin 5-7mg/kg IV or IM daily in 2 divided doses 12 hourly **PLUS** • Metronidazole 500mg IV every 8 hourly for at least 3 days. • **Surgical intervention:** After clinical improvement switch to oral antibiotics If no clinical improvement after 72 hours Discuss with tertiary hospital/possible referral

8.9 Dysmenorrhoea

Description

Dysmenorrhoea is pain experienced during the menstrual period that interferes with the normal function. It is common (about 50% of women). It can occur without any organic cause (primary dysmenorrhea) and sometimes due to an organic cause (secondary dysmenorrhoea) such as underlying infection in the pelvic organs (P.I.D).

Signs and symptoms

- Intermittent pain and heaviness in lower abdomen associated with the menstrual period.
- Also may be accompanied by:
  - Headache
  - Diarrhoea or constipation
  - Nausea or vomiting

Causes

- Psychological problems and physiological problems, e.g. anxiety, emotional instability, a faulty outlook on sex and menstruation, and imitation of the mother's feelings about menstruation

Risk factors

- Younger average menarche
- Smoking, obesity
- Alcohol consumption
- High levels of stress can also greatly increase the incidence of dysmenorrhoea, as can depression, anxiety, and disruption of social networks
- Heavy menstrual loss
- Premenstrual symptoms
- Irregular menstrual cycles
- Age younger than 30 years
- Clinically suspected pelvic inflammatory disease
- Sexual abuse
- Low body mass index
- Sterilisation

Diagnostic criteria and investigations

- Based on the signs and symptoms

Management

Community level	Health centre level	Hospital level
• Advise and reassure women with primary dysmenorrhoea about the nature of the condition. • Advise the woman to undertake regular exercise as a part of lifestyle modification. • Apply heating pack over the lower abdomen and back. • Reduce sugary diet • Hydration	**Primary dysmenorrhoea:** • Ibuprofen 200-400mg 8 hourly for 2-3 days **Refer** if: • No improvement • Secondary dysmenorrhoea	**Primary dysmenorrhoea:** • Mefenamic acid tablets 250 – 500mg 8 hourly for 2-3 days • Indomethacin suppository 100mg PRN **Secondary dysmenorrhoea:** • Treat the underlying condition. • Refer to gynaecologist if no improvement

8.10 Ectopic pregnancy

Description

Ectopic pregnancy is the implantation of a fertilised ovum outside the uterine cavity. The most common site is in the fallopian tubes.

Signs and symptoms

- Amenorrhea
- Vaginal bleeding
- Pain in the lower abdomen
- Backache
- Dizziness and fainting
- Tenderness in the lower abdomen with or without rebound
- A tender mass may be felt in one adnexae on bimanual examination
- Shock may be present if there is severe bleeding in the peritoneum
- Cervical motion tenderness

Causes

- One cause of an ectopic pregnancy is a damaged fallopian tube that doesn't let a fertilised egg into the uterus, so it implants in the fallopian tube or somewhere else

Risk factors

- History of pelvic inflammatory disease (PID)
- Sexually-transmitted diseases such as chlamydia and gonorrhoea
- Congenital abnormality (problem present at birth) of the fallopian tube
- History of pelvic surgery (because scarring may block the fertilised egg from leaving the fallopian tube)
- History of ectopic pregnancy

- Unsuccessful tubal ligation (surgical sterilisation) or tubal ligation reversal
- Use of fertility drugs
- Infertility treatments such as in vitro fertilisation (IVF)

Diagnostic criteria and investigations

- Positive pregnancy test
- Pelvic sonography where available
- Culdocentesis

Management

Community level	Health centre level	Hospital level
Refer to health centre	• Secure IV line with wide-bore cannula (16-18G). • Normal saline (0.9% NaCl), or Ringer's lactate to run fast. • If signs of shock (see management of shock under emergencies). **Refer** to hospital as an emergency- with a sample of blood for typing and cross matching	**Surgical intervention** • Draw blood samples, grouping and cross matching. • Do a laparotomy urgently if you have done this before. If not refer patient with a sample of blood for typing and cross matching.

8.11 Abnormal uterine bleeding

Description

Abnormal uterine bleeding (AUB) is the term used to describe any symptomatic variation from normal menstruation in terms of regularity, frequency, volume, or duration.

Signs and symptoms

- Menorrhagia: Involve more blood loss (loss of more than about 3 ounces of blood or periods that last more than 7 days) but occur at regular intervals
- Polymenorrhea: Occur more frequently fewer than 21 days apart
- Metrorrhagia: Occur frequently and irregularly between periods
- Menometrorrhagia: Involve more blood loss and occur frequently and irregularly between menses

Causes

Polycystic Ovarian syndrome

- The level of estrogen that remains high instead of decreasing as it normally does after an egg is released and is not fertilised.

Risk factors

Risk is increased in women with the following:

- Age 35 or older
- Around menarchy and perimenopausal
- Obesity
- Improper use of hormonal pills
- Uncontrolled diabetes mellitus

Diagnostic criteria and investigations

- Based on signs and symptoms
- A physical examination
- A complete blood count
- Ultrasonography
- BHCG

Management

Community level	Health centre level	Hospital level
• **Refer** to health centre	**Refer** to hospital	**Exclude pregnancy** complications or organic cause. • NSAIDS e.g mefenamic acid 250 – 500 mg 8 hourly for 2 – 3 days **OR** • Ibuprofen oral 200–400mg 8 hourly daily for 2–3 days IF secondary to misuse of contraception, then re-initiate and counsel on correct use. **Refer** to specialist if bleeding is heavy and uncontrollable.

8.12 Miscarriage (abortion)

Description

A miscarriage or abortion is a loss of pregnancy before the 28th week of gestation either spontaneously or induced. In most cases, there will be history of missed menstrual period associated with vaginal bleeding.

Causes

- Idiopathic
- Trauma
- Medically induced or criminally induced
- Incompetent cervix
- Placental abnormalities
- Fibroids
- Hormonal imbalances

Risk factors

- Genetic predisposition
- Medications
- Maternal conditions (infections; (TORCH), diabetes mellitus, hypertension, malnutrition, etc.)
- Maternal habits (alcohol consumption and smoking)
- Obesity
- Cultural practices (consumption of traditional concoctions)

Diagnostic criteria and investigations

- History
- Clinical examination
- Beta HCG
- FBC
- USS

Classification of miscarriages (abortion)	Management
Threatened abortion- There is mild vaginal bleeding usually without abdominal pain and the cervix is closed.	• Monitor vital signs e.g. BP, pulse, FBC • Prescribe physical and sexual rest • Counsel and support the patient
Inevitable abortion- vaginal bleeding, associated with abdominal pain and cervical dilatation.	**First Trimester** • Evacuation of the uterus **Second Trimester** • Misoprostol 200mcg every 6 hourly
Incomplete abortion-vaginal bleeding associated with partial passage of products of conception and the cervix is dilated	• Manual vacuum aspiration **First Trimester** • Evacuation of the Uterus **Second Trimester** • Misoprostol 200mcg every 6 hourly
Complete abortion- When there is complete expulsion of the products of conception.	• Observe the patient • Reassure • Counselling
Missed abortion –when there is foetal death with retention of the product of conception	**First Trimester** • Misoprostol 600mcg sublingually every 3 hours maximum of two doses **Second Trimester** • Misoprostol 200mcg sublingually, orally, pv four to six hourly maximum of five doses
Septic abortion - complete or incomplete abortion associated with infection, **Clinical features** • Often history of unsafe abortion. • Fever and chills, abdominal pain, foul smelling vaginal discharge and/or • products of conception. • Lower abdominal tenderness.	**Antibiotics** • Evacuate uterus about 12 hours after initiating antibiotics • Co Amoxyclav 1.2g IV 8 hourly • Metronidazole 500mg IV 8 hourly

Classification of miscarriages (abortion)	Management
Septic Shock History and examination as in septic abortion and inclusive of the following. Tachycardia, week pulse, low blood pressure, cold clammy extremities	• Start resuscitation with IV fluids (Ringer's lactate or normal saline) • Intravenous antibiotics • Evacuation of the uterus after the patient has been stabilised • Employ life saving measures • Monitor vital signs • Give blood if indicated • Give misoprostol 400-800mcg orally or rectally • Oxytocin IV 20-40 IU diluted in 1000ml Ringer's lactate post partum; • Give egormetrine in cases of septic abortion (rule out hypertension). • If bleeding continues repeat oxytocin after 30 minutes. • Institute symptomatic treatment • Evacuate the uterus (MVA) • Counsel on FP • Treat the cause of abortion once the patient is stable to prevent recurrence. • **Refer** all women with vaginal bleeding to hospital Common antibiotics used in treatment of septic miscarriage: • Amoxycillin 500mg every 8 hours for 7 days **OR** • Metronidazole 400mg orally 8 hourly for 7 days • Amoxycillin-clavulanic acid 500/125mg 8 hourly 5-7 days **PLUS** **If allergic to penicillin:** • Azithromycin 500mg immediately, then 500mg daily for 2 days • Evacuation of the uterus should be carried out
	Refer: patients with signs of peritonitis who may need laparotomy **NB**: Rh-negative mothers should have administration of anti D immunoglobulin IM 100 micrograms within 72 hours of delivery of the foetus

8.13 Family planning

The key objective of FP is to ensure that everyone plan their family so that all children are born when wanted, expected and welcome. The health benefits of FP also have a major role in protecting the lives of infants, children, women and the family as a whole. To be successful both partners should take responsibility for the health of their family. Common contraceptive methods used in Lesotho are as follows:

8.13.1 Oral contraceptives

They fall into two major categories:

Combined oral contraceptives (COCs):

- Oestrogen 30 – 35 micrograms (as ethinyloestradiol) "Low dose"
- Oestrogen 50 micrograms + progestogen "High dose"
- "Triphasic pills" – contain phased levels which closely mimic normal cyclical hormonal activity

Note:

- Lower oestrogen dose pills cause fewer side effects than higher dose pills
- Mid-cycle spotting in patients on 30 micrograms COCs can be managed by changing to 50 micrograms COCs
- Menstruation on COCs will be regular, light and short

Progestogen Only Pills (POPs)

These contain norethisterone, or norethindrone or levonorgestrel. This type is suitable for lactating mothers or women with mild or moderate hypertension. Menstrual irregularity is a more common side effect.

Management

Instruct women always to inform the doctor or nurse that they are on contraceptives while attending clinic or hospital.

Women on Oral Contraceptives need regular physical check-ups including blood pressure measurement every six months e.g. if women develop depression after starting OC.

Need to withdraw COCs or POPs

- Pregnancy
- Severe headaches especially associated with visual disturbances
- Numbness or paresis of extremities
- Unexplained chest pain or shortness of breath
- Severe leg pains
- Development of any of the absolute contra-indication conditions

  Medicines reducing the effect of Oral Contraceptives are as follows:
  - Hypnotic/sedatives anti-migraine medication, barbiturates, chloral hydrate, diazepam
  - Anti-acid: aluminium hydroxide, magnesium hydroxide, magnesium trisilicate
  - Anti TB such as rifampicin
  - Antiretroviral such as nevirapine and ritonavir
  - Certain antibiotics such as penicillins and tetracyclines

Note:
For long term use of these "High Dose" COCs – 50 micrograms should be used or other method of contraception.

Drugs made less effective by oral contraceptives

Prescribers might consider increasing the doses of the following drugs, known with careful monitoring:

- Anti-convulsant
- Anti-diabetic agents
- Anti-coagulants
- Anti-hypertensive agents (methyldopa)
- Corticosteroids
- Hypnotics, sedatives or other CNS depressants

Post Coital Contraception ("morning-after pill")

The method is applicable mostly after rape and unprotected sexual intercourse where pregnancy is not desired. Within 3 days (72 hours) of unprotected sexual intercourse give:

- Combined oral Contraceptive ethinyloestradiol 100 mcg and levonorgestrel 500 mcg (2 high dose COC tablets) **OR**
- Ethinyloestradiol 30-35 mcg and levonorgestrel 150-250 mcg -3 tablets (3 low dose COC tablets).
- Repeat this dose after twelve hours
- Advise to return to physician if menstruation does not occur within 3 weeks
- Give advice on contraceptive use
- Rape victims should also be given erythromycin 250 mg-500 mg 6 hourly for 5 days
- Offer counselling

8.13.2 Long term hormonal contraceptives

Injectable Contraceptive:

- Medroxyprogesterone acetate IM 150 mg every three months **OR** Depot Medroxyprogesterone acetate 104/0.65ml every three months
  OR Norethisterone enanthate, IM, 200 mg, 8 weekly
  Note: Avoid use in severe hypertension and in women without proven fertility. Rule out pregnancy before next dose.

Implant contraceptive

- Progestogen-only sub-dermal implant: Flexible progestogen-releasing plastic rods surgically inserted under the skin of the woman's upper arm which provide contraceptive protection for 5 years.

Indications

Women wanting long-term highly-effective but not permanent contraception where alternative FP methods are inappropriate or undesirable.

Contraindications
As for POP
Warning signs (require urgent return to clinic)
- Heavy vaginal bleeding
- Severe chest pain
- Pus, bleeding or pain at insertion site on arm

Management

- Insert the implant subdermally under the skin of the upper arm following recommended procedures.
- Carefully explain warning signs and need to return if they occur
- Advise client to return:
  - after 2 weeks: to examine implant site
  - after 3 months: for first routine follow-up
  - annually until implant is removed: for routine follow-up

Contraindications for the subdermal implant are as follows
- Severe hypertension
- Thromboembolism
- Active liver disease
- Sickle cell anaemia
- Undiagnosed genital bleeding
- Severe headaches

8.13.3 Intrauterine device (IUD)

Easily reversible long-term non-hormonal FP method effective for up to 8 years which can be inserted as soon as 6 weeks postpartum *(e.g. Copper T380A).*

Indications
- Women in stable monogamous relationships wanting long-term contraception
- Breastfeeding mothers
- When hormonal FP methods are contraindicated

Contraindications
- Pregnancy (known or suspected)
- PID or history of this in last 3 months
- Undiagnosed abnormal uterine bleeding
- Women at risk of STIs (including HIV), e.g. women with, or whose partners have, multiple sexual partners)
- Reduced immunity, e.g. diabetes mellitus, HIV/AIDS
- Severe anaemia or heavy menstrual bleeding

Management

- Insert the IUD closely following recommended procedures and explaining to the client as each step is undertaken.
- Carefully explain possible side-effects and what to do if they should arise.
- Advise client:
  - to abstain from intercourse for 7 days after insertion
  - to avoid douching
  - not to have more than one sexual partner

8.13.4 Condom (male and female)

Indications are as follows:

- Couples where one or both partners have HIV/AIDS even if wife is using another FP method
- Couples in need of an immediately effective method
- Couples waiting to rule out suspected pregnancy
- Protection against exposure to STIs, including HIV/AIDS
- Where back-up method is needed when woman starting or forgotten to take oral contraceptives
- Where the couple prefer this FP method

8.13.5 Natural FP

8.13.5.1. Cervical mucus method (CMM)

CMM is a fertility awareness-based method of FP which relies on the change in the nature of vaginal mucus during the menstrual cycle in order to detect the fertile time. During this time, the couple avoids pregnancy by changing sexual behaviour as follows:

- **Abstaining from sexual intercourse:** avoiding vaginal sex completely (also called periodic abstinence)
- **Using withdrawal:** taking the penis out of the vagina before ejaculation (also called coitus interruptus)
- **Using barriers methods**: eg. condoms

Management

- Show client how to complete the CMM chart
- Advise client to always use condoms as well as CMM if there is any risk of exposure to STIs/ HIV

8.13.5.2. Lactational amenorrhoea method (LAM)

LAM relies on the suppression of ovulation through exclusive breastfeeding as a means of contraception. Guidance on correct use of the method is only available at centres with trained service providers.

Management

Explain to client that:

- She must breastfeed her child on demand, on both breasts at least 10 times during day and night.

- She must *not* give the child any solid foods or other liquids apart from breast milk
- Advise the client:
  To use condoms as well as LAM if there is any risk of exposure to STIs/HIV

8.13.6 Voluntary surgical contraception (VSC) for men: Vasectomy

This permanent FP method involves a minor operation carried out under local anaesthetic to cut and tie the two sperm-carrying tubes (vas deferens). It is only available at centres with specially trained service providers.

Indications
Fully aware, counseled clients who have voluntarily signed the consent form

Males of couples
- Who have definitely reached their desired family size and want no more children
- Where the woman cannot risk another pregnancy due to age or health problems

Management
- Ensure client understands how the method works and that it is permanent, not reversible and highly effective.
- Explain to client that vasectomy is not castration and sexual ability/activity is not affected that the client will need to use a condom for at least 15 ejaculations after the operation

8.13.7 Voluntary surgical contraception (VSC) for women: Tubal ligation

This permanent FP method involves a minor 15-minute operation carried out under local anaesthetic to cut and tie the two egg-carrying fallopian tubes. It is only available at centres with specially trained service providers.

Indications
As for 8.13.6 vasectomy (above) but for females

Management
- Ensure client understands how the method works and that it is:
  - Permanent and irreversible
  - Highly and immediately effective

- Explain to client that they:
  - Should use condoms if there is any risk of exposure to STIs/HIV

8.14 Prophylaxis for caesarian section

Prophylactic use of antibiotics in women undergoing caesarean section reduces the risk of infection-

Thirty minutes before operation

- Co-amoxyclav 1.2g IV stat **Plus**
- Metronidazole 500mg (I.V) stat **OR**
- Ceftriaxone 1g (I.V) stat

Note: Use of antibiotics for prophylaxis during surgery, should be evaluated from situation to situation and not generalised.

8.15 Labour induction

Description

Induction of labour is the artificial initiation of labour before its spontaneous onset to deliver the feto placental unit.

For induction of labour use:

Drug	Dose	Route	Frequency
Misoprostol	50mcg	Oral **OR**	4 hourly (max 4 dose)
	20ml	Oral **OR**	2 hourly (max 200mcg in 200ml water)
	50mcg	Posterior fornix	

8.16 Augmentation of labour

Oxytocin should only be used if membranes are ruptured

For oxytocin IV- the dose will depend on parity

Primigravida:

- Oxytocin IV 5 IU in 500ml of fluid titrate at 15, 30, 60 drops per minute until desired uterine contractions are attained

Multiparous:

- Oxytocin IV - start with low dose eg 1.25 IU in 500ml of fluid titrate as above. Regulate the dose according to response.

If no progress of labour is achieved give;

- Oxytocin IV initially 1 unit then 4 units in 1 litre normal saline at 15, 30, 60 drops per minute until regular contractions lasting for more than 40 seconds are maintained
  When 4 units are not enough to cause maintained contractions, and it is first pregnancy, the dose can be increased to 16, 32 then 64 units in litre of normal saline each time increasing the delivery rate through 15, 30 and 60 dpm.

If the membranes already ruptured and no labour progressing, the steps above should be followed

- Obstructed labour could be the cause of labour failure.
  Note: Rule out obstruction before augmenting labour with oxytocin

NB: Availabilty of misoprostol tablets is restricted to health facilities with pharmacy personnel only

Management

Non drug treatment

- Counselling
- Stop smoking
- Maintain a balanced diet
- Regular exercise

Drug treatment

- Hormone replacement therapy (HRT)
  This is not indicated in all postmenopausal women. Women with significant menopausal symptoms and those with osteoporosis Risk factors will benefit most
  The benefits of HRT need to be weighed against the potential harm (e.g. breast cancer, venous thrombo-embolism)

Note: Contraindications to HRT: Current, past or suspected breast cancer.

- Known or suspected oestrogen-dependent malignant tumours
- Undiagnosed genital bleeding
- Untreated endometrial hyperplasia
- Previous idiopathic or current venous thrombo-embolism
- Known arterial CHD. Active liver disease
- Porphyria
- Thrombophilia

Intact uterus (no hysterectomy)

HRT can be offered as sequentially opposed or continuous combined preparations. Continuous combined preparations have the advantage of less breakthrough bleeding, but should only be commenced once the woman has been stable on sequentially opposed therapy for a year. Treatment should be planned for 5 years but reviewed annually.

Sequentially opposed therapy:

- Conjugated equine oestrogens, oral, 0.3–0.625 mg daily for 21 days. **AND**
- Medroxyprogesterone acetate, oral, 5–10 mg daily from day 11–21.
  Followed by no therapy from day 22–28. **OR**
- Estradiol valerate, oral, 1–2 mg daily for 11 days. **AND**
- Medroxyprogesterone acetate, oral, 10 mg daily from day 11–21
  Followed by no therapy from day 22–28

Equivalent doses to medroxyprogesterone acetate:

- Norethisterone acetate, oral, 1 mg daily from day 11–21
- Cyproterone acetate, oral, 1 mg daily from day 11–21

Continuous combined therapy, e.g.:

- Conjugated equine oestrogens, oral, 0.3–0.625 mg plus medroxyprogesterone acetate, oral, 2.5–5mg daily. **OR**
- Estradiol valerate, oral, 0.5–1 mg plus norethisterone acetate, oral, 0.5–1 mg daily.

Note:

- Start at the lowest possible dose to alleviate symptoms. The need to continue HRT should be reviewed annually. Abnormal vaginal bleeding requires specialist consultation/referral.
- Any unexpected vaginal bleeding is an indication for excluding endometrial carcinoma. The use of transvaginal ultrasound to measure endometrial thickness plus the taking of an endometrial biopsy are recommended.

Uterus absent (post hysterectomy)

HRT is given as oestrogen only:

Estradiol valerate, oral, 1–2 mg daily. **OR**

- Conjugated equine oestrogens, oral, 0.3 mg daily **or** 0.625 mg on alternative

days up to a maximum of 1.25 mg daily.

Referral

- Premature menopause, i.e. < 40 years of age
- Severe osteoporosis
- Management difficulties, e.g. where a contra-indication to oestrogen replacement therapy exists
- Post-menopausal bleeding

chapter

9

Diseases of Public Health Concern

9.1 Malaria

Description

Infection by Plasmodium species. Malaria is transmitted by female anopheles mosquito bites. It presents in different clinical statuses which are uncomplicated malaria and complicated malaria. Lesotho is not a malaria-endemic country.

Signs and symptoms

Uncomplicated malaria	Complicated malaria	
Signs and symptoms	**Signs and symptoms**	**Laboratory findings**
• High fever and chills • Sweats • Headaches • Fatigue • Low energy • Nausea • Vomiting • Myalgia (muscle aches) • Stomach upset • Diarrhoea	• Impaired consciousness prostration, i.e. unable to sit, stand or walk without assistance multiple • Convulsions: more than two episodes in 24hours • Acidotic breathing and respiratory distress • Acute pulmonary oedema and acute respiratory distress syndrome • Circulatory collapse or shock • Anuria • Jaundice • Abnormal bleeding	• Hypoglycaemia (< 20%) • Hyperparasitaemia • Anaemia (hb less than 7 g/dl) • Haemoglobinuria • Hyperlactataemia (lactate >5mmol/l) • Renal impairment (serum creatinine >265µmol/l) • Pulmonary oedema (radiological)

Causes

- More than 90 per cent of human malaria infections in sub-Saharan Africa are due to P. *falciparum* while the remainder is due to P. ovale, P. *vivax*, or P. *malariae*.

Risk factors

- Travel to an endemic malaria country is the main risk factor
- Risk groups include pregnant (and post-partum) women, young children, the elderly, splenectomised and immunocompromised persons (including HIV-infected persons)

Diagnostic criteria and investigations

- Patient history
- Microscopic examination of thick and thin blood smears.
- Rapid diagnostic tests, e.g. HRP2 antigen dipsticks
- FBC, blood glucose, lactate, U&E tests, LFTs and urinalysis

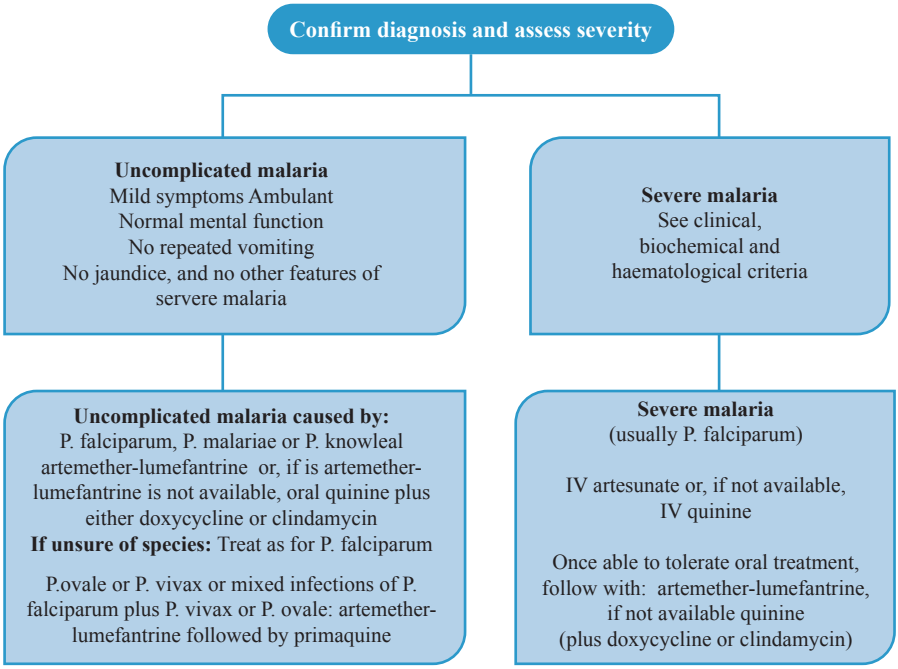
Management

- Treatment of malaria depends on the species of malaria, as well as on the severity of the disease. WHO recommends;

- Treatment of uncomplicated P. falciparum malaria
- Treatment of uncomplicated malaria caused by P. vivax
- Treatment of severe malaria
- Mass drug administration

Community level	Health centre level	Hospital level
• Preventative measures against mosquito bites between dusk and dawn include: • Use of di-ethyl 3-methylbenzamid (DEET) insecticide-impregnated mosquito nets, insecticide coils or pads. • Application of insect repellent to exposed skin and clothing • Wearing long sleeves, long trousers and socks, if outside, as mosquitoes are most active at this time. • Visiting endemic areas only during the dry season. • **Refer** to health centre	• Treat as CL **AND** • **Refer** to hospital.	• Treat as HC **AND** **For uncomplicated malaria** • Artemether/lumefantrine, oral, 20/120 mg, with fat-containing food/full cream milk to ensure adequate absorption. • Give the first dose immediately. • Follow with second dose 8 hours later. • Then 12 hourly for another 2 days (total number of doses in 3 days = 6) **When artemether-lumefantrine is not available or is contraindicated (e.g. a history of allergy to artemisinins or lumefantrine), uncomplicated malaria can be treated:** • Quinine 10 mg salt/kg body weight PO TDS for 7 days **AND** • Doxycycline 100 mg PO (or 2.2mg/kg in children) BD for at least 7 days. NOTE: Avoid in pregnancy and children under eight years old **OR** • Clindamycin 10 mg/kg PO BD for 7 days **For severe malaria** Intravenous therapy: the preferred agent is parenteral artesunate: • Artesunate IV, 2.4 mg/kg at 0, 12 and 24 hours; then daily until patient is able to tolerate oral therapy. • Administer at least 3 IV doses before switching to oral artemether/lumefantrine. **If parenteral artesunate is not available:** • Quinine, IV (1 mL = 300 mg quinine salt). • Loading dose: 20 mg/kg in dextrose 5% over 4 hours.

Community level	Health centre level	Hospital level
		• Maintenance dose: 8 hours after start of the loading dose, give 10mg/kg in dextrose 5% over 4 hours repeated every 8 hours until there is clinical improvement and the patient can take oral therapy. • Monitor for hypoglycaemia and dysrhythmias at least 4 hourly. • If there is significant renal failure increase dose interval to 12 hourly after 48 hours. • Follow intravenous therapy with oral therapy: Artemether/lumefantrine 20/120 mg, oral, 4 tablets/ dose with fat containing food or full cream milk to ensure adequate absorption. • Give the first dose immediately. • Give the second dose 8 hours later. • Then 12 hourly for another 2 days. (Total number of doses in 3 days = 6; i.e. 24 tablets).



Management of complications of severe malaria is summarised in the following table:

Complications	Management
Anaemia (Hb<7 g/dl)	Transfusion for severe anaemia
Hypoglycemia (BSL<2.2 mmol/L)	Dextrose 50% 1ml/Kg (2ml/Kg D10% for children)
Cerebral malaria	Airway management, anticonvulsant for seizures e,g. Diazepam 0.3-05mg/Kg IM, IV slow (PR in children)
Metabolic acidosis	Correct causes such as dehydration, hypoglycemia and seizure
Respiratory distress	Fluid restriction, oxygenation and ventilation support, diuretics for pulmonary oedema
Bleeding	Transfusion, Vitamin K1
Haemoglobinuria	Change treatment regimen, hydrate with normal saline
Circulatory collapse	Resuscitate accordingly
Renal failure	Hydration with normal saline to achieve urine output of 0.5ml/kg/hour in adults (1ml/kg/hour in children)

Note : Urgent Referral should be done for the following:

- All patients in areas that do not stock antimalarials
- Vomiting leading to inability to retain medication
- Patients not responding to oral treatment within 48 hours
- After 1st dose of artemether/lumefantrine 20/120 mg
- All patients with any sign of severe (complicated) malaria, see Section above under management
- Malaria, severe/complicated
- All children < 2 years of age
- Pregnant women
- Patients with co-morbidities such as HIV, diabetes etc
- Patients > 65 years of age

Malaria prophylaxis

- Mefloquine 250mg PO once weekly, begin 1-2 weeks before travel to malarial areas; discontinue 4 weeks after departure from malarial areas
- For patients who cannot tolerate mefloquine
  Atovaquone-proguanil (250/100mg) 1 tablet/day PO taken with food or a milky drink, begin 1-2 days before travel to malarial areas; discontinue 7 days after departure from malarial areas

All areas

- Doxycycline 100mg/day PO, begin 1-2 days before travel to malarial areas; discontinue 4 weeks after departure from malarial areas

9.2 Monkey Pox

Description

Monkeypox, a rare disease, is caused by the monkeypox virus, which is structurally related to the smallpox virus and causes similar, but usually causes milder illness. It presents as a rash that can look like pimples or blisters that appears on the face, inside the mouth, and on other parts of the body, like the hands, feet, chest, genitals, or anus.

The rash goes through different stages before healing completely.

Causes and transmission

Despite its name, non-human primates are not monkeypox virus reservoirs. Although the reservoir is unknown, the leading candidates are small rodents (e.g. squirrels) in the rain forests of Africa, mostly in Western and Central Africa.

Monkeypox is probably transmitted from animals via body fluids, including salivary or respiratory droplets or contact with wound exudate. Person-to-person transmission occurs inefficiently and is thought to occur primarily through large respiratory droplets via prolonged face-to-face contact.

Signs and symptoms

- Skin lesions occur more often in crops, and lymphadenopathy
- Secondary bacterial infection of the skin and lungs may occur
- Fever (38.8 - 40°C [101-104°F])
- Severe headache
- Backache
- Pharyngitis
- Nausea
- Vomiting (rare)
- Prostration
- Chills
- Exhaustion

Risk factors

- Newborns
- Children
- Immunocompromised individuals

Diagnosis and investigation criteria

- **Confirmed case**
  - Diagnosis of monkeypox is by culture
  - Polymerase chain reaction (PCR)
  - Immunohistochemistry, or
  - Electron microscopy, depending on which tests are available

- **Probable case**

This is contact that meets current epidemiologic criteria per the CDC. It is the occurrence of fever and vesicular-pustular rash, with the onset of the first sign or symptom at most 21 days after the last exposure, meeting the epidemiologic exposure.

- **Suspected case**

This is contact that meets current epidemiologic criteria per the CDC. It the occurrence of fever or unexplained rash and 2 or more other signs or symptoms, with the onset of the first sign or symptom at most 21 days after exposure, meeting the epidemiologic criteria.

Management

- Any suspected case has to be notified to public health
- Treatment of monkeypox is supportive
- Symptomatic treatment of flu-like symptoms
- Severe cases may require potentially useful antiviral drugs including;
  - Tecovirimat
  - Cidofovir or brincidofovir have activity against monkeypox in vitro and in experimental models. However, none of these drugs has been studied or used in endemic areas to treat monkeypox

9.3 Emerging Respiratory Pathogens

Description

Viral respiratory illness caused by coronaviruses, including Middle East respiratory syndrome (MERS-CoV), severe acute respiratory syndrome (SARS) and severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2). SARS-CoV-2 causes coronavirus infectious disease-2019 (COVID-19).

9.3.1 Covid-19 (Coronavirus disease-19)

Note: notifiable medical condition

Description

- Viral respiratory illness caused by the severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2). SARS-CoV-2 causes coronavirus infectious disease 2019 (COVID-19).
- The mean incubation period is 4-5 days but may be up to 14 days. Patients may however be infectious for 2-3 days prior to the onset of symptoms.

Disease severity classifications

Asymptomatic		Infection with SARS-CoV-2 without symptoms
Mild disease	Pneumonia	Individuals with COVID-19 Signs and symptoms (fever, cough, sore throat, malaise, etc) without hypoxia or dyspnea
Moderate disease		Clinical signs of pneumonia (fever, cough, dyspnea, tachypnea) and SpO2 ≥ 94% and no signs of severe pneumonia

Asymptomatic		Infection with SARS-CoV-2 without symptoms
Severe disease	Severe pneumonia	Adolescents and adults with clinical signs of pneumonia and pneumonia respiratory rate >30 breaths/min or severe respiratory distress or SpO2 < 94% on room air. Child with clinical signs of pneumonia and central cyanosis or SpO2 < 94% or severe respiratory disease; or general danger sign or fast breathing (<2 months ≥ 60 breaths/min; 2-11 months≥ 50 breaths/min; 1-5 years ≥ 40 breaths/min; 5-9 years ≥ 30 breaths/min).
Critical disease	Acute Respiratory Distress Syndrome	Respiratory failure not fully explained by cardiac failure or fluid overload. Oxygen impairment in adolescents and adults: Mild - PaO2/FiO2 between 200-300mmHg with PEEP≥ 5 cmH20 Moderate – PaO2/FiO2 between 100-200mmHg Severe – PaO2/FiO2 ≤ 100 mmHg Oxygen impairment in children: SpO2/FiO2 <264
	Sepsis	Acute, life-threatening organ dysfunction due to dysregulated host response to suspected or proven infection.
	Septic shock	Persistent hypotension despite volume resuscitation, requiring vasopressors to maintain MAP ≥ 65mmHg and serum lactate level >2mmol/L. Children: any hypotension or two of three of the following: Altered mental status, bradycardia or tachycardia, prolonged capillary refill or weak pulse, fast breathing, mottled or cool skin, high lactate, reduced urine output, hypothermia or hyperthermia

Signs and symptoms

- Covid-19 presents as an asymptomatic infection; or as a respiratory tract infection that may range from mild to severe with the key respiratory syndrome consisting of ANY of:
  - Cough
  - Sore throat
  - Shortness of breath
  - Anosmia (loss of smell) or dysgeusia (loss of taste)
- Atypical manifestations such as diarrhoea, skin manifestations, hyperglycemic syndromes and large vessel strokes may also accompany the respiratory syndrome
- Other symptoms include fever, fatigue, lethargy or myalgia

Risk factors

- The elderly (60 years of age or older)
- Cardiopulmonary co-morbidities
- Obesity
- HIV
- Diabetes mellitus.
- Active cancer
- Chronic kidney disease (e.g. dialysis patient)
- People with severe acute malnutrition (all ages)
- Current smokers

Diagnostic criteria and investigations

- A suspected Covid-19 case includes
  - Any person presenting with an acute (≤14 days) respiratory tract infection **or**
  - Other clinical illness compatible with Covid-19, **or**
  - An asymptomatic person who is a close contact to a confirmed case.
- Real-time, reverse-transcription polymerase chain reaction (RT-PCR)
- Rapid Antigen tests are available.
- CXR, ABG, FBC, LFTs, U&E, Blood Glucose, SpO2

Management (Symptomatic)

Community level	Health centre level	Hospital level
• Home management for patients who are asymptomatic **AND:** • Provided they can safely self-isolate and seek urgent health care if required i.e. • Separate bedroom available for patient to self-isolate in • Able to maintain physical distancing at home • Able to maintain hand hygiene • **Refer** to health centre	• Treat as CL **AND** • **Refer** to hospital.	• Treat as HC **AND/OR** **Home management for patients who are asymptomatic or who meet criteria for mild disease i.e.** • SpO2 ≥95% • Respiratory rate <25 breaths/minute • HR <120 beats/minute • Mental status normal • AND provided they can safely self-isolate and seek urgent health care if required: • Separate bedroom available for patient to self-isolate in • Able to maintain physical distancing at home • Able to maintain hand hygiene • Patient able to contact, and return to, healthcare facility in case of deterioration

Management (Symptomatic)

Community level	Health centre level	Hospital level
• Paracetamol, oral, 1 g 4–6 hourly when required. Maximum dose: 15 mg/kg/dose. Maximum dose: 4g in 24 hours. • **Refer** to health centre	• Treat as CL **AND** • **Refer** to hospital according to patient's condition.	• Treat as HC **AND/OR** Outpatient treatment with remdesivir: Initiate as soon as possible after diagnosis of symptomatic COVID-19 has been made and within 7 days of symptom onset 200mg IV on Day 1, then 100mg IV on days 2-3 (i.e. 3 consecutive days) **Inpatient treatment with remdesivir:** • Day 1 loading dose: 200mg IV, THEN • Day 2 and thereafter: 100mg IV per day **Treatment duration:** • Not requiring invasive mechanical ventilation and/or extracorporeal membrane oxygenation (ECMO): 5 days; if clinical improvement not demonstrated, treatment may be extended up to 10 days total • Requires invasive mechanical ventilation and/or ECMO: 10 days **Begin empiric antibiotics immediately upon admission for possible concurrent bacterial pneumonia.** • **Recommended:** Ceftriaxone 2 grams IV stat followed by 1 gram IV twice daily for 5-7 days **AND** • Azithromycin 500mg PO daily for 3 days **OR** • Clarithromycin 500mg PO twice daily for 5-7 days **OR** • Doxycycline 100mg PO twice daily for 7 days **Alternate:** Amoxycillin-clavulanic acid 1.2 grams IV twice daily for 5-7 days **AND** • Azithromycin 500mg PO daily for 3 days **OR** • Clarithromycin 500mg PO twice daily for 5-7 days **OR** • Doxycycline 100mg PO twice daily for 7 days

Community level	Health centre level	Hospital level
		Venous thromboembolic (VTE) disease prophylaxis: • Heparin 5,000 units SC BD **OR** • Enoxaparin 40mg OD for all admitted COVID-19 patients (do not use enoxaparin if patient has significant kidney injury) **Patients who develop a DVT or pulmonary embolus should receive:** • Enoxaparin 1 mg/kg SC BD for 7 days **AND** • Aspirin 100mg for patients with stable or unstable angina • Begin warfarin 5- 10mg OD and follow-up after discharge for at least 3 months. For all patients with an oxygen saturation <94%: • Dexamethasone 6mg daily for 10 days **OR** • Prednisone 40mg daily • Dose is adjusted accordingly if a patient requires a higher dose of steroid for another clinical indication such as asthma, COPD, or septic shock.

chapter

10

Infections and Infestations

10.1 Brucellosis

Description

A bacterial infection of acute or insidious onset (also known as undulant fever, Malta fever, or abortus fever). It is common as an occupational disease among people working with infected livestock or handling associated fresh animal products, particularly when the worker has skin wounds.

Signs and symptoms

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

Causes

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

Risk factors

- Occupational (eg butcher, farmers' abattoir)

Diagnostic criteria/investigations

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

Management

Community level	Health centre level	Hospital level
Provide public Health education on: • Milk hygiene e.g. drinking only pasteurised or boiled milk • Careful handling of animals e.g pigs, goats, dogs, and cattle if a person has wounds or cuts • Provide veterinary services for domestic animals • Paracetamol orally 500mg-1g 6-8 hourly for 3 days • **Refer** to health centre	• Treat as CL **AND/OR** • **Refer** to hospital.	• Treat as HC **AND/OR** • Exclude TB before starting therapy • Doxycycline po 100mg twice daily 6 weeks **AND** • Streptomycin IM 1g daily for 2 weeks **OR** • Gentamycin IV 5-7mg/kg daily for 2 weeks **OR** • Ciprofloxacin po 500mg twice daily for 2 weeks **Note** • Doxycycline and gentamycin contraindicated in pregnancy

Community level	Health centre level	Hospital level
		• Ciprofloxacin is contraindicated in children below 12 years of age. • **Refer** children below 10 years to a paediatrician.

10.2 Chickenpox

Description

Chicken pox is a contagious viral disease which presents 2–3 weeks after exposure to the organism (varicella zoster virus VZV). It is infective from the start of the fever until 6 days after the lesions have appeared or until all the lesions have crusted. The infection is self-limiting, with a duration of about 1 week.

Symptoms and signs:

- Fatigue then the rash appears

Rash that has the following characteristics

- Start out as flat red areas
- Develops into raised papules, and then changes to vesicles with crusts
- Papules and vesicles may develop at the same time
- Mucous membranes may be affected
- Lack of appetite
- Headache
- Fever

Causes

- Initial infection with VZV

Risk factors

- Age
- No previous history of infection
- Patient has not been vaccinated
- Works in or attend school or child care facility
- Live with children
- Immuno compromised patients

Diagnostic criteria and investigations

- Diagnosis is mainly based on signs and symptoms.
- Examination of the fluid within the vesicles of the rash for direct fluorescein antibody
- Blood test
- Ultrasound for prenatal diagnosis plus a PCP (DNA TEST) of the mother's amniotic fluid

Management

Community level	Health centre level	Hospital level
• Adequate hydration, • Cut fingernails short and discourage scratching. • Isolation of infected person until all lesions have crusted • **Refer** to health centre	• Treat as CL **AND/OR** • Adequate hydration • Calamine lotion applied 12 hourly for 5 days. • Avoid the use of acetylsalicylic acid in children because of risk of Reye's syndrome **Refer to hospital if:** • Complications such as • Meningitis • Encephalitis • Pneumonia • Severely ill adults • Babies under 6 months • Pregnant women	• Treat as HC **AND** • Acyclovir 400-800mg four-five times daily 7 days (adults) • Acyclovir 20mg/kg four times a day 7 days **Treatments with antiviral agents are recommended for:** • Immunocompromised patients. • Visceral involvement. • All patients with severe chickenpox (irrespective of duration of rash). • Extensive rash. • Pregnant women. • Haemorrhagic rash. • Presence of complications. • Adults and adolescents presenting within 48 hours of the onset of the rash.

Table: Symptomatic management of chickenpox for both health centre and hospital levels

	Medicine	Dose	Frequency	Duration
Itchiness	Calamine lotion	Applied	as needed	1 week
Severe cases of itchiness	Cetirizine or loratadine Or chlorpheniramine	10mg 10mg 4mg, 0.1mg/kg children	Daily Daily Two-three times	5 days
Fever	Paracetamol	500mg -1g orally (adults) 10–15 mg/kg/dose 6 hourly when required (children)	Three times a day	5-7 days

	Medicine	Dose	Frequency	Duration
if skin infection is present due to scratching,	Cloxacillin **OR** • Erythromycin **OR** • Azithromycin	250-500mg Children:50-100 mg/ kg/day 500mg Children: 30-50 mg/kg/day 500mg stat then 250mg	6 hourly 12 hourly for	7 days 3-4 days

10.3 Herpes Zoster (Shingles)

Description

An acute viral infection involving primarily the dorsal root ganglia and characterised by a vesicular eruption in areas supplied by peripheral sensory nerves in the affected root ganglia

Sign and symptoms

- Chills, fever
- Malaise
- Headache
- The above precede characteristic crops of vesicles which are very painful, typically unilateral and involve the side supplied by affected nerve

Cause

- Varicella zoster virus, usually reactivated from the posterior root ganglia by reduced immunity

Risk factors

- Age (+50 yrs)
- Patient has not been vaccinated
- Immunocompromised patients

Diagnostic criteria and investigations

- Based on signs and symptoms

Management

Community level	Health centre level	Hospital level
• Isolate patient from immunocompromised or pregnant non-immune individuals. Open lesions can spread VZV infection. • Offer HIV test • Avoid direct contact with infected person • Bath with saline to remove exudate **Adults:** • Paracetamol 500mg -1g orally 4–6 hourly daily not exceeding three days **Children:** • Paracetamol 20mg/kg 6 hourly daily not exceeding 3 days. • **Refer** to health centre	• Treat as CL **AND/OR** • Clean the lesions with chlorhexidine solution 0.05% or hydrogen peroxide solution 6%. **AND** • Apply calamine lotion 8-12 hourly daily for 5-7 days **OR** • Apply acyclovir cream 5% 12 hourly for 5-7 days **AND** • Acyclovir 800mg 5 hourly daily for 5-7 days. • For post-herpetic neuralgia amitriptyline po 25mg at night. Titrate as necessary to a maximum of 75mg. • **Refer** to hospital.	• Treat as HC **AND/OR** • Amitriptyline 25mg nocte for 7 days. (post herpetic neuralgia) **OR** • Carbamazepine 100-200mg 24 hourly for 7 days. **OR** • Gabapentin 300mg 24 hourly in adult when carbamazepine is contraindicated. **OR** • Tramadol 50-100mg 4-6 hourly when necessary not exceeding 400mg per day for 5 days. • Avoid carbamazepine in patients on ART, TB, FP and hepatitis • **NB:** Antiviral therapy: may decrease the length of time for new vesicle formation, the number of days to attain complete crusting, and the days of acute discomfort. Therapy should be started within 72 hours of onset of symptoms. **Refer there is:** • Herpes zoster with secondary dissemination or neurological involvement. • Ocular involvement (if the tip of the nose is involved then ocular involvement is more likely). • Uncontrolled pain.

10.4 Measles

Description

An acute, highly communicable viral infection characterised by a generalised skin rash, fever and inflammation of mucus membrane. It is caused by measles virus which is spread by droplet infection and direct contact.

Signs and symptoms

Catarrhal stage:

- Fever, runny nose, barking cough
- Misery, anorexia, vomiting and conjunctivitis
- Koplik's spots (diagnostic)
- (Later) generalised maculopapular skin rash
- Desquamation stage (later still)
- Diarrhoea (common)

- Skin lesions peel off
- Rash fades
- Temperature falls

Complications

- Secondary bacterial RTI, e.g. bronchopneumonia
- Laryngotracheobronchitis
- Protein Energy Malnutrition (PEM) - especially following diarrhoea
- Cancrum oris (from mouth sepsis)
- Otitis media
- Corneal ulceration & panophthalmitis - leads to blindness
- Demyelinating encephalitis

Causes

Measles virus

Risk factors

- Being unvaccinated
- Travelling internationally
- Vitamin A deficiency
- Contact with infected person

Diagnostic criteria and investigations

- History of fever of at least 3 days
- Observation of Koplik spots'
- Confirmation of positive measles IgM antibodies from blood sample
- IgA testing

Management

Community level	Health centre level	Hospital level
• **Refer** to health centre	Health education on prevention: • Measles vaccination • Avoid contact between infected persons and uninfected **AND** • Apply tetracycline eye ointment 1% every 12 hourly for 5 days OR chloramphenicol eye ointment **AND** • Calamine lotion applied 12 hourly after bathing for 5 days **AND** • Chlorpheniramine 2mg/kg 12 hourly for 2-3 days **AND** • Paracetamol 120-500mg 12 hourly for 2-3 days • Increase fluid intake	• Treat as HC

Community level	Health centre level	Hospital level
	• Increase fluid intake • Vitamin A dosage according to age as follows: • -1st dose: at diagnosis • -2nd dose: the next day • -3rd dose: 2-4 weeks later • **Refer** to the hospital if complications occur.	

10.5 Meningitis

Description

Meningitis is a clinical syndrome characterised by an acute inflammation of the meninges.

Signs and symptoms

- Rapid onset of fever
- Severe headache and neck stiffness or pain
- Photophobia
- Convulsions
- Altered mental state, confusion, coma
- Projectile vomiting in children

Causes

- Bacterial:
  - Streptococcus pneumoniae
  - Haemophilus influenzae serotype b - mainly in young children
  - Neisseria meningitides
- Fungal:
  - Cryptococcus neoformans (Opportunistic Infection in HIV/AIDS patients)
- Mycobacterial (TB)
  - Mycobacterium tuberculosis

Risk factors

- Immunocompromised patients

Diagnostic criteria and investigations

- CSF: for white cell count and type, protein, sugar, Indian-ink staining, Gram stain, culture and sensitivity
- Blood: for serological studies and haemogram
- Chest X-ray and ultra sound to look for possible primary site
- Each patient suspected for meningitis should be investigated for HIV and VDRL

Management

Community level	Health centre level	Hospital level
• Provide case definition for meningitis • Provide pain killers Paracetamol 1g three times a day • Refer to health centre	• **Refer** to hospital where lumber puncture can be done. • Ibuprofen 200-400mg three times a day	**Adult:** Empirical therapy for bacterial meningitis until sensitivity tests are available: **1st line treatment** • Ceftriaxone 2g IV or IM daily in 1-2 divided doses for 10 days. **OR** • Cefotaxime 2g IV 6 hourly **2nd line treatment** • Ampicillin/amoxycillin 2g IV 4 hourly **OR** • Chloramphenicol b (IV): 1g given every 6 hours **OR** • Benzylpenicillin (IV): 4 million IU (2.4g) given every 4 hours • **Meningitis due to streptococcus pneumoniae** **Adults:** • Benzylpenicillin 3-4 MU IV or IM 4 hourly. **OR** • Ceftriaxone 2g IV or IM daily in 1- 2 divided doses **AND** • Vancomycin, IV (15mg/kg 12 hourly for 7-10 days (adults) **Children:** • Benzylpenicillin 100,000 IU/kg per dose. **OR** • Ceftriaxone 50-100mg/kg daily dose in 1-2 doses. Refer to specialist if no improvement. • **Meningitis due to haemophilus influenzae** **Adult:** • Ceftriaxone 2g IV or IM 12 hourly for 7-10 days. **OR** Ampicillin 2-3g IV 4-6 hourly for 7-10 days. **Children:** • Ceftriaxone 50-100mg/kg 12 hourly for 7-10 days. **OR** • Ampicillin 50mg/kg IV 4-6 hourly for 7-10 days. • **Meningitis due to neisseria meningitidis:** **Adult:** • Ceftriaxone 2g IV 12 hourly • Benzylpenicillin 4million IU every four hours. Maximum 24 million units per day. **Children:** • Benzylpenicillin 50mg/kg in paediatric patients older than 1 month. • **Refer** to specialist if no improvement

10.6 Poliomyelitis

Description

An acute viral infection characterised by acute and sudden onset of flaccid paralysis of skeletal muscles (including muscles of respiration) to a child less than 5 years (often) who was previously healthy.

Signs and symptoms

- Majority of cases are asymptomatic - only 1% result in flaccid paralysis of limbs
- Minor illness of fever, malaise, headache, and vomiting
- May progress to severe muscle pain
- Paralysis is characteristically asymmetric
- Paralysis of respiratory muscles is life threatening (bulbar polio)
- Aseptic meningitis may occur as a complication
- Strain and intramuscular injections precipitate and may worsen paralysis

Causes

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

Risk factors

- Decreased immunisation coverage
- It is transmitted primarily from person to person through the faecal-oral route
- Contaminated water can be a risk

Diagnostic criteria and investigations

Case definition:

- Guillain-Barre syndrome
- Based on signs and symptoms
- Fresh stools sample analysis

Management

Community level	Health centre level	Hospital level
• Encourage immunisation of children against Polio • Screening of household • **Refer** suspected cases to Health centre	• Track the person's contact • Treat as CL and • **Refer** suspected cases to hospital	• Treat as HC **AND** • Confirm diagnosis • Acute stage: Bed rest • Supportive care as required • Intensive rehabilitation

10.7 Sexually transmitted infections

Description

Sexually Transmitted Infections (STIs) are infections acquired through sexual activities. Different micro-organisms are responsible for STIs -viral, bacterial, protozoal and fungal

Signs and symptoms

Depend on the sites and the type of STI:

- Abdominal pain
- Urethral discharge syndrome
- Vaginal discharge
- Genital ulcer
- Dysuria
- Genital pruritis
- Genital warts
- Scrotal swelling

Causes and risk factors

- Unprotected sex with infected partner

Diagnostic criteria and investigations

- Clinical examination
- Based on signs and symptom
- To offer HTC to anyone presenting STI signs and symptoms
- Lab investigations (where possible culture and sensitivity for swab)

10.7.1 Discharge

Vaginal discharge syndrome:
Abnormal vaginal discharge that persists despite appropriate syndromic management should be investigated.

Signs and symptoms

- Often asymptomatic (difficult to diagnose)
- Vaginal discharge
- Itching, pruritus (scratched skin)
- Dysuria
- White plaque (candida)

Causes

- Trichomonas vaginalis
- Candida albicans
- Bacterial vaginosis
- Neisseria gonorrhoea
- Chlamydia trachomatis

Investigations

- Vaginal examination
- Endocervical swab

Differential diagnosis

Cancer of the cervix, especially in old women with many women (bloody stained smelly discharge)

Management

Community level	Health centre level	Hospital level
• Health education • Provide condoms • **Refer** to HC	• Treat as CL **AND/OR** **1st line treatment:** • Ciprofloxacin 500mg stat **AND** • Doxycycline tabs 100mg 12 hourly for 7 days **AND** • Metronidazole 2g stat. **AND** • Clotrimazole vaginal cream/pessaries applied/ inserted 12 hourly for 7 days. **OR** • Nystatin pessaries inserted 12 hourly for 7 days **Alternative 1st line** • Cefixime 400mg OD stat **OR** • Ceftriaxone, IM, 1g immediately as a single dose OR Gentamicin, IM, 6mg/kg, IM as a single dose **AND** • Azithromycin, oral, 1g as a single dose **AND** • Metronidazole, oral, 2g as a single dose. **AND** • Clotrimazole vaginal cream/pessaries applied/ inserted 12 hourly for 7 days. **OR** • Nystatin pessaries inserted 12 hourly for 7 days	• Treat as HC **AND** • Perform culture and sensitivity tests if patient fails to improve

10.7.2 Male Urethritis Syndrome

Description

Presence of secretions (pus) from the anterior urethra that is accompanied by burning or urethral discomfort when passing urine

Signs and symptoms

- Urethral discharge (white, yellow, brown or bloody)
- Pain or painless
- Itchiness
- Dysuria
- Genital lesions or rashes on hands or chest (indicative of other STIs)

Causes

- Neisseria gonorrhoae
- Chlamydia trachomatis
- Trichomonas vaginalis

Management

Community level	Health centre level	Hospital level
• Health education • Provide condoms • **Refer** to HC	• Treat as CL **AND/OR** **1st line treatment:** • Cefixime 400mg OD stat **OR** Ceftriaxone, IM, 1g immediately as a single dose **AND** azithromycin, oral 2g stat **Severe penicillin allergy:** Gentamicin, IM, 6mg/kg, IM as a single dose **AND** Azithromycin, oral, 2g as a single dose.	• Treat as HC **AND** • Perform culture and sensitivity tests if patient fails to improve

10.7.2 Chancroid

Description

Chancroid is a bacterial sexually transmitted infection (STI) caused by infection with Haemophilus ducreyi. It is chracterised by painful necrotising genital ulcer that may be accompanied by inguinal lymphadenopathy.

Signs and symptoms

- Presence of painful genital ulcers with undermined ragged edges
- The base is covered with dirty purulent exudates and easily bleeds on touch

Causes

Haemophilus ducreyi

Diagnostic criteria and investigations

- Based on signs and symptoms
- Blood culture

Management

Community level	Health centre level	Hospital level
• Provide Health education • Provide Condoms • **Refer** to health centre	• Treat as CL **AND** • Azithromycin PO 1g stat **OR** • Erythromycin 500 mg 6 hourly for 10 days or 1g BD **OR** • Ciprofloxacin 500mg 12 hourly for 7 days **OR** • Ceftriaxone IM: 250 mg single dose **OR** • Benzathine benzylpenicillin, IM, 2.4 MU immediately as a single dose • **Refer** to hospital if no improvement.	• Treat as HC • **Note:** treat simultaneously for syphilis and chancroid as both are frequent, and cannot be correctly distinguished on clinical grounds.

10.7.3 Epididymo-Orchitis

Description

It is an acute severe inflammation of the epididymis, testis and spermatic cord

Signs and symptoms

Swollen and tender epididymis severe pain of one or both testes and reddened oedematous scrotum

Causes

- Filarial worms
- Chlamydia
- Trachomatis
- Neisseria gonorrhoea
- E.coli
- Viruses such as paramyxovirus which cause mumps

Note: Exclude other pathology such as torsion of testis

Diagnostic criteria and investigations

- Based on the symptoms
- TORCH
- Urine culture and sensitivity

Management

Community level	Health centre level	Hospital level
• Health education • **Refer** to health centre	• Treat as CL • **Refer** to hospital.	• Treat as HC **1st line treatment:** • Doxycycline 100mg 12 hourly for 7 -10 days **AND** • Ceftriaxone 500mg IM STAT **AND** • Azithromycin 1g stat • Diclofenac 50-100mg 8-12 hourly for 5 days. **Note:** Patient may need to wear scrotal support. If no response within 3 days, conduct serology tests and culture and sensitivity tests.

10.7.4. Chlamydia infections

Description

Chlamydia is an STI caused by the chlamydia trachomatis which is an intracellular organisms.

Signs and symptoms

Presence of scanty to moderate white mucoid or serious discharge (milk like) and is often seen 1- 3 weeks after sexual intercourse

Fishy smell

Causes
Chlamydia trachomatis

Diagnostic creteria nd investigations
- Microscopic examination: clue cells
- Whiff test
- TORCH
- Smear for cytology for clue cells

Differential diagnosis
- Candidiasis (white patches)
- Neisseria Gonnorhoeae (yellowish malodorous glue like discharge)
- Trichomoniasis (amine odor)

Management

Community level	Health centre level	Hospital level
• Provide Health education • Provide condoms • **Refer** to health centre	• Treat as CL **AND** • Azithromycin 1g PO STAT **OR** Doxycycline 100mg 12 hourly for 7 days. • **Refer** to hospital if no improvement.	• Treat as HC • Treat as HC **AND** • Conduct culture and sensitivity tests if no improvement

10.7.5 Syphilis

Description
Syphilis is a chronic infectious disease caused by the spirochete *Treponema pallidum*. It can be acquired mainly through sexual intercourse or congenitally when the mother transfers it to the foetus.

Signs and symptoms
The signs and symptoms described in table

Table: Classification of Syphilis symptoms

Type	Stage	Clinical features/presentation
Congenital	Early	Rhinitis
	Late	Mucocutaneous lesions e.g. bullae, stigmata of osteochondritis, osteitis (or scars)
Acquired	Primary and secondary Syphilis	A painless chancre rash, non-tender lymphadenopathy, condylomata acuminata

Type	Stage	Clinical features/presentation
Congenital	Tertiary (benign gummatous)	Interstitis, photophobia, corneal infection, 8th cranial nerve deafness, bilateral kneeeffusion, recurrent arthoropathy
	Quarterly (cardiovascular) and Neurosyphilis	Interstitis, photophobia, corneal infection, cardiovascular syphilis and neurosyphilis will give clinical features associated with that system.

Causes
Treponema pallidum

Risk factors
- Unprotected sex
- Antenatal clinic patients without screening

Diagnostic criteria and investigations
- Rapid Plasma Reagin (RPR) test
- Treponema pallidum hemagglutination assay (TPHA)
- Eye screeening

Management

Community level	Health centre level	Hospital level
• Health education • **Refer** to health centre	**Treat as CL** **For primary and secondary syphilis:** • Benzathine penicillin 2.4 MU deep i.m as a single dose given as two injections in different buttocks. If there is penicillin allergy: • Erythromycin 500mg 6 hourly for 14 days **OR** • Doxycycline 100mg 12 hourly for 14 days **OR** • **Caution:** Doxycline should not be given to pregnant and breast feeding women and children under 12 years of age **Late syphilis:** • Benzathine penicillin give 2.4 MU IM weekly for 3 weeks. **Congenital syphilis:** • Up to 2 years of age • Benzylpenicillin 15,000MU/kg body weight IM/IV 6 hourly for 10days. **OR** • Procaine benzylpenicillin 50,000 MU/kg body weight 24 hourly for 10 days.	• Treat as HC

Community level	Health centre level	Hospital level
• Health education • **Refer** to health centre	**Over 2 years of age:** • Benzyl penicillin 50,000-75,000MU/kg body weight IV or IM 6 hourly for 10-14 days **OR** • Erythromycin 10mg/kg body weight 6 hourly for 30 days **Syphillis in pregnancy** **Early syphilis:** • Benzathine benzylpenicillin (IM): 2.4 million IU STAT **For pregnant women allergic to penicillin:** • Erythromycin 500mg 8 hourly for 10-14 days **OR** • Azithromycin 500mg 24 hourly for 6 days **OR** (2g single dose) **Late syphilis or unknown stage** • Benzathine benzylpenicillin (IM): 2.4 million IU (One dose per week for 3 consecutive weeks (e.g. on days 1, 8 and 15). **For pregnant women allergic to penicillin:** • Erythromycin 500mg 8 hourly for 30 days. • **Refer** to hospital.	

10.7.6.1 Genital Warts

Description

These are usually caused by papilloma group of viruses infecting the skin or mucous membrane. The common sites affected by warts include genital region (condylomata acuminata) hands and legs

Signs and symptoms

- The lesions are usually asymptomatic fleshy growths
- In the genital region, lesions are often finger like and increase in number and size with time

Causes

Low risk human papilloma species

Risk factors

- Poor hygiene
- Unprotected sex

Diagnostic criteria and investigations

- Based on the signs and symtoms
- HPV test

Management

Community level	Health centre level	Hospital level
• Health education • **Refer** to health centre	• Treat as CL **AND** • Podophyllin 10-25% to the warts, and wash off 6 hourly, drying thoroughly **OR** • Silver nitrate to the warts, and wash off in 6 hours, drying thoroughly. Treat every 2-3 days until warts are gone. • **Note:** Do not apply on healthy surrounding skin. Surgery may be useful in selected cases to remove the warts. • **Caution:** It is contraindicated in pregnancy and lactation • **Refer** to hospital.	• Treat as HC **AND** • **Refer** pregnant women for specialist attention

10.7.6.2 Cervical warts

The description, signs and symptoms are the same as genital warts except for the site of infection.

Causes

High risk HPV serotypes

Management

Community level	Health centre level	Hospital level
• Health education • **Refer** to health centre	• Treat as CL • **Refer** to hospital.	• Treat as HC with podophyllin **Refer** to specialist. • This case should be referred to specialist / expert. Most expert advice against the use of podophyllin for cervical warts; therefore apply imiquimod cream as above.

10.7.7 Trichomoniasis

Trichomoniasis is an STI caused by flagellate protozoa and trichomonas vaginalis.

Signs and symptoms

- Inflammation of vagina and cervix in females and inflammation of urethra and prostate gland in males
- Itchiness
- Patient may be asymptomatic or may present with a frothy green/yellowish discharge, itchness, erosion of cervix

Causes

- Flagellate protozoa
- Trichomonas vaginalis

Diagnostic criteria and investigations

- Urine microscopy (Flagellate with man face)

Management

Community level	Health centre level	Hospital level
• Health education • **Refer** to health centre	• Metronidazole 400mg 8hourly for 5 days (women) **OR** • Metronidazole 2g STAT (men) **OR** • Tinidazole 2gm stat **Children:** • Metronidazole 5mg/kg body weight every 8 hourly for 7 days **OR** • Tinidazole 50-75 mg/kg single dose. • **Note:** Give the same treatment to partner. In pregnancy treatment with metronidazole should be delayed until after first trimester • **Refer** to hospital.	• Treat as HC

10.7.8 Vaginal candidiasis

Description

It is an STI infection of the vaginal mucosa by candida species

Signs and symptoms

- Pruritic, curd-like vaginal discharge, dysuria and dyspareunia
- Disseminated candidiasis; resulted from complications of the above, presents with fever and toxicity

Risk factors

- Women on the pill, in pregnancy and diabetics and in people on prolonged antibiotic courses

Causes

- Candida albicans

Diagnostic criteria and investigation

- Vaginal swab wet preparation

Management

Community level	Health centre level	Hospital level
• Health education • Health hygiene • Avoid antiseptic soaps • **Refer** to health centre	• Treat as CL **AND** • Nystatin pessaries insert 1 at night for 14 days **OR** • Clotrimazole pessaries/vaginal cream insert/ apply 1 at night for 6 days **OR**	• Treat as HC

Community level	Health centre level	Hospital level
	• Miconazole pessaries/vaginal cream insert/ apply once at night for 3 days **OR** • In severe or recurrent cases ADD • Ketoconazole 200-600mg 24 hourly for 10 days **OR** • Fluconazole 200mg once daily for 14 days. • **Refer** to hospital.	

10.8 Neonatal conjunctivitis

Description

Inflammation of the conjunctiva in the neonate by many organisms such virus, bacteria, fungi, chemical and allergens, presenting with purulent discharge; inflame conjunctiva with oedema. Most infections are acquired during delivery. It could be caused by gonococcal infection or chlamydial infection or reaction to application to the eye (e.g., silver nitrate). The condition is preventable if antibiotic eye drops are applied soon after birth. Bilateral or unilateral reddish swollen eyelids with purulent discharge.

Signs and symptoms

- The mother may complain that the baby's eyes are sticky, discharging, and oedematous
- Mildly inflamed conjunctiva
- Purulent conjunctivitis in the newborn
- Features that suggest gonococcal infection are—
  - Maternal history of a purulent vaginal discharge
  - Onset within 4 days of birth
- Features that suggest chlamydial infection are—
- Onset after the 4th day after birth
- Slight watery or mildly purulent discharge

Causes

- Viral
- Bacterial
- Chlamydia
- Gonococcal
- Allergic

Diagnostic criteria and investigations

- TORCH
- Eye swab culture and sensitivity
- Smear cytology
- Ophthalmoscopy

Management

Community level	Health centre level	Hospital level
• Health education • **Refer** to health centre	• Treat as CL. **AND** • Irrigate eye with normal saline or boiled water 1-2 hourly until discharge is cleared. • Ceftriaxone 50mg/kg stat (max 125mg) IM stat **AND** • Erythromycin 125mg/5ml 50mg/kg 6 hourly for 14 days. • **Refer** to hospital.	• Treat as HC • NB refer to paediatrician

10.9 Septicaemia

Description

Sepsis is life-threatening organ dysfunction caused by a dysregulated host response to infection. Septic shock is sepsis that requires vasopressor therapy to maintain blood pressure. **The choice of empiric antibiotic(s) will depend on the likely source of infection (see individual infections).** The guidance given here, relates to sepsis/septic shock where no infection source is immediately identifiable.

Signs and symptoms

- Fever, shivering or feeling very cold
- Hypotension
- Prostration (extreme tiredness)
- Sometimes anaemia
- Toxic shock is a complication (occurs more commonly in the immuno suppressed)
- Increased heart rate
- Increased breathing rate
- Confusion or disorientation
- Shortness of breath
- Extreme pain or discomfort

Causes

Staphylococcus aureus, Klebsiella, Pseudomonas, Staphylococcus epidermidis, fungal (Candida spp), Coliforms and Salmonella spp, Pneumococci, Proteus spp, viral infections such as influenza.

Differential diagnosis

- Congestive cardiac failure
- Meningitis

Diagnostic criteria and investigations

- FBC,
- Blood culture and sensitivity- aerobic and anaerobic

Management

Community level	Health centre level	Hospital level
• Encourage adequate oral rehydration • **Refer** to health centre immediately	• Paracetamol 1g P.O • Normal saline IV • Clinical sepsis of unknown origin • Ceftriaxone 2 kg given once a day **OR** • Cefotaxime: 2 g given every 8 hours **AND** • Gentamicin: 5 mg/kg given once a day **OR** **Amikacin:** 15 mg/kg given once a day • **Refer** to hospital immediately.	**Adult:** • Cloxacillin 2g IV 4-6 hourly for 5-7 days **OR** • Gentamycin 5-7mg/kg IV 24 hourly or 1.5-2mg/kg IV or IM 8 hourly **AND** • Chloramphenicol 750mg IV 6 hourly for 5-7days **OR** • Amoxycillin-Clavulanic Acid 500/125mg 8 hourly 5-7 days **OR** • Ceftriaxone 50-100mg/kg/day in two divided doses. **Children:** • Ceftriaxone 50-100mg/kg/day in two divided doses for 5-7 days OR • Cloxacillin 50mg/kg IV 4 – 6 hourly for 5-7 days **OR** • Benzylpenicillin 50,000 IU/kg IV 4-6 hourly for 5-7 days **OR** **Note:** Sepsis can be prevented by: • Protect groups at risk, for example, immunosuppressed and post-surgical patients surgical antibiotic prophylaxis • Use of strictly aseptic environment • Take good care of chronic conditions • Get recommended vaccines • Good hygiene practice

10.10 Tetanus

Description

Bacterial disease characterised by muscle spasms (twitching) of voluntary muscles

Signs and symptoms

- Stiff jaw (trismus)
- Generalised spasms induced by sounds, strong light characterised by grimace (risus sardonicus)
- Arching of back (opisthotonus) with the patient remaining clearly conscious
- Fever
- Irregular heart beat
- Progressive muscle spasms
- Pain

Causes

- The contamination of wounds with exotoxin of clostridium tetani
- Tetanus spores enter the body through deep penetrating skin wounds, the umbilical cord of the newborn, ear infection, or wounds produced during delivery and septic abortions

Diagnostic criteria and investigations

- Based on signs and symptoms
- Lab test for serum antitoxin to be removed as this follow under investigations

Management

Community level	Health centre level	Hospital level
• Education about animal movement restriction around the health facility and their vaccination by the veterinarian. • **Refer** to health centre immediately	• Treat as CL **AND** • Nurse patient intensively in a quiet isolated area • Maintain adequate hydration • Maintain adequate nutrition - in the neonate use expressed breast milk via NGT. Avoid IM injections as much as possible - use alternative routes (for example, NGT, rectal) • Clean wounds and remove necrotic tissues • In neonate thoroughly clean umbilical area • **Refer** to the hospital.	• Treat as HC **AND/OR** • Maintain close observation and attention to airway (intubate if necessary); to be done at the hospital. • Insert nasogastric tube (NGT) for nutrition, hydration and medicine administration (including painkiller) • Neonate have a mucous extractor or other suction available for use as required • Maintain fluid balance/adequate hydration - initially IV if required, later by NGT • Prevent aspiration of fluid into the lungs • Maintain adequate nutrition - in the neonate use expressed breast milk via NGT • Avoid IM injections as much as possible - use alternative routes (for example, NGT, rectal). • Change from parenteral to oral medication as soon as possible and keep patient handling to a minimum to avoid provoking spasms. • Clean wounds and remove necrotic tissues • In neonate thoroughly clean umbilical area **AND** **Adult** • Benzylpenicillin 1-2 MU IM **OR** IV 6 hourly for 10 days **AND**

Community level	Health centre level	Hospital level
		• Metronidazole 500mg IV 8 hourly 5-10 days **AND** • Chlorpromazine 100mg 24 hourly **OR** • Diazepam 5-10 mg 24 hourly **OR** • Magnesium as intravenous infusion **AND** • Tetanus immunoglobulin human (TIG) 150 IU/kg IM into multiple sites **OR** • Tetanus antitoxin (anti-tetanus serum) Adult& Child: 50,000-100 000 IU as as an IV single dose. **Children**: • Benzylpenicillin 50000-100,000 IU/kg IM or IV per dose 6 hourly • Neonate benzylpenicillin 100,000 IU/kg IV every 12 hourly **AND** • Metronidazole 7.5mg/kg 8 hourly IV for 5-10 days **AND** • Chlorpromazine 12.5mg-25mg 24 hourly **OR** • Diazepam 0.5-1mg/kg by NG tube every 4-6 hourly. Rectally recommended **OR** • Magnesium as intravenous infusion **AND** • Tetanus immunoglobulin human (TIG) 150 IU/kg IM into multiple sites **OR** • Tetanus antitoxin (anti-tetanus serum) Adult & Child: 50,000-100 000 IU as as an IV single dose.

Note: Prevention of future tetanus:

- Neonate/child: after recovery ensure full course of immunisation with DPT vaccine
- Childhood immunisation: Immunise all children against tetanus during routine childhood immunisation
- Prophylaxis against neonatal tetanus. Immunise all pregnant women/women of childbearing age (15-45yrs) against tetanus with Tetanus toxoid vaccine (TT) 0.5mL IM into the upper arm or upper outer thigh as follows:

Vaccine recommended timing

TT1 (1st dose)	at first contact with the woman, e.g. at the 1st antenatal visit, or as early as possible during pregnancy
TT2 (2nd dose)	at least 4 weeks after TT1
TT3 (3rd dose)	at least 6 months after TT2 or as early as possible during a subsequent pregnancy
TT4 (4th dose)	at least 1 year after TT3 or as early as possible during a subsequent pregnancy
TT5 (5th dose)	at least 1 year after TT4 or as early as possible during a subsequent pregnancy

Passive immunisation

- Give IM tetanus immunoglobulin human (TIG):
- Child<5 yrs: 75 IU
- Child 5-10 yrs: 125 IU
- Child>10 yrs/adult: 250 IU

Alternative: only if TIG not available:

- Tetanus antitoxin (antitetanus serum) 1,500 IU subcutaneous or deep IM

Active immunisation

- Unimmunised or never fully immunised patients: Administer a full course of vaccination: three doses of TT 0.5mL SC or deep IM at intervals of 4 weeks

Fully immunised patients but last booster >10 years ago:

- Administer one booster dose of TT 0.5mL SC or deep IM

10.11 Tuberculosis

Description

Tuberculosis (TB) is an infectious bacterial disease caused by Mycobacterium tuberculosis, which most commonly affects the lungs. It is transmitted from person to person via droplets from the throat and lungs of people with the active respiratory disease. It can also affect any part of the body including the tummy (abdomen), glands, bones and nervous system.

Latent TB Infection Treatment (TB Preventive Therapy)

Refer to the most recent TB guidelines

Treatment of latent TB infection can reduce the risk of developing active TB by 60 – 90%. TB screening using the national TB screening tool is mandatory before offering TB preventive Therapy (TPT)

Eligibility Criteria

- All PLHIV above 1 year of age who has no signs or symptoms of active TB
- Children living with HIV aged 0-14 years and exposed to TB through household contacts without signs or symptoms of active TB, including infants < 1 year

- After the completion of TB treatment for all TB/HIV co-infected persons
- HIV-negative children 0-14 years exposed to TB through household contacts without signs or symptoms of active TB, including infants <1 year
- All Health Care Workers in whom active TB disease has been excluded
- All clients with silicosis in whom active TB disease has been excluded

NB: The absence of baseline liver function tests should not preclude or delay the initiation of TPT

Interpretation of LFT Results in Context of Initiating TPT (Insert table 5.12 -2019 TB Guidelines)
Preferred regimens

1. Rifapentine and Isoniazid Preventive Therapy (3HP)

- Weekly dosing for 12 doses = 3HP
- Not for use in children below 2 years of age
- Not for use in pregnant or breastfeeding women or women who are planning to become pregnant in the next three months
- Not for use in those on PIs or NVP
- For children on DTG – double the dose of DTG by increasing to twice daily dosing
- Supplement with pyridoxine (Vitamin B6) 12.5-25 mg daily x 3 months

Pediatric (2-14 years) Dosing for 3HP

	If using individual formulantions		If using FDC
Weight	Isoniazid (100mg)	Rifapentine (150mg)	HP 150/150mg
10-15kg	3	2	2
24-30kg	6	4	4
16-23kg	5	3	3
>30kg	7	5	5

Adolescent and Adult (>14 years) Dosing for 3HP

	If using individual formulantions		If using FDC
Weight	Isoniazid (300mg)	Rifapentine (150mg)	HP 3000/300mg
30kg and up	3	6	3

2. Rifampicin and Isoniazid Preventive Therapy (RH)

- Daily dosing for 3 months = 3HR
- Recommended for children < 2 years for whom rifapentine is not recommended
- Supplement with pyridoxine (vitamin B6) 12.5-25 mg daily x 3 months
- For those on DTG – double the dose of DTG by increasing to twice daily dosing • For those on LPV/r tablets, increase ritonavir to reach Lopinavir to ritonavir ratio 1:1
- Not for use in those on DRV/r. Coadministration of darunavir and rifampicin is contraindicated. Use another TPT option or change DRV/r to LPV/r if feasible.

- Not for use in those on ATV/r. Co-administration of atazanavir and rifampicin is contraindicated. Use another TPT option or change ATV/r to LPV/r if feasible

Weight-based dosing of RH

Weight	RH 75/50mg	RH 150/75mg
2-3.9kg	½ tablet	
4-6.9kg	1 tablet	
8-11.9kg	2 tablets	
12.15.9kg	3 tablets	
16-24.9kg	4 tablets	
25-40kg		2 tablets
40-55kg		3 tablets
55-70kg		4 tablets
>70kg		5 tablets

3. Isoniazid Preventive Therapy (IPT)

- Daily dosing for six months
- Supplement with Pyridoxine (vitamin B6) 12.5-25 mg daily x 6 month

Weight-Based Dosing for Isoniazid

Weight (kg)	INH 100mg	Dose given (mg)
<5kg	½ tablet	50
5.1-9.9kg	1 tablet	100
10-13.9kg	1½ tablets	150
14-19.9kg	2 tablets	200
20-24.9kg	2½ tablets	250
>25kg	3 tablets or INH 300mg x 1 tablet	300

10.11.1 Pulmonary Tuberculosis (PTB)

Signs and symptoms

- Cough
- Fever
- Haemoptysis
- Fatigue
- Pallor
- Dyspnoea on exertion
- Night sweats
- Loss of weight
- Loss of appetite
- Weakness
- Chronic pleuritic chest pain
- Swollen lymph node

Causes

- Mycobacterium tuberculosis

Risk factors

- Overcrowding
- Immunosuppression
- People living with Active TB patients

Diagnostic criteria and investigations

- Sputum microscopy/gene expert
- Chest X-ray. (if available for negative sputum)
- Sputum smear
- Sputum TB culture
- DNA molecular test
- DST
- LAM Test

Management

Community level	Health centre level	Hospital level

Health education on:
• Health Education on:
  • Proper nutrition
  • Ventilation and isolation
  • Cough etiquette
  • Personal protective masks
  • **Refer** to health centre
	• Treat as CL **AND/OR**
	New patients:
	Adult:
	• **Initial Phase:** 2 months
	• Rifampicin/Isoniazid/Pyrazinamide/Ethambutol 150/75/275/400mg dosing based on weight.
	• Rifampicin/Isoniazid/Ethambutol 150/75mg/275mg dosing based on weight
	• **Continuation Phase:** 4 Months
	Children:
	• **Initial Phase:** 2 months
	• Rifampicin/Isoniazid/Pyrazinamide + Ethambutol 60/30/150/100mg dosing based on weight
	• Rifampicin/Isoniazid dosing based on weight
	Previously Treated Patients; Treatment Failure or TB relapse or default: Adult:
	Adult:
	• **Initial Phase:** 2 months orals plus streptomycin injection IM 15mg/kg/day not exceeding 1g/day (500-750mg/day in elderly patients) and 1 month orals
	• Rifampicin/Isoniazid/Ethambutol + streptomycin150/75/275/400mg dosing based on weight
	• **Continuation 5 months**
	• Rifampicin/Isoniazid150/75mg dosing based on weight
		• Treat as HC

Community level	Health centre level	Hospital level
	Children: • **6 months treatment regimen (2HRZ(E)/4HR)** • Rifampicin/Isoniazid 1dosing based on weight. • **Refer to hospital the following:** • Sputum negative patients who are not improving clinically • Retreatment cases and high risk groups must be referred for culture and Drug Sensitivity Testing (DST) • Symptomatic children must be referred	

10.11.2 Extra-Pulmonary TB

Signs and symptoms

- Same as in pulmonary tuberculosis
- Specific signs and symptoms depending on the site of the extra-pulmonary tuberculosis such as:
  - Abdominal pain for abdominal TB
  - Swelling and pain in spine (Spinal TB)

Management

Community level	Health centre level	Hospital level

• Proper nutrition
• Ventilation and isolation
• Cough etiquette
• Personal protective masks
• **Refer** to health centre
	• Treatment is also similar as in PTB, however there are exceptions such as:
	  • TB meningitis (for details refer to National TB guidelines).
	  • TB pericarditis (for details refer to National TB guidelines).
	  • TB in pregnancy.
	• **Refer** all cases with suspected extra-pulmonary TB to the hospital.
		• Treat as HC

Treatment of drug-susceptible TB using 4-month regimens
Management: 4- months regimen

Community level	Health centre level	Hospital level

• Health Education on:
  • Proper nutrition
  • Ventilation and isolation
  • Cough etiquette
  • Personal protective masks
  • **Refer** to health centre
	• Treat / CL **AND OR**
	New Patients:
	Adult:
	• 4- months regimen
	• Isoniazid, rifapentine, moxifloxacin and pyrazinamide
	• (2HPMZ/2HPM)
	Children:
	Between 3 months and 16 years
	4-month treatment regimen
	(2HRZ(E)/2HR
		• Treat as HCL

Management of MDR-TB/FQ-Resistance TB

Drug	Abbreviations
Levofloxacin Moxifloxacin	Lfx Mfx
Bedaquiline	Bdq
Linezolid	Lzd
Clofazimine	Cfz
Cycloserine *or* Terizidone	Cs Trd
Ethambutol	E
Delamanid	Dlm
Pretonamid	Pa
Pyrazinamide	Z
Amikacin†	Am
Imipenem-cilastatin *or* Meropenem	Ipm/Cln Mpm
Ethionamide Prothionamide	Eto Pto
High dose isoniazid	HH
Para-aminosalicylic acid	PAS
Fluoroquinolones	FQ

Standardised regimens for the management of MDR-TB/ FQ-Resistance TB

Types of DR-TB	Regimen	Phases/duration of treatment
RR-TB/MDR-TB	BPaLM	6Bdq-Pa-Lzd-Mox
FQ-R TB/XDR-TB	BPaL	6-9Bdq-Pa-Lzd
RR-TB/MDR-TB	Lfx-Bdq-Lzd-Dlm-Cfz	(9-12)Lfx-Bdq-Lzd-Dlm-Cfz
FQ-R TB/XDR-TB	Bdq-Lzd-Cs-Cfz-Dlm-Z	12Bdq-Lzd-Cs-Cfz-Dlm-Z / 6Bdq-Lzd-Cs-Cfz-Z
RR/MDR-TB	Lfx-Bdq-Lzd-Cs-Cfz	18-20Lfx-Bdq-Lzd-Cs-Cfz

For more information on MDR-TB/FQ-Resistance TB, refer to Lesotho MDR-TB Guidelines.

10.12 Leprosy

Description

Leprosy is as infectious disease caused by leprosy bacillus. It is most probably spread as a droplet

infection. Like many other infections, leprosy can be treated by antibiotics.
Leprosy usually starts as a patch on the skin, but it can also attack the nerves and damages them. If leprosy is left untreated, it can cause damage to nerves that lead to problems in the face, hands and feet – but if people with leprosy are taken care of, most permanent damage can be prevented.

Types of Leprosy

Tuberculoid

A mild, less severe form of leprosy. People with this type have only one or a few patches of flat, pale-colored skin (paucibacillary leprosy). The affected area of skin may feel numb because of nerve damage underneath. Tuberculoid leprosy is less contagious than other forms.

Lepromatous

A more severe form of the disease. It has widespread skin bumps and rashes (multibacillary leprosy), numbness, and muscle weakness. The nose, kidneys, and male reproductive organs may also be affected. It is more contagious than tuberculoid leprosy.

Borderline: People with this type of leprosy have symptoms of both the tuberculoid and lepromatous forms.

Causes

Leprosy is caused by a slow-growing type of bacteria called Mycobacterium leprae (M. leprae).

Signs and symptoms

- Disfiguring skin sores, the skin sores are pale-coloured
- Lumps, or bumps that do not go away after several weeks or months
- Nerve damage can lead to:
  - Loss of feeling in the arms and legs
  - Muscle weakness

Diagnostic criteria and investigations

- Based on signs and symptoms
- Skin examination - a patch of the skin that is lighter in colour than the surrounding skin
- Test the feeling in the skin patches (itching or pain)
- Feel the nerves (for any unusual sensations such as numbness, tingling, or burning sensation)
- Examine hands and feet for signs of weakeness in terms of holding or lifting things

Management

Community level	Health centre level	Hospital level
• Encourage hygiene • **Refer** to health centre immediately	• Treat as CL • **Refer** to hospital.	• Treat as HC • PB leprosy treatment – for patients 15 years of age, the course of treatment is given for 6 months.

MDT for PB Leprosy	
Monthly dose	Rifampicin 600mg
	Dapsone 100mg
Daily dose	Dapsone 100mg

The monthly dose is taken at the start of treatment (day 1) and then every 28 days for 6 months. The daily dose is taken every day for 6 months. It must be completed within 9 months or less.

- MB leprosy treatment – for patients over 15 years of age, the course of treatment is given for 12 months

MDT for PB Leprosy	
Monthly dose Clofazimine 300mg Dapsone 100mg	Rifampicin 600mg
Daily dose Clofazimine 50mg	Dapsone 100mg

The monthly dose is taken at the start of treatment (day 1) and then every 28 days for 12 months. The daily dose is taken every day for 12 months. It must be completed within 18 months or less.

Leprosy treatment for children

The dosage for children varies according to their age, but they must take the same drugs for same length of time as an adult. That means 6 months for PB and 12 months for MB. As the the table below shows, clofazimine is only given for MB leprosy.

MDT for PB Leprosy		Below 10 years	10 – 14years
Monthly dose	Rifampicin	300mg	450mg
	Dapsone	25mg	50mg
MB only	Clofazimine	100mg	150mg
Daily dose	Dapsone	25mg	50mg
MB only	Clofazimine	50mg twice a week	50mg every other day

10.13 Typhoid fever (Enteric fever)

Description

Bacterial infection characterised by fever and spread through contaminated food and water.

Signs and symptoms

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

or diarrhoea, usually occurring 10-15 days after infection
- Abdominal pain and tenderness are prominent features
- Temperature rises in steps
- Relative bradycardia
- Delirium and stupor
- Tender splenomegaly (common)
- Intestine perforation (peritonitis)

Causes
- Bacterial disease (Salmonella typhi and Salmonella paratyphi A, B and C).

Diagnostic criteria and investigations
- Stool culture
- Blood: culture
- Widal's agglutination reaction - check weekly for rising antibody titres
- Based on signs and symptoms

NB. A single positive Widal screening does not indicate presence of infection. Widal is for orientation not for diagnosis.

Management

Community level	Health centre level	Hospital level
• Ensure and encourage personal and food hygiene • Ensure adequate rehydration. • Provide health promotion education • Drink safe water • Paracetamol 500mg-1g stat and refer • **Refer** to health centre	• Treat as Cl **AND** • **Refer** to hospital immediately	• Treat as HC **AND/OR** **Adults:** • Chloramphenicol 500mg IM, IV or oral 6 hourly for 10-14 days **OR** • Ciprofloxacin 500-700mg 12 hourly for 7-14 days **OR** • Amoxycillin 250-500mg 8 hourly for 7 days **OR** • Cotrimoxazole 960mg bd for 5days **Children:** • Chloramphenicol 25mg/kg 6 hourly for 10-14 days **OR** • Ciprofloxacin 10-15mg/kg 12 hourly for 7-14 days. • Note: Chronic carriers should be treated for 4-6 weeks **OR** • Cotrimoxazole 24mg/kg 12 hourly • Amoxycillin 25mg/kg 8 hourly for 7 days (max: 250mg) **OR** • Amoxycillin-Clavulanic Acid 500/125 mg 8 hourly 5-7 days • If allergic to penicillin give erythromycin 250mg 6 hourly 7-14 days

10.14 Surgical site antibiotics prophylaxis

Description

Antibiotic prophylaxis: prevention of infectious complications by administering an effective antimicrobial agent before exposure to contamination during surgery.

Surgical site infection: an infection that occurs after surgery in the part of the body where the surgery took place. Surgical site infections can sometimes be superficial infections involving the skin only. Other surgical site infections are more serious and can involve tissues under the skin, organs or implanted material.

Surgical site infection is also defined as an infection that occurs up to 30 days after an operation and affects:

(i) the skin and subcutaneous tissue of the surgical incision (superficial incisional); and/or
(ii) the deep soft tissue (for example, fascia or muscle) of the incision (deep incisional) and/or
(iii) any part of the anatomy (for example, organs and spaces) other than the incision that was opened or manipulated during an operation (organ/space).

Surgical wound: a wound created when an incision is made with a scalpel or other sharp cutting device and then closed in the operating room by suture, staple, adhesive tape, or glue and bringing the skin edges together.

10.14.1 Categories of surgical wound:

- **Clean:** an uninfected surgical wound in which no inflammation is found, and which is not in the respiratory, alimentary, genital or urinary tracts. In addition, clean wounds are usually closed and, if necessary, drained with closed drainage. Surgical incisional wounds that are done after non-penetrating (blunt) trauma should be included in this category if they meet the criteria.
- **Clean-contaminated:** a surgical wound in the respiratory, alimentary, genital or urinary tracts which was made under controlled conditions and without unusual contamination. Operations involving the biliary tract, appendix, vagina and oropharynx are included in this category, provided no evidence of infection or major (i.e. significant) break in sterile technique is found.
- **Contaminated:** open, fresh, accidental wounds. Also included in this category are: operations with major break in sterile technique (e.g. open cardiac massage) or substantial spillage (of gastrointestinal contents) from the gastrointestinal tract; and incisions in which acute, non-purulent inflammation is found, including necrotic tissue, without evidence of purulent drainage (e.g. dry gangrene).
- **Dirty or infected:** old traumatic wounds with retained dead tissue and those that involve existing clinical infection or perforated viscera. Such wounds suggest that the organisms causing postoperative infection were present at the site of the surgery before the operation.

10.14.2 Antibiotic prophylaxis before surgical procedures

The choice of the antibiotic should be based on the type of surgical procedure because not all procedures are associated with the same risk of developing an infection.

Type of procedure	First choice	Second choice
Clean procedure[a]	**Cefazolin (IV):** • **Children:** 50mg/kg - single dose • **Adults:** 2g[b] - single dose	**Cefuroxime (IV):** • **Children:** 50mg/kg - single dose • **Adults**: 1.5g – single dose
Clean contaminated procedurec (except bowel surgery and urological procedures)	**Cefazolin (IV):** • **Children:** 50mg/kg - single dose • **Adults:** 2g[b] - single dose	**Cefuroxime (IV):** • **Children:** 50mg/kg - single dose • **Adults:** 1.5g – single dose
Clean procedure[a]	**Cefazolin (IV):** • **Children:** 50mg/kg - single dose • **Adults:** 2g[b] - single dose	**Cefuroxime (IV):** • **Children:** 50mg/kg - single dose • **Adults**: 1.5g – single dose
Clean contaminated procedurec (except bowel surgery and urological procedures)	**Cefazolin (IV):** • **Children:** 50mg/kg - single dose • **Adults:** 2g[b] - single dose	**Cefuroxime (IV):** • **Children:** 50mg/kg - single dose • **Adults:** 1.5g – single dose
Contaminated procedured	**Cefazolin (IV):** • **Children:** 50mg/kg - single dose • Adults: 2 gb - single dose **AND** **Metronidazole (IV):** • **Children**: 7.5mg/kg - single dose • **Adults:** 500mg - single dose	**Amoxycillin+clavulanic acid (IV):** • **Children:** 40-50mg/kg of amoxycillin component – single dose • **Adults:** 2g + 200mg – single dose **OR** **Gentamycin (IV):** • **Neonates:** 5mg/kg – single dose • **Children:** 7.5mg/kg – single dose
		• **Adults:** 5mg/kg – single dose **AND** **Metronidazole (IV):** • **Children:** 7.5 mg/kg - single dose • **Adults:** 500mg - single dose
Bowel surgery[e]	**Cefazolin (IV):** • **Children:** 50mg/kg - single dose • **Adults:** 2 g[b] - single dose **AND** **Metronidazole (IV):** • **Children:** 7.5mg/kg - single dose • **Adults:** 500mg - single dose	**Amoxycillin+clavulanic acid (IV):** • **Children:** 40-50mg/kg of amoxycillin component – single dose • **Adults:** 2g + 200mg – single dose

Type of procedure	First choice	Second choice
Urologic procedures	**Cefazolin (IV):** • **Children:** 50mg/kg - single dose • **Adults:** 2g[b] - single dose	**Gentamycin (IV):** • **Neonates:** 5mg/kg – single dose • **Children:** 7.5mg/kg – single dose • **Adults:** 5mg/kg – single dose

Notes: All dosages are for normal renal and hepatic function.

[a] Surgical procedures where the respiratory, alimentary, genital or urinary tracts are not entered.

[b] Higher doses of cefazolin (e.g. 3g) may be required in obese patients (> 120 kg).

[c] Surgical procedures where the respiratory, alimentary, genital or urinary tracts are entered under controlled conditions and without unusual contamination. Operations involving the biliary tract, appendix, vagina and oropharynx are included in this category.

[d] Operations with major (i.e. significant) interruptions in sterile technique (e.g. open cardiac massage) or substantial spillage from the gastrointestinal tract.

[e] Bowel surgery includes appendectomy, small intestine and colorectal surgical procedures.

[f] Gentamycin should be given in combination with metronidazole and not as a stand-alone option in contaminated surgical procedures because, if given alone, it provides insufficient coverage of anaerobic bacteria. Amikacin could be used instead of gentamycin based on local availability.

ACCESS antibiotics are indicated in green, WATCH antibiotics in yellow and RESERVE antibiotics in red.

10.14.3 Timing and administration of antibiotics

Surgical antibiotic prophylaxis must be administered before surgical incision to achieve effective plasma and tissue concentrations at the time of incision. Administration of any antibiotic after skin incision reduces effectiveness.

1. IV cefazolin can be given over 5 minutes and should be administered no more than 60 minutes before skin incision.
2. IV amoxycillin can be given over 3 to 4 minutes and should be administered no more than 60 minutes before skin incision.
3. IV gentamycin can be given over 3 to 5 minutes and should be administered within 120 minutes before surgical incision.
4. IV metronidazole and IV clindamycin infusions can be given over 20 minutes. Maximum plasma concentrations occur at the conclusion of the infusion. They should be fully administered within 120 minutes of surgical incision.

10.15 Helminthic Infestations

10.15.1 Round Worm (Ascariasis)

Description

These are worms 20-30cm long, pink or white in colour found in the GIT as intestinal parasite. It is spread from faeces to mouth. The worms in the lungs cause a cough. They are mostly common in school children and young adults.

Signs and symptoms
- May be asymptomatic
- Colicky abdominal pain
- Cough, fever
- Blood tinged sputum if pneumonia develops while roundworms are in the lungs
- The patient may have seen worm in the sputum or stools
- Poor appetite
- Tiredness
- Diffuse mild abdominal pain sometimes
- Distension
- If pneumonia develops: elevated temperature, dullness to percussion at site of pneumonia, crepitation, occasional ulcers
- If the worm load is severe, the worms may form a mass in the right iliac fossa abdominal pain
- Intestinal obstruction

Causes
- Ascaris lumbricoides

Risk factors
- Poor hygiene and sanitation
- Malnutrition
- Iron deficiency anaemia

Diagnostic criteria and investigations
- Based on signs and symptoms
- FBC
- Stool microscopy

Management

Community level	Health centre level	Hospital level
• Health education about hygiene and sanitation, deworming every 6 months with albendazole 400mg as a single dose • Reassure the patient and • **Refer** to health centre	• Treat as CL **AND/OR** **Adult:** • Albendazole 400mg stat **Children:** Albendazole 200mg/5ml stat • Note: Anthelmintic drugs including mebendazole are not safe in pregnancy as they may cause congenital defects. Delay treatment until after delivery. • **Refer** to hospital.	• Treat as HC

10.15.2 Hook worm

Description
A chronic parasitic infestation of the intestines by blood sucking hookworms.

Signs and symptoms
- Dermatitis (ground itch)
- Cough and inflammation of the trachea -common during larvae migration phase
- Iron-deficiency anaemia

Causes
- Necator americanus and Ancylostoma duodenale- by penetration of the skin by larvae from the soil

Risk factors
- Limited access to clean water
- Poor sanitation
- Walking bare footed in endemic areas
- International travelling and migration
- Warm temperatures
- Moist well aerated soil shielded from sunlight
- Low socioeconomic status

Diagnostic criteria and investigations
- Stool examination for ova
- Full blood count for iron deficiency anaemia
- PCR assays

Management

Community level	Health centre level	Hospital level
• Avoid walking barefooted • Ensure proper faecal disposal • Deworm children every 6 months • **Refer** to health centre	• Treat as for ascariasis above • **Refer** to the hospital.	• Treat as HC

10.15.3 Taeniasis (Tape worm infestation)

Description
It is a disease acquired from eating raw or under cooked meat from infected animals.

Signs and symptoms
Saginata:
- Usually asymptomatic but live segments may be passed in stool
- Epigastric pain, diarrhoea, sometimes
- Weight loss
- Usually asymptomatic but live segments may be passed in stool
- Heavy larvae infestation causes cysticercosis (muscle pains, weakness, or fever)
- CNS involvement may cause meningoencephalitis or epilepsy

D. latum:
- Megaloblastic anaemia may occur as a rare complication

Causes
- Taenia saginata (from undercooked beef)
- Taenia solium (from undercooked pork)
- Diphyllobothrium latum (from undercooked fish)

Risk factors
- Poor hygiene eg infrequent washing
- Exposure to livestock
- Eating raw meat
- Leaving in endemic areas

Diagnostic criteria and investigations
- Macro and micro stool examination for ova
- Ultrasonography
- CT
- MRI
- Stool antigen
- ELISA tests

Management

Community level	Health centre level	Hospital level
• Avoid uncooked or undercooked pork, beef, or fish • **Refer** to health centre	• Treat as CL **AND/OR** **Adult:** • Mebendazole 500mg single dose **OR** • Niclosamide single dose 2g as a single dose on the first day, then 1g daily for 6 days **OR** • Praziquantel stat 40mg/kg body weight. **AND** a purgative 2 hours after the dose, e.g. Bisacodyl • Bisacodyl 10mg stat **Children:** • Mebendazole <2yrs 250mg single dose **OR** • Niclosamide single dose: • <2yrs: 500mg as a single dose on the first day, then 250mg daily for 6 days 2-6yrs: 1g as a single dose on the first day then 500mg daily for 6 days. • **Refer** to the hospital.	• Treat as HC

10.15.4 Trichuriasis (Whipworm infestation)

Description
Infestation of the human caecum and upper colon by Trichuris *trichiura* (whipworms)

Signs and symptoms

- May be asymptomatic
- Heavy infestation may cause bloody, mucoid stools and diarrhoea
- Anaemia
- Prolapse of the rectum
- Abdominal cramps

Risk factors

- Contaminated food
- Contact with contaminated hands
- Spread via faecal-oral route

Diagnostic criteria and investigations

- Based on signs and symptoms
- Stool examination for ova
- Sigmoidoscopy, where facilities available

Management

Community level	Health centre level	Hospital level
• Treat as ascariasis above • **Refer** to health centre	• Treat as above • **Refer** to the hospital.	• Treat as HC

10.16 Human Immunodeficiency Virus (HIV) and Acquired Immunodeficiency Syndrome (AIDS)

Note: Refer to the most recent Lesotho National guidelines on the Use of Antiretroviral Therapy for HIV Prevention and Treatment.

Description

HIV disease refers to an infection caused by the human immunodeficiency viruses, HIV-1 and HIV-2, which cause cytopathic effects either directly or indirectly to the human body. The hallmark of HIV disease is a profound immunodeficiency resulting primarily from a progressive quantitative and qualitative deficiency of the subset of T-lymphocytes referred to as helper T cell and the combination of viral pathogenic and immunopathogenic events that occurs during the course of HIV disease from the moment of initial (primary) infection through the development of advanced-stage disease is varied. Advanced HIV disease is referred to as Acquired Immunodeficiency Syndrome (AIDS) defined by the WHO clinical staging or use of CD4 cell count.

Signs and symptoms

The symptoms of HIV vary depending on the stage of infection. Though people living with HIV tend to be most infectious in the first few months after being infected, many are unaware of their status until the later stages in terms of the WHO Clinical staging.

Diagnostic criteria and investigations

- Antibody testing (RDTs and HIV Self-tests)

- Virologic testing (DNA PCR)

Risk factors

Behaviours and conditions that put individuals at greater risk of contracting HIV include:

- Having unprotected anal or vaginal sex;
- Having another sexually transmitted infection (STI) such as syphilis, herpes, chlamydia, gonorrhoea and bacterial vaginosis;
- Sharing contaminated needles, syringes and other injecting equipment and drug solutions when injecting drugs;
- Receiving unsafe injections, blood transfusions and tissue transplantation, and medical procedures that involve unsterile cutting or piercing; and
- Experiencing accidental needle stick injuries, including among health workers

Management

10.16.1 HIV Prevention

Preventing new HIV infections is critical to controlling the HIV epidemic in Lesotho. Comprehensive combination prevention includes biomedical, behavioural, and structural interventions designed to meet the HIV prevention needs of specific people and communities. Individuals should be offered a tailored combination of HIV prevention services to maximise benefits and protection.

Refer to the Lesotho National guidelines on the Use of Antiretroviral Therapy for HIV Prevention and Treatment.

This section primarily focuses on Pre-Exposure Prophylaxis (PrEP), Post-Exposure Prophylaxis (PEP) and EMTCT.

Health centre and hospital levels:

Pre-Exposure Prophylaxis (PrEP)

Pre-exposure prophylaxis (PrEP) is the use of antiretroviral drugs by HIV-negative people to reduce their risk of acquiring HIV infection. It should be offered as an additional prevention choice for people at substantial risk of HIV acquisition, as part of a combination of prevention approaches that include HIV testing, risk reduction counselling, male and female condoms, lubricants and VMMC.

10.16.1.1 PrEP Eligibility

PrEP should be offered to clients that meet the following eligibility criteria:

1. HIV seronegative – based on HIV test done on day of initiation on PrEP
2. Sexually active and at substantial risk of acquiring HIV infection. Individuals at substantial risk are those who:

- Have a sexual partner with HIV who:
  - Is not on ART
  - Has been on ART for less than 6 months
  - Has been on ART for more than 6 months but is not virally suppressed
  - Is virally suppressed but the couple want to conceive
- Have a sexual partner with unknown HIV status
- Have had vaginal or anal sexual intercourse without condoms with more than one partner in the past six months

- Have a sexual partner with one or more HIV risk factors in the past six months (this may include: having unprotected anal or vaginal sex; having a sexually transmitted infection such as syphilis, herpes, chlamydia, gonorrhoea, or bacterial vaginosis; injection drug user sharing needles and other injecting equipment)
- Have a history of a sexually transmitted infection (STI) by lab testing or self-report or STI syndromic management in the past six months
- Have had sex in exchange for money, goods or a service in the last six months
- Inject drugs using shared equipment
- Request PrEP- Clinicians should consider any request for PrEP as indication of risk
  PrEP must be provided after confirming client understanding.

3. Have no suspicion of acute HIV infection
4. Have minimal risk of renal impairment
5. Weigh 35kg or above
6. Are willing to use PrEP as prescribed

Oral PrEP

Recommended ARV for PrEP: Tenofovir/Lamivudine 300/300mg (TDF/3TC)

Oral PrEP options:

1. Daily: TDF/3TC 300/300mg 1 Tab once daily
   PrEP must be taken for 7 days before it becomes fully effective, followed by daily use for the duration of possible exposure to HIV in order to maintain full protection.

2. Event-Driven (ED) (2+1+1)
   Lesotho has adopted event-driven PrEP dosing as an option for all people assigned male status at birth and not taking gender-affirming hormones. Daily oral PrEP is still recommended for all people at substantial risk of HIV, including men.

Table: ED PrEP Dosing

	Timing	Number of Pills
First Dose	2-24 hours before sex	2
Second Dose	24 hours after loading dose	1
Third Dose	48 hours after loading dose	1

10.16.1.2 Dapivirine Vaginal Ring

Dapivirine vaginal ring is a female-initiated option to reduce the risk of HIV infection. It is made of silicone and contains dapivirine, which is slowly released into the vagina over one month.

10.16.1.3 Post Exposure Prophylaxis (PEP)

Post-exposure prophylaxis (PEP) is the prevention of transmission of pathogens following a potential exposure. An exposure has potential for HIV transmission only if the source has HIV infection, an infectious body fluid is involved and there is a route of infection. In the context of HIV, post-exposure prophylaxis refers to the set of services that are provided to prevent HIV infection and includes first aid; counselling, assessment of risk of infection and HIV testing. Decisions about whether or not to offer post-exposure prophylaxis should be based purely on clinical considerations of risk and should not be tied in any way to a person's decision to file a

police report or to pursue legal action.
All persons exposed to HIV accidentally, occupationally, sexually or otherwise should access PEP as early as possible within 72 hours of exposure to minimise the risk of transmission of HIV and other bloodborne pathogens. PEP should also be associated with measures to prevent other blood borne diseases, such as Hepatitis B and C.

PEP services at Hospital and Health centre

- HTS
- Emergency contraception
- Psychological support
- STI prophylaxis
- PEP

PEP Regimens

DTG is the preferred third drug in PEP regimens. NRTI backbone of TDF/3TC or ABC/3TC depends upon the age and weight of the client. Adolescents and adults >35kg should be provided TDF/3TC/DTG and children ABC/3TC + DTG.

Recommended PEP drug regimen

Population	Drug	Dose	Frequency	Duration
Adults and adolescents ≥35kg	TDF/3TC	300/300mg	Once daily	28 days
[b]Adults, adolescents and children	DTG (3rd drug)	[a]Weight-based	Once daily	28 days
Adults, adolescents and children < 35kg	ABC/3TC	[a]Weight-based	Once daily	28 days
[c]Adults and children	Lopinavir/ritonavir (3rd drug)	[a]Weight-based	Twice daily	28 days

[a]See annex for weight-base dosing.
[b]Counsel on potential risks of childbearing potential when taken around the time of conception.
[c]For those unwilling or unable to use DTG, LPV/r is the preferred 3rd drug.

10.16.2 HIV Treatment

After diagnosis of HIV, people living with HIV should be linked to HIV care in order to receive the comprehensive package of HIV services. ART should be initiated as soon as a person is ready to commit to treatment, preferably the same day as testing, regardless of the availability of baseline laboratory tests.

i. Health centre and hospital levels

Clinical evaluation of the HIV infected patient: Refer to latest ART guidelines

Antiretroviral Treatment Regimens

Antiretroviral therapy (ART) is used to suppress the virus ideally to undetectable levels. Regimens containing Dolutegravir (DTG) are recommended as first line therapy for all adolescents and adults ≥ 3kg, including pregnant and breastfeeding women. Dolutegravir is also used in second- and third-line regimens if the client has no previous exposure to DTG and there are no contraindications.

Three antiretroviral drugs from two different classes are given together in order to effectively treat HIV infection because of HIV's propensity to develop resistance. There are four classes of ARVs used in Lesotho – nucleoside reverse transcriptase inhibitors (NRTI), non-nucleoside reverse transcriptase inhibitors (NNRTI), boosted protease inhibitors (PI) and integrase strand transfer inhibitors (INSTI). The classes are based upon mechanism of action and which of the primary HIV proteins they inhibit – reverse transcriptase, integrase or protease. PIs are boosted with ritonavir (/r).

10.16.2.1 First Line ART

In treatment-naïve adults, adolescents, and children ≥ 4 weeks and ≥3 kg, the first-line ART regimen should consist of two nucleoside reverse transcriptase inhibitors (NRTIs) plus Dolutegravir (DTG). DTG-based HIV treatment leads to better outcomes for all age groups of people living with HIV, including children.

Recommended first-line ART regimens

First-line ART	Preferred 1st line regimens	Alternative 1st line regimens
Adolescents and adults ≥35kg (including pregnant and breastfeeding women)	TDF+3TC+DTG	ABC+3TC+DTG AZT+ 3TC+DTG TDF+3TC+ATV/r or LPV/r
Children (≥4 weeks and ≥3kg) and adolescents < 35kg	ABC+3TC+DTG	ABC+3TC+DTG AZT+ 3TC+ LPV/r or ATV/r
Infants ≥4 weeks and < 3kg	AZT+ 3TC+Ral	AZT+ 3TC+NVP

10.16.2.2 Second line ART

If there is evidence of treatment failure on a 1st line regimen, switching to a 3rd line regimen is recommended after addressing any adherence barriers, drug-drug interactions and opportunistic infections.

PLHIV with treatment failure needing a switch to 2nd line therapy are to be presented to ART Advisory Committee (AAC) for review. Approval will be provided after review of clinical histories, adherence assessment, and laboratory investigations.

Table: Recommended Second-line ART regimens

Age group	Preferred 1st-line regiment*	Alternative 2nd-line ART regimen**
Adults and adolescents ≥35kg	TDF/3TC + LPV/r or ATV/r	TDF/3TC+DTG If contraindicated, switch to TDF - ABC/3TC + DTG
	ABC/3TC + DTG+LPV/r	
	AZT/3TC + LPV/r or ATV/r	
	TDF/3TC + DTG	TDF/3TC + ATV/r or LPV/r If contraindicated, switch to TDF ABC/3TC + ATV or LPV/r
	ABC/3TC + DTG	
	AZT/3TC + DTG	
Children (≥4 weeks and ≥3kg) and Adolescents < 35kg	AZT/3TC + LPV/r or ATV/r	ABC/3TC + DTG If contraindicated, switch to ABC AZT/3TC + DTG
	ABC/3TC + LPV or ATV/r	
	ABC/3TC + DTG	ABC/3TC + LPV or ATV/r If contraindicated, switch to ABC AZT/3TC + LPV/r or ATV/r
	AZT/3TC + DTG	
*PLHIV currently (2021) on PI-based 2nd line therapy are eligible for transition to DTG-based regiments. See Section 6.7 for details. **Change AZT/3TC to TDF/3TC once 35kg if no contraindication to TDF.		

10.16.2.3 Third Line ART

If there is evidence of treatment failure on a 2nd line regimen, switching to a 3rd line regimen is recommended after addressing any adherence barriers, drug-drug interactions and opportunistic infections.

PLHIV with treatment failure needing a switch to 3rd line therapy are to be presented to National ART Advisory Committee (NAAC) for review. Approval will be provided after review of clinical histories, adherence assessment, and laboratory investigations.

Third-line ARV drugs for Lesotho include:

- Boosted PIs – darunavir (DRV), lopinavir (LPV), atazanavir (ATV)
- INSTI – dolutegravir (DTG)
- NNRTI – etravirine (ETV)
- NRTIs – recycled NRTIs based on a client's genotypic resistance test results and complete ARV treatment history.

Special considerations

- ETV should not be given with DTG as the concentration of DTG is reduced.
  - A regimen consisting of DTG + ETV + DRV/r may be used.
  - Paediatric formulations of DRV and ETV are readily available in Lesotho through a long-term donation programme from the drug manufacturer.

NB: PLHIV on a failing regimen with no new ARV options should continue on a tolerated

ART regimen that achieves maximal viral suppression in order to slow disease progression and HIV-related morbidity and mortality. Partial viral suppression is better than uncontrolled viral replication.

ART FOR PRE-TERM OR LOW-BIRTH-WEIGHT INFANTS

Refer to Paediatrics HIV Specialist for guidance with use of the ART dosing recommendations for infants initiated on ART 4 weeks chronological age, and/or prior to weighing 3kg.

ART for infants younger than four weeks of age

	2 - < 3kg	3 - < 4kg	4 - < 5kg
AZT 10mg/ml syrup	1ml BD	1.5ml BD	2ml BD
3TC 10mg/ml syrup	0.5ml BD	0.8ml BD	1ml BD
NVP 10mg/ml syrup	1.5ml BD*	2ml BD*	3ml BD*
RAL 10mg/ml granules (< 1 week of age)	0.4ml daily	0.5ml daily	0.7ml daily
RAL 10mg/ml granules (oral granules for suspension: 100mg/sachet)** (>1 week of age)	0.8ml BD	1ml BD	1. ml BD
*NVP is given once daily for two weeks of treatment and twice daily thereafter. **RAL granules for oral suspension should be used for newborns weighing at least 2kg.			

ART for infants over four weeks of age but below 3kg

Drug	Strength	2 kg to < 3kg	
		AM	PM
AZT/3TC	60/30mg	0.5 tab	0.5 tab
NVP	10mg/ml	1.5ml	1.5ml*
RAL+	10mg/ml granules	1.5ml	1.5ml
LPV/r	80mg/20mg/ml	0.6ml	0.6ml
*NVP is only given once daily during first two weeks of treatment. RAL+ granules are 100 mg/sachet.			

NB: Once the infant is at least four weeks of age and weighs at least 3kg, standard paediatric treatment with weight-appropriate ABC/3TC + DTG is recommended.

Monitoring Schedule for PLHIV on ART refer to the most recent ART guidelines

ARV Regimen	Assessment/ Investigations	Baseline	Week 2	Month 1	Month 3	Month 6	Month 12	Every 12 months
All Regimens	Rule out active TB using TB screening tool	X	X	X	X	X	X	At every visit Children & Adolescents: 3-6 monthly Adults: 6-12 monthly
	Adherence assessment		X	X	X	X	X	
	Clinical exam (including weight)	X	X	X	X	X	X	
	Assessment for possible ARV side effects		X	X	X	X	X	
	Treatment Supporter	X					X	If adherence concerns (regularly if adherence issues persist)
	Treatment Supporter	X					X	If adherence concerns (regularly if adherence issues persist)
TDF[1]/3TC/DTG		CD4, ALT, Cr, FBC FBS, HBsAg, pregnancy test, RPR/ VDRL^				VL, Cr	VL, CD4[oo], Cr,	VL, CD4[oo], Cr, FBS
ABC/3TC/DTG						VL	VL, CD4[oo],	VL, CD4[oo], Cr, FBS
AZT/3TC/DTG[3]				Hb		VL, Hb	VL, Hb, CD4[oo],	VL, hB, CD4[oo], FBS
All pregnant women		Pregnant women should receive clinical exams and laboratory monitoring in accordance with ANC and eMTCT guidelines.						
PI-based regimens		Fasting blood glucose and lipids should be checked at baseline and annually thereafter						

[1]All clients with abnormal Hb at baseline should have repeat measurement to ensure correction.
[3]Inability to perform creatinine clearance should not be be a barrier to tenofovir use in asymptomatic persons
^For those 12 years and older
Preganant and breastfeeding women, children and adolscents require more frequent VL monitoring.
[oo]CD4 monitoring, Use CD% for childrren under 5 years. Continue monitoring if previous CD4 resulst reveals advace or severe inmmunosuppression.

Key ARV drug-drug interactions

ARV Drug	KEY INTERACTIONS	SUGGESTED MANAGEMENT
DTG	Carbamazepine, phenobarbital and phenytoin	Use alternative anticonvulsant agents (such as valproic acid or gabapentin
	Rifampicin	Increase DTG to twice daily
	Rifapentine in TB preventative therapy regimens (1HP or 3HP)	No dose adjustment needed for DTG 50mg Awaiting more data regarding DTG 10mg
	Metformin	Avoid high-dose metformin with DTG. Reduce the metformin dose as availability is increased.
	Polyvalent cation products containing Mg, Al, Fe, Ca and Zn	Use DTG at least 2 hours before or at least 6 hours after supplements cotaining polyvalent cations, including but not limited to the following products: Fe, Ca, Mg, Zn multivitamin supplement , mineral supplements, cation-containg laxatives and Al, Ca or Mg containing antacids. *If taking medication with meals, DTG may be taken at the same time with supplements*.
TDF	Lithium	Monitor renal function closely
	NSAIDs	Avoid prolonged use in those with renal disease or at risk of nephrotoxicity.
Boosted PI (ATV/r, DRV/r, LPV/r)	Rifampicin	Replace rifampicin with rifabutin Adjust the dose fo LPV/r Contraindicated with ATV/r and LPV/r
	Rifapentine	Avoid combination
	Lithium, haloperidol	Use with caution since there is a risk of QT prolongation with ATV/r and LPV/r
	Amlodipine	Consider reducing the dose of amlodipine by 50%
	Antidiabetic drugs (such as glibenclamide and gliclazide)	Reduce the antidiabetic drug dose as needed
	Statins	Simvastatin: contraindicated because of the risk of rhabdomyolysis; use alternative agent Atorvastatin: dose adjustment required; total daily dose should be limited to 10mg with ATV/r, 20mg with LPV/r and 40mg with DRV/r

ARV Drug	KEY INTERACTIONS	SUGGESTED MANAGEMENT
	Hormonal contraceptives	Use alternative or additional contraceptive methods
	Fluticasone or budesonide	Risk of Cushing's syndrome, use alternative corticosteroid (such as beclomethasone)
	Acid-reducing agents	ATV/r: use at least 2 hours before or 1 hour after antacids; contraindicated with proton pump inhibitors

10.17 Immune reconstitution inflammatory syndrome (IRIS)

Description

Following ART initiation, the immune system begins reconstituting and starts responding to antigens more vigorously, which may result in a paradoxical reaction with worsening symptoms. In the process, signs of an opportunistic infection appear despite ART and virologic improvement. This situation is referred to as immune reconstitution inflammatory syndrome (IRIS). IRIS most commonly occurs in TB/HIV co-infected patients after the initiation of TB and HIV treatment.

Screening and identification

IRIS can present in two ways:

- Paradoxical IRIS – a patient is diagnosed with an opportunistic infection, most commonly TB, starts the appropriate OI treatment followed by ART, and then develops worsening or new Signs and symptoms of their opportunistic infection
- Unmasking IRIS – a patient is screened for opportunistic infections before initiation of ART and no signs or symptoms of OI are found
  After starting ART, new symptoms and signs of an opportunistic infection appear (most commonly TB)

  Occurrence**:** IRIS usually occurs within the first 2-12 weeks of initiating ART but can be as long as six months after ART initiation.

Risk factors

- Severe immune suppression (CD4 count <50 cells/mm)
- High Viral Load >100,000 copies/mL)
- Early initiation of ART
- Marked rise of CD4 count and fall of viral load following ART initiation
- Presence of subclinical opportunistic infections

Management

i. Hospital level
   - Counseling is important to ensure that the patient understands that IRIS does not mean failure of ART
   - Management of IRIS is mainly symptomatic, e.g. aspiration of TB lymph nodes or effusions
   - Continue ART and therapy for the opportunistic infection

For pain and fever:

- Paracetamol, oral, 1g 4–6 hourly when required 24 hourly
- Maximum dose: 15mg/kg/dose
- Maximum dose: 4g in 24 hours **OR**
- Ibuprofen, oral, 400mg 8 hourly with meals

For severe IRIS manifestations (e.g. compression of major structures by enlarging lymph nodes, expanding CNS tuberculomata, worsening meningitis):

- Prednisone, oral, 1.5mg/kg daily for 2 weeks
- Then 0.75mg/kg daily for 2 weeks

Note: Steroids should not be used in patients with Kaposi sarcoma.

Latent TB Infection Treatment (TB Preventive Therapy) Refer to the most recent TB guidelines Treatment of latent TB infection can reduce the risk of developing active TB by 60 – 90%. TB screening using the national TB screening tool is mandatory before offering TB preventive Therapy (TPT)

Eligibility Criteria

- All PLHIV above 1 year of age who has no signs or symptoms of active TB
- Children living with HIV aged 0-14 years and exposed to TB through household contacts without signs or symptoms of active TB, including infants < 1 year
- After the completion of TB treatment for all TB/HIV co-infected persons
- HIV-negative children 0-14 years exposed to TB through household contacts without signs or symptoms of active TB, including infants <1 year
- All Health Care Workers in whom active TB disease has been excluded
- All clients with silicosis in whom active TB disease has been excluded

NB: The absence of baseline liver function tests should not preclude or delay the initiation of TPT

Interpretation of LFT Results in Context of Initiating TPT (Insert table 5.12 -2019 TB Guidelines)

Preferred regimens

1. **Rifapentine and Isoniazid Preventive Therapy (3HP)**
   - Weekly dosing for 12 doses = 3HP
   - Not for use in children below 2 years of age
   - Not for use in pregnant or breastfeeding women or women who are planning to become pregnant in the next three months
   - Not for use in those on PIs or NVP
   - For children on DTG – double the dose of DTG by increasing to twice daily dosing
   - Supplement with pyridoxine (Vitamin B6) 12.5-25 mg daily x 3 months

Paediatric (2-14 years) Dosi[illegible] of 3HP

	If using individual fomulations		If using FDC
Weight	**Isoniazid (100mg)**	**Rifapentine (150mg)**	**HP 150 (150mg)**
10 - 15kg	3	2	2
15 - 23kg	5	3	3
24 - 30kg	6	4	4
>30kg	7	5	5

Adolescent and Adult (>14 years) Dosing for 3HR

	If using individual fomulations		If using FDC
Weight	**Isoniazid (300mg)**	**Rifapentine (150mg)**	**HP 300 (300mg)**
30kg and up	3	6	3

2. Rifampicin and Isoniazid Preventive Therapy (RH)

- Daily dosing for 3 months = 3HR
- Recommended for children < 2 years for whom rifapentine is not recommended
- Supplement with pyridoxine (vitamin B6) 12.5-25mg daily x 3 months
- For those on DTG – double the dose of DTG by increasing to twice daily dosing
- For those on LPV/r tablets, increase ritonavir to reach Lopinavir to ritonavir ratio 1:1
- Not for use in those on DRV/r. Coadministration of darunavir and rifampicin is contraindicated. Use another TPT option or change DRV/r to LPV/r if feasible.
- Not for use in those on ATV/r. Coadministration of atazanavir and rifampicin is contraindicated. Use another TPT option or change ATV/r to LPV/r if feasible

Weight-based dosing of RH

Weight	RH 75/50mg	RH/150/75mg
2 - 3.9kg	½ tablet	
4 - 6.9kg	1 tablet	
8 - 11kg	2 tablets	
12 - 15.9kg	3 tablets	
16 - 24.9kg	4 tablets	
25 - 40kg		2 tablets
40 - 55kg		3 tablets
55 - 70kg		4 tablets
>70kg		5 tablets

3. Isoniazid Preventive Therapy (IPT)

- Daily dosing for six months
- Supplement with Pyridoxine (vitamin B6) 12.5-25mg daily x 6 months

Weight-based dosing for Isoniazid

Weight (kg)	INH 100mg	Dose given (mg)
>5	½ tablet	50
5.1 - 9.9	1 tablet	100
10 - 13.9	1 ½ tablets	150
14 - 19.9	2 tablets	200
20 - 24.9	2 ½ tablets	250
>25	3 tablets or INH 300mg x 1 tablet	300
>70kg		5 tablets

chapter

11

Musculoskeletal Conditions

11.1 Gouty arthritis

Description

A condition of abnormal deposition of uric acid crystals in the joints, kidneys and musculoskeletal soft tissues. This results in inflammation and pain in the joints. Attacks can come suddenly, often at night.

11.1.1 Acute gouty arthritis

Signs and symptoms

- Recurrent attacks of a characteristic acute pain in joints
- Occurs in one joint (usually big toe)
- Extreme pain, swelling, redness and very hot
- Occasional deformity
- Interstitial renal disease - poor kidney function
- Uric acid kidney stones (nephrolithiasis)
- Increased serum uric acid concentration (above 0.5 mmol/L)
- Formation of a tophi

Causes

- Crystallisation of uric acid in the joint

Risk factors

- Gender related (commonly occurs in men >40 years and in postmenopausal women)
- Diet
- Genetic predisposition which is usually under-excretion of uric acid by the kidney
- Physical trauma
- Surgery
- Medicines (diuretics, niacin, cyclosporine)
- Metabolic conditions (metabolic syndrome, obesity)

Diagnostic criteria and investigations

- Clinical examination
- Based on signs and symptoms
- Radiology
- Aspiration of synovial fluid and polarimetry
- Blood test for uric acid, WBC and ESR

Management

Community level	Health centre level	Hospital level
• Immobilise the affected joint during acute painful attack • Increase fluid intake • Avoid alcohol • Avoid aspirin • Avoid red meat • Bed rest • **Refer** to health centre for specific treatment	• Treat as CL • Initiate treatment as soon as possible using NSAIDs orally 8 hourly after meals for duration of attack e.g. indomethacin 50mg orally 8 hourly after meals for duration of attack • **In high-risk patients: > 65 years of age; history of peptic ulcer disease; on concomitant warfarin, aspirin, or corticosteroids: ADD** PPI, e.g.: • omeprazole, oral, 20mg daily while on an NSAID. • **If NSAIDs are contraindicated eg warfarin therapy and renal dysfunction give:** Prednisolone 40mg daily for 5 days (doctor initiated) • Refer if: ▪ No response to treatment ▪ For confirmation of diagnosis, if in doubt ▪ Patients with chronic kidney disease ▪ Suspected secondary gout	• Treat as HC • Diclofenac 75mg IM hourly-continue as long as it is necessary. • If the patient does not respond: colchicine 0.5–1mg orally immediately then 0.5mg 2–3 hourly until pain is relieved or gastrointestinal distress develops. Do not exceed a total daily dose of 6 mg of colchicine **N.B** Do not repeat a course of colchicine within 3 days **OR** • Allopurinol 300mg 24 hourly or 12 hourly lowers serum uric acid levels, helps prevent recurrent attacks and reduce tophaceous deposits. **Prophylaxis** • Colchicine oral 0.5mg 24 hourly or 12 hourly until uric acid lowering agents can be administered. **Note:** Colchicine is effective and specific for acute gout but it is not easy to use optimally due to the development of gastrointestinal adverse effects. **Refer** to higher treatment centre in cases of: • Failure to respond • Uncertain diagnosis • Chronic gout is suspected

11.1.2 Chronic gouty arthritis

Description

Gout with one or more of the following symptoms and signs:

Signs and symptoms

- Many acute attacks (more than four per year)
- Tophi
- Bony destruction
- Kidney stones
- Poor renal function
- Serum uric acid over 0.5mmol/L

Diagnostic criteria and investigations

- X-rays: periarticular erosions due to tophi
- Urate crystals in synovial fluid

NB: If possible, avoid known precipitants and medicines that increase uric acid, including:

- Low dose aspirin
- Ethambutol
- Pyrazinamide
- Thiazide and loop diuretics

Management

Community level	Health centre level	Hospital level

• Encourage controlled weight loss.
• Advise avoidance of substances that may trigger acute gout: -alcohol, acetylsalicylic acid and certain foods, e.g. red meat.
	• Treat as CL
	• **Refer** all patients with chronic gout to hospital.
		• Treat as HC
		AND/OR
		• Allopurinol 100mg 24 hourly, for **moderately** severe gout 300 - 600mg per day in divided doses and for severe: 700-900mg per day in divided doses. (But it should be initiated when acute attack has settled completely) Increase monthly by 100mg according to serum urate levels.
		• Titrate dose to reduce serum urate to <0.35mmol/L.
		• Allopurinol dosage is dependent on severity of disease and serum urate concentration.
		• Doses in excess of 300mg should be administered in divided doses.
		• Maximum dose: 900mg per day.
		• Elderly: start with Allopurinol 50mg daily.
		• Renal impairment:
		• Adjust dose according to renal function.
		  • eGFR 30–60mL/minute: start with 50mg daily.
		  • eGFR <10mL/minute: consult a specialist

CAUTION: Concomitant use of more than one oral NSAID has no additional clinical benefit and only increases toxicity. Use of all NSAIDs is associated with increased risks of gastrointestinal bleeding, renal dysfunction, and cardiovascular events (stroke and myocardial infarction). NSAIDs should be used judiciously at the lowest effective dose for the shortest duration. Do not use NSAID in pregnancy or while breastfeeding.

11.2 Osteoarthritis

Description

Osteoarthritis is a degenerative disorder typically affecting weight-bearing joints and the hands. Mostly affects people over 50 years.

Signs and symptoms

- Joint pain and stiffness. Usually gets better with rest and worse with movement. It is usually worse during cold or rainy weather
- Pain is usually mild
- Pain in the neck may radiate to the arms or cause weakness in the arms
- Mild tenderness on palpation over affected joints
- Possible nodes on fingers - distal phalangeal joints
- The joints are not hot or swollen

Risk factors

- Genetic
- Metabolic
- Biomechanical

Causes

It is caused by degeneration of cartilage and bones

Diagnostic criteria and investigations

- Blood tests
- X-ray
- MRI
- CT scan
- Based on signs and symptoms

Management

Community level	Health centre level	Hospital level
• Joint rest (use crutches and walkers to protect weight-bearing joints) • Weight management • Paracetamol 500mg- 1g orally 8 hourly for 1 day • Methylsalicylate ointment 12 hourly for a day. • Keep joints warm.	• Treat as C Land/or • Acetylsalicylic acid 300mg-600mg 6-8 hourly with meals for 7 days. **OR** • Ibuprofen 400mg 8 hourly for 5-7 days • In high-risk patients: i.e. patients > 65 years of age, or with a history of peptic ulcer disease, or on concomitant warfarin, aspirin or corticosteroids: **ADD** • PPI, e.g.: Omeprazole, oral, 20mg daily. • **Refer** all cases with: ▪ uncertain diagnosis ▪ Intractable pain ▪ Recurrent episdes of pain with inflammation ▪ Suspected infection	• Treat as HC **AND/OR** • Diclofenac 75mg IM stat then 25mg- 50mg orally 8 hourly for 5-7 days. **OR** • Methylprednisolone 40mg IM stat. **OR** • Dexamethasone 4mg IM stat **AND** • Prednisone 5mg- 20mg orally 8 hourly for 7- 14 days **NB:If urethritis is present, treatment may prevent further episodes of arthritis:** • Ceftriaxone, IM, 250mg as a single dose. o For ceftriaxone IM injection: Dissolve ceftriaxone 250mg in 0.9 mL lidocaine 1% without epinephrine (adrenaline). **AND** • Azithromycin, oral, 1g, as a single dose.

11.3 Osteomyelitis

Description

Osteomyelitis is an acute or chronic infection of the bone cortex and bone marrow. It destroys the bone, sometimes permanently. Mostly affects legs, arm and spine. The infection is spread through three main routes – hematogenous, contiguous and direct inoculation.

Signs and symptoms

- Fever
- Pain on moving affected area of bone
- Chills
- Weakness and fatigue
- Elevated temperature 39^{o}C
- Redness, temperature increase and swelling over area of affected bone, or in the nearby joint

Causes

- Bacterial (Staphylococcus aureus, Enterobacter spp, Group A & B Streptococci, Haemophilus influenza, Salmonella typhi, Pseudomonas aeruginosa, Eschericia coli and complications of Mycobacterium tuberculosis infection)
- Fungal (blastomyces)
- Trauma and infections
- Compromised host resistance as in immunosuppression

Diagnostic criteria and investigations

- Combination of clinical examination and indirect laboratory markers e.g, FBC, ESR
- Blood culture
- Based on signs and symptoms
- Radiography
- CT and MRI scans

Management

Community level	Health centre level	Hospital level
• **Refer** to health centre.	• Immobilise the affected area with splints • **Refer** to hospital	• **Refer** chronic cases to surgeon

Types of bone infections and treatment are tabulated below:

Empiric antibiotic therapy

Therapy is directed against S. aureus unless there is evidence of urethritis or PID, in which case gonococcal infection should be covered.

It is crucial to obtain cultures of blood, joint or aspirate of osteomyelitis focus before administering antibiotics.

- Cloxacillin 2g stat, then 500mg IV four times a day for two weeks then 500mg orally four times a day for four weeks.
- If allergic to penicillin give erythromycin 500mg four times a day for six weeks.

Second line

- Clindamycin 600mg IV 8 hourly for patients allergic to penicillin for two weeks then oral for four weeks.
  OR
- Vancomycin 15-20mg IV 12 hourly for methicillin resistant staphylococcus aureus and patients allergic to penicillin for two weeks.
  - Change antibiotic according to culture results
  - Monitor treatment response by weekly CRP
  - Length of treatment controversial; continue until CRP is normal

NB: Surgical debridement is recommended for chronic osteomyelitis unless patient is not fit for surgery then antibiotic suppression may be given.

Referral

- Acute osteomyelitis/ septic arthritis for early drainage by specialist surgeon
- If pyrexia persists despite adequate antibiotic therapy, a sub-periosteal abscess must be sought and drained by a specialist surgeon
- Chronic osteomyelitis
- Pathological fractures

11.4 Pyomyositis

Description

Primary acute bacterial infection of skeletal muscles associated with abscess formation

Signs and symptoms

- Most commonly localised in one muscle – usually large striated muscle
- Fever
- Painful swelling of the involved muscle
- Affected area is hot, swollen, and tender
- Fluctuation when pus forms

Causes

- Bacterial infection (commonly Staphylococcus aureus)

Risk factors

- Trauma
- Nutritional deficiency
- Immunosuppression
- Parasitic manifestations
- Viral infections
- IV drug abuse

Differential diagnosis

- Cellulitis
- Boils
- Osteomyolitis

Diagnostic criteria and investigations

- Blood: full count, Culture and Sensitivity
- Pus: Culture and Sensitivity

Management

Community level	Health centre level	Hospital level
• Elevate and immobilise affected limb (where relevant) • Paracetamol 1g 8 hourly for 1 day. • **Refer** to health centre	• Treat as CL **AND/OR** • Cloxacillin 500mg 6 hourly for 7 days **Note:** As soon as pus localises: • Carry out surgical incision and drainage of the abscess and leave the wound open • **Refer** to hospital.	• Treat as HC **AND/OR** • Cloxacillin 2g IV or IM 6 hourly for 7 days • Flucloxacillin 250-500mg 6 hourly for 7 days **OR** • Clindamycin 300mg 6hourly for seven days **OR** • Gentamycin 40-80mg

11.5 Rheumatoid arthritis

Description

Rheumatoid arthritis is a systemic inflammatory disease that affects many parts of the body i.e. heart, lungs, spleen and joints. But it is mostly a disease of the joints.

Signs and symptoms

- Stiffness and pain of the joints especially in the morning when getting up. It improves as the day goes on
- Weakness
- Weight loss
- Loss of appetite
- Low grade fever
- Symmetrical joint swelling, tenderness and redness, especially spindling or the fingers
- Nodules present over bony prominences like fingers and elbows
- May have enlarged spleen
- May have lymph node enlargement
- Deformity of the fingers, toes and spine
- Atrophy of the skin and muscles
- Loss of mobility of proximal joints of the hands and feet

Causes

- Unknown, the fundamental mechanism is dysregulation of the immune system

Risk factors

- Cigarette smoking
- Infections
- Trauma

Diagnostic criteria and investigations

- X-ray
- ESR
- CRP
- Renal function tests and synovial biopsy
- Based on signs and symptoms

Management

Community level	Health centre level	Hospital level
• Daily rests help to decrease pain and swelling. • Daily exercise of all joints helps to keep them from stiffening. • Paracetamol 500mg-1g for 1 day. • **Refer** to health centre	• Treat as CL **AND** • **Refer** to the hospital.	• Treat as HC **AND/OR** • Diclofenac 25- 50mg 8 hourly for 5-7 days. In acute exacerbation: • 75mg IM stat then 25- 50mg orally 8 hourly **AND** • Prednisolone 5-20mg orally 8 hourly for 5-7 days. **Caution:** Adjust the dose for elderly **Refer** all patients for treatment by specialists with disease modifying anti-rheumatic (DMARDs) agents to minimise joint erosions and deformities and other systemic complications.

11.6 Septic Arthritis (pyogenic arthritis)

Description

A condition involving infection of one or more of the large joints. Infection is usually blood borne, but may follow trauma to the joint.

Signs and symptoms

- Extreme discomfort and difficulty in using the affected joint
- Joint becomes larger
- Severe pain
- Reddening
- Swelling
- Warm joint
- Fever

Causes

- Bacterial infections due to Streptococci, Haemophilus influenzae, Salmonella, Staphylococci and Neisseria gonorrhoeae
- Virus
- Fungi

Diagnostic criteria and investigations

- Aspiration of joint
- FBC
- MCS
- X-ray

Management

Community level	Health centre level	Hospital level
• Paracetamol 500mg-1g stat. • **Refer** to health centre.	• Treat as CL **AND/OR** • **Refer** to hospital.	• Treat as HC **AND/OR** • Cloxacillin 1g IV 6 hourly for 3 days. **THEN** • Cloxacillin 500mg 6 hourly for 14 days. **OR** • Clindamycin 600-4800mg IV/IM 6-12 hourly for 7 days. **OR** • Ciprofloxacin 500mg 12 hourly for 5-7 days **AND** • Doxycyclne 100mg 12 hourly for 5-7days

Community level	Health centre level	Hospital level
		Children: • Cloxacillin 50-100mg/kg 6 hourly for 14 days **OR** • Clindamycin: • 0-1month 15-20mg/kg iv in divided doses 6-8 hourly for 7 days. • 1 month -16years 20-40mg/kg iv/im in divided doses 6-8 hourly for 7 days.

11.7 Osteoporosis

Description

A disease characterised by low bone mass and micro-architectural bone deterioration leading to bone fragility and increase in fracture risk.

Signs and symptoms

- Back pain
- Loss of height over time
- A stooped posture

Causes

- Postmenopausal
- Idiopathic age-related
- Metabolic conditions (calcium and vitamin D deficiencies)
- Endocrine conditions (hyperthyroidism)
- Renal diseases
- Gastrointestinal-liver disease
- Bone marrow infiltration
- Drugs (leukemia)
- Arthritis
- Life style (nutrition, alcohol, smoking, excessive caffeine)

Risk factors

- Gender (more in females than males)
- Age (geriatrics)
- Family history
- Body frame size (especially men and women with small body frames)

Diagnostic criteria

- X-ray
- Ultra sound
- Laboratory tests: FBC, electrolytes (calcium, phosphorus, magnesium), renal function test

Management

Community level	Health centre level	Hospital level
• **Refer** to health centre.	• **Refer** to hospital.	• Calcium oral, 1g daily • Vitamin D, oral, 800 units or 50 000 units weekly In glucocorticoid induced osteoporosis • Bisphosphonates • Alendronic acid, oral, 70mg weekly for a maximum of 5 years Taken with a full glass of water, 30 minutes before breakfast – do no lie down. Hormone replacement therapy **Referral to tertiary hospital if there is no response to the treatment.**

chapter

12

Nutritional Conditions

Description

Malnutrition refers both to undernutrition and over-nutrition, but in this document the term refers to deficiency of nutrition. There are two main types of malnutrition, namely; Severe Acute Malnutrition and Moderate Acute Malnutrition.

12.1 Types of acute malnutrition

- **Kwashiorkor (oedematous undernutriton)** is a life-threatening nutritional deficiency state affecting infants and young children characterised by:
  - Generalised oedema
  - Apathy
  - Skin lesions ranging from pigmentary changes to open sores
  - A marked tendency to superimposed infections, which may be difficult to detect due to the body's inability to mount an adequate response
- **Marasmus** (wasting) is a deficiency of predominantly energy foods and is recognised by an obvious lack of muscle tissue and subcutaneous fat
- **Marasmic kwashiorkor** is a combination of the above two forms

Signs and symptoms

- Impaired consciousness
- Temperature below 35°C
- Open skin sores
- Anaemia
- Persistent diarrhoea

Causes and risk factors

- Pneumonia
- Persistent diarrhoea
- Inadequate diet
- Malabsorptive disorders
- Anorexia

Management

Community level	Health centre level	Hospital level
• Health education and promotion on nutrition • Weight and growth assessment	• Assess for Bilateral pitting oedema, if Grade II and III, keep the child warm and refer immediately to hospital.	**Admit paediatrics to inpatient care if:** • Weight for height < -3SD and/or a Mid Upper Arm Circumference (MUAC) < 11.5cm and presence of any grade of bilateral pitting oedema

Community level	Health centre level	Hospital level
• Active case finding and early detection by use of Mid Upper Arm Circumference (MUAC) tapes • **Refer** to health centre for further management	• Rule out complications, if complications are present i.e hypoglycaemia, hypothemia, vomiting, fever, dehydration, severe anaemia, difficult in breathing, skin lession, lethargic or unconscious, convulsions. • Take weight and height and determine the Weight for Height z-scores, if W/H z scores < -3SD refer immediately. • If child presents with bilateral pitting oedema grade I and has appetite, admit to outpatient Therapeutic Programme. • Give RUTF (Plumpy Nut) based on weight **AND** • Amoxycillin 250mg 8 hourly for 5-7 days **OR** • Amoxycillin-Clavulanic acid 15mg/kg 12 hourly for 5-7 days. **If penicillin allergic Give:** • Erythromycin 5mg/kg in 6 hourly for 5-7 days. **Moderate Malnutrition** • If weight for height z scores is between < -2 and < -3 SD or MUAC 11.5-12.4 cm and no complications and no bilateral pitting oedema, admit to Supplementary Feeding Programme • Provide with Supercereal plus. **Note: All children with anorexia should be referred to hospital for management** **AND** • Amoxycillin 250mg 8 hourly for 5-7 days. **OR** • Amoxycillin-Clavulanic acid 15mg/kg12 hourly for 5-7 days. **If penicillin allergic:** • Erythromycin 5mg/kg in 6 hourly for 5-7 days	**OR** • A child with no appetite/ anorexia or complications (hypoglycaemia, hypothemia, vomiting, fever, dehydration, severe anemia, difficult in breathing, skin lession, lethargic or unconscious, convulsions Treatment is in two phases (phase 1 and 2): • Phase 1: Use of Formula 75 (F75). F75 must be exclusive. Do not switch to F100 if oedema has not subsided. • Phase 2: Use of Formula 100 (F100), RUTF (Plumpy nut) as the child gains weight and feels more hungry, food can be started. • If the child develops oedema in phase 2, switch to F75 (Phase 1) • Broad spectrum antibiotics preferably Amoxycillin should be given per National recommendations for paediatrics • Dehydrated malnourished should be given ReSoMal instead of ORS • Iron supplementation and deworming must not be given during the first 2 weeks of treatment. Iron can be added when the child is on F100/ RUTF for completed two (2) days. • Continued health education

12.2 Micronutrient Deficiencies

12.2.1 Vitamin A deficiency

Description

A condition affecting the skin, mucous membranes and the eyes. Most common in children 1–5 years. It is the commonest cause of blindness in children if not identified and treated early.

Signs and symptoms

- Night blindness
- Dry eyes (xerophthalmia) with eventual ulceration and perforation of the cornea (keratomalacia)
- Small greyish triangular deposits near the cornea (Bitot's spots)

Causes and risk factors

- Children with eye complications secondary to vitamin A deficiency
- Children with kwashiorkor and/or marasmus but no associated eye complications secondary to vitamin A deficiency
- Children with measles at present or during the past 3 months

Diagnostic criteria and investigations

- Based on signs and symptoms
- Blood tests

Management

Community level	Health centre level	Hospital level

• Health education
• **Refer** to health centre
	• Retinol (vitamin A) oral:
	  • Under 12 months: 100 000 IU immediately and repeat 24 hours later and after 6 weeks
	  • Over 12 months: 200 000 IU immediately and repeat 24 hours later and after 6 weeks
	Note:
	Prophylaxis:
	For children:
	Vitamin A prophylaxis as:
	• Under 12 months: 100 000 IU every 6 months
		• Treat as HC
		AND
		For children admitted with severe malnutrition (without oedema),
		• Vitamin A should be given on admission, day 2 and day 14.
		For children admitted with severe malnutrition (with oedema),
		• Vitamin A should be given on the second phase of treatment preferably after 2 days on F100. Follow doses according to age.

Community level	Health centre level	Hospital level
	• Over 12 months: 200 000 IU every 6 months until a child is 60 months • **Refer** to hospital if symptoms persist for more than 2 months.	

12.2.2 Pyridoxine (Vitamin B6) deficiency

Description

Pyridoxine deficiency is related to malnutrition, alcoholism and malignancy

Signs and symptoms

- Symptoms and signs of anaemia
- Signs of peripheral neuritis such as: -tingling sensation of the legs - leg pains - calf muscle cramps - muscle weakness

Management

Community level	Health centre level	Hospital level
Refer to health centre	**Deficiency of pyridoxine:** **Adult:** • Pyridoxine 25mg 8 hourly for 3 weeks **Children:** • Pyridoxine 12.5-25mg/day for 3 weeks **Prophylaxis during TB treatment:** **Adults:** • Pyridoxine 25mg per day. • Children: • < 3 years Pyridoxine • 12.5mg daily • >3 years Pyridoxine 25mg daily. • If suspect drug induced neuropathy **Refer** to hospital.	• Treat as HC. **Drug-induced neuropathy:** **Adults:** • Pyridoxine 50–200mg every 8 hours for 3 weeks **Children:** • Pyridoxine 10-50mg/day for 3 weeks **Refer** to specialist if there is: • Convulsions • Hallucinations • Anaemia • Seborrhoeic dermatitis around the eyes, nose and mouth accompanied by stomatitis and glossitis

12.2.3 Pellagra (Nicotinamide deficiency)

Description

Pellagra is a condition associated with nicotinamide deficiency, usually accompanied by other vitamin deficiencies. It is caused by lack of niacin in diet, niacin is present in liver, meat, whole-grains and group nuts.

Signs and symptoms

- Patient does not feel well, but is not sure as to why
- Patient is often depressed
- Four Ds (diarrhoea, dermatitis, dementia, death)
- Red, roughened skin becoming darkly pigmented and scaly especially of the sun-exposed areas
- Redness and enlargement of the tongue
- Confusion, forgetfulness

Risk factors

- Inadequate diet
- Malabsorption

Management

Community level	Health centre level	Hospital level
• Lifestyle adjustment (reduce alcohol intake) • Patient counselling (diet rich in niacin e.g liver, meat, whole-grains and group nuts.) **Refer** to health centre	• Treat as CL • **Refer** to hospital	• **Adults:** **Less severe pellagra:** Nicotinamide • 100mg 6 hourly for 7 days followed by multivitamin preparation containing 50 to 60mg of nicotinamide daily for 1 month. • **Severe pellagra:** Nicotinamide 300–500mg 6 hourly for 7 days followed by multivitamin preparation containing 50 to 60mg of nicotinamide daily for 1 month. **Children:** Nicotinamide 100mg 8 hourly for 7 days, followed by multivitamin preparation containing 50 to 60mg of nicotinamide daily for 1 month.

Community level	Health centre level	Hospital level
		Refer for specialist's care if: • Confusion • Depression • Memory loss • Psychosis • Dementia • Hallucinations • Delusions

12.2.4 Thiamine deficiency vitamin B1 (Wernicke's encephalopathy and beriberi)

Description

Thiamine deficiency is a medical condition of low levels of B1, a severe and chronic form is known as beriberi.

Signs and symptoms

- Confusion
- Paralysis of one or more of the ocular muscles (ophthalmoplegia)
- Nystagmus
- Ataxia
- Peripheral neuropathy
- Congestive heart failure

Risk factors

- Alcoholism
- Gastric bypass surgery
- Genetic
- Kidney disease
- Poor diet

Note: Alcoholics may present with Wernicke's encephalopathy, or with neuropathies associated with multiple vitamin deficiencies.

Management

Community level	Health centre level	Hospital level
• Lifestyle adjustment (reduce alcohol intake) • Patient counselling (diet rich in niacin e.g liver, meat, whole-grains and group nuts.) **Refer** to health centre.	• Treat as CL. • **Refer** to hospital	**Thiamine deficiency:** Thiamine 50mg orally 24 hourly for 6 weeks. **Peripheral neuropathy:** • Thiamine 50-100mg orally once daily for 6 weeks depending on persistence of symptoms.

Community level	Health centre level	Hospital level
		Refer to specialist if, Wernicke's encephalopathy • Congestive heart failure • Severe peripheral

12.2.5. Scurvy

Description

This condition results from the lack of vitamin C in the diet

Symptoms and signs

- Swollen bleeding gums, especially when the teeth are brushed
- Joint pains-due to bleeding in the joints. The joint pains may even prevent the child from walking properly.
- Muscle and bone pains due to bleeding in the muscle and bones
- Swollen and very tender joints, especially the wrists and ankles
- Bleeding into the skin or muscles may occur
- Anaemia due to the bleeding which can be severe

Risk factors

- Chronic diarrhoea
- Using illegal drugs
- Having neurological conditions
- Getting radiation and chemotherapy
- Excessive alcohol consumption
- Older age
- Poor diet lacking in fresh fruits and vegetables

Management

Community level	Health centre level	Hospital level
• Counselling on proper nutrition • Fresh oranges daily for one month **Refer** to health centre	• Ascorbic acid 250-500mg or 1g for higher dose 24 hourly for one month. **Children:** • Ascorbic acid 100-300 mg 24 hourly for a month or 500mg for higher dose • Refer to hospital if: • Anaemia is severe for blood transfusion.	• Treat as HC. • If patient presents with severe anaemia transfuse accordingly

12.2.6 Vitamin B deficiencies

Description

A condition in which multiple vitamin B deficiencies occur, such as:

- Malnutrition
- Pellagra associated with multiple vitamin B deficiency
- Physical and neurological complications of alcoholism

Management

Community level	Health centre level	Hospital level
• Lifestyle adjustment • Patient counselling • Discourage alcohol abuse **Refer** to health centre	• Treat as HC **Adult:** Vitamin B complex 2 tablets 8 hourly for 1 week, then one tablet daily for 3 months **Children** • Vitamin B complex 5 ml syrup 24 hourly for 3 months **Refer** to hospital if not responding	Treat as HC **AND** **Refer** the following conditions to Psychiatrist: • Wernicke's encephalopathy • Confusion • Depression • Memory loss • Psychosis • Dementia • Hallucinations • Delusions

12.2.7 Folic acid deficiency

Description

Folic acid is involved in the metabolism of amino acid (conversion of histidine to glutamic acid). It is also involved in the synthesis of thymine (a distinctive component of DNA) and therefore in the formation of red blood cells and maintenance of nervous system.

Signs and symptoms of deficiency

- Macrocytic megaloblastic anaemia
- Stomatitis, glossitis
- Diarrhoea
- Neural tube defects (spina bifida, anencephaly, encephalocele)

Risk factors

- Pregnancy
- Heavy alcohol use
- Elderly people
- Malabsorption syndrome e.g. inflammatory bowel disease
- Certain medicines
- Vitamin poor diet

Community level	Health centre level	Hospital level
Refer to health centre	• Counsel on green leafy vegetables, legumes, liver, meat, fish, and poultry. **Adults:** Folic acid 5mg 24 hourly for 4 months, then maintenance dose of 5 mg every 1-7 days depending on underlying disease. **Children over one year:** Folic acid 0.5 mg/kg body weight 24 hourly for 4 months, then maintenance dose of 0.5 mg/kg every 1-7 days depending on underlying disease. **Refer** to hospital if not responding	Treat as HC

12.2.8 Vitamin D deficiency

Description

Vitamin D facilitates calcium and phosphorus absorption and utilisation, hence formation of bones and teeth.

Signs and symptoms of deficiency

- Rickets – a disease of bones in infants and children
- Osteomalacia in adults

Community level	Health centre level	Hospital level
Health education on exposure of the skin to sunshine (vitamin D is produced by the action of the sun on the skin) and vitamin D rich foods (wheat germ, fish, liver, egg yolk, organ meats, cheese, milk breast milk other milks, butter, margarine, mayonnaise).	• Treat as CL. **Refer** to hospital	Treat as HC. And add • Ergocalciferol 1000 – 5000 IU 24 hourly for 2 weeks then 4000 IU 24 hourly for 2 months

12.2.9 Vitamin E (tocopherol) deficiency

Description

Vitamin E is an antioxidant. It plays a role in reproductive health (enhances fertility) and also in haemoglobin synthesis.

Signs and symptoms of deficiency

- Leg cramps
- Muscle weakness
- Nerve problems and
- Hearing problems

Management

Community level	Health centre level	Hospital level
Refer to health centre	Health education on diet (consumption of vegetable oils and whole grain cereals). **Refer** to hospital	**i. Adult:** • Alpha tocopherol acetate 50 - 100mg daily until recovery. **Children:** • Below 1 year: Alpha tocopherol acetate 50mg until recovery

12.2.10 Vitamin K deficiency

Description

Vitamin K is essential for the synthesis of prothrombin in the liver, factor VII, IX and X. It also helps in the production of proteins necessary for bone calcification. Primary deficiency of vitamin K occurs only in neonates. Secondary deficiency may be associated with malabsorption syndrome, liver cirrhosis and the use of Coumarin derivatives such as dicumarol, warfarin and other analogues.

Signs and symptoms of deficiency

- Injuries/wounds taking long to stop bleeding.
- Infants are relatively deficient in vitamin K and therefore at risk of serious bleeds including intracranial bleeding.

Management

Community level	Health centre level	Hospital level
Refer to health centre	Counsel on diet (consumption of food from plants and animal sources) **Refer** to hospital	Treat as HC. and i. Phytomenadione 10 mg i/v stat ii. To prevent vitamin K deficiency bleeding (haemorrhagic disease of the newborn): Phytomenadione 0.5-1 mg i/m once, at birth **OR** iii. Phytomenadione 2 mg, two doses given in the first week. Third dose given at 1 month.

12.2.11 Zinc deficiency

Description

Zinc is known to be essential nutrient for the body. It is a component of insulin and many enzymes, including:

- Carbonic anhydrase (which transports CO from RBCs to the lungs)
- Carboxypeptidase (necessary for peptide digestion)
- Alcohol dehydrogenase

It plays role in the synthesis of nucleic acids and protein, metabolism of vitamin A from the liver and wound healing (synthesis of collagen) and enhancement of absorption of folic acid, Zinc is present in all tissues, higher concentrations being in:

- The choroid membrane of the eye
- Male reproductive organs (especially the prostate gland)
- In the red blood cells
- In the pancreas (as component of insulin)
- Relatively lower concentrations in the liver, skeletal muscle, bone, skin and hair

Signs and symptoms of deficiency

- Slow growth
- Loss of smell and taste
- Loss of appetite
- Diarrhoea
- Poor wound healing
- Skin lesions

Management

Community level	Health centre level	Hospital level
Refer to health centre	• Counsel on zinc rich food sources (meat, seafood, eggs yolk and Oysters, cereal grains and legumes). • Zinc tablets 50mg 2 to 3 times daily until recovery.	Treat as HC

12.2.12. Selenium deficiency

Description

Selenium functions as a component of glutathione peroxidase – a powerful antioxidant. Kwashiorkor children have shown improved weight gain with selenium supplementation. Selenium deficiency may lead to "Kesharis disease" – a serious condition affecting heart muscle.

Signs and symptoms

- Muscle weakness
- Pancreatitis (blockage of the pancreatic ducts)
- Impaired growth
- Impaired hearing

- Impaired immune system
- Faster HIV infection progression and reduced survival

Management

Community level	Health centre level	Hospital level
Refer to health centre	Counsel to eat selenium rich foods (meats, seafoods, egg yolk and milk, mushrooms and asparagus are rich sources) **Refer** to hospital	• Treat as HC.**AND** • Selenium IM/IV / oral 100 - 500 microgram 24 hourly until recovery

12.2.13. Calcium deficiency

Description

Calcium strengthens bones and teeth, facilitates normal functioning of the heart and helps blood clotting. Calcium also helps in the maintenance of normal blood pressure.

Signs and symptoms

- Delayed blood clotting
- Osteoporosis (weak breakable bones)
- Osteomalacia
- Teeth problems
- Low resistance to infection
- Stunting

Management

Community level	Health centre level	Hospital level
Refer to health centre	• Counsel on calcium rich foods (milk, yoghurt, cheese, fish with bones, green leafy vegetables such as broccoli, peas) **Refer to hospital**	• Treat as HC. **AND** **Adults:** • Calcium gluconate 10% I.V (94.7mg elemental calcium) at a rate of not exceeding 5ml/minute. **OR** • Calcium gluconate 500mg daily until recovery **Children**: Calcium gluconate 10% I.V (47.5mg elemental calcium) at a rate of not exceeding 5ml/minute. **OR** Calcium gluconate 500mg daily until recovery

12.2.14 Copper deficiency

Description

All body tissues contain some copper. But highest concentrations are in the liver, brain, heart, kidneys and in the blood. Copper in the form of ceruloplesmin (a copper-protein complex in the blood plasma) is involved in various stages of iron nutrition. Copper enhances iron absorption and stimulates mobilisation of iron from stores (in the liver and other tissues). Plays part in the conversion of ferrous iron to ferric (important during various stages of iron metabolism). Copper-containing enzymes play part in carbohydrate and fatty acid metabolism. Copper deficiency has been linked to anaemia in premature infants and in people with severe protein energy malnutrition. Menke's disease (a rare congenital condition) is caused by failure of copper absorption.

Signs and symptoms

- Mental deterioration
- Hypothermia
- Hair depigmentation
- Microcytic anaemia (indistinguishable from iron deficiency anaemia) affecting infants and people with severe PEM

Management

Community level	Health centre level	Hospital level

Refer to health centre	• Counsel on copper rich foods (nuts, shellfish, liver, kidney, raisins and legumes).
	• Copper content of foods is also influenced by enviro-nmental factors such as:
	  • Copper content in the soil
	  • Geographical location, for example, close to a copper industry.
	  • Kind of fertiliser used.
	  • Water equipment made of copper.
	Refer to hospital
		Treat as HC

12.2.15. Magnesium deficiency

Description

In the body magnesium is found in the bone, muscle, in the soft tissues and in blood. Many of the physiological functions of Mg are based on the mineral's ability to interact with calcium, phosphate and carbonate salts. Magnesium catalyses many essential enzymatic reactions (glucose, fatty acid, amino acid metabolism), takes part in bone metabolism and protein synthesis. Mg is important in nervous activity and muscle contraction.

NB: Under certain circumstances (e.g. diarrhoea and severe PEM etc.) excessive body losses of Mg may occur. This leads to weakness and mental changes and, occasionally, to convulsions.

Signs and symptoms

- Muscle spasms, cramps
- Tremors, seizures, coma

Management

Community level	Health centre level	Hospital level
Refer to health centre	• Counsel of magnesium rich foods dairy products, meats, poultry, green vegetables (broccoli), cucumber skin, avocado, cereals (whole grain),legumes. **Refer to hospital**	• Treat as HC and • Magnesium sulphate 0.5 to 1mmol/kg, I.V/I.M up to 160mmol per day for 5 days. Maintenance: oral dose 24mmol per day in divided doses

12.2.16. Fluorine deficiency

Description

Fluorine is a mineral that plays a protective role to bone and dental tissues. It protects against dental caries (makes them resistant to weak organic acids formed from foods that get stuck between teeth). It prevents bones from developing osteoporosis. Fluorine enhances iron absorption (protects against anaemia) and enhances wound healing.

NB: High concentration of fluorides in water (above 6 ppm) causes mottling of teeth (dark brown stain). Chronic ingestion of high concentrations (from natural high content in the area or environmental pollution) can lead to bone and tooth malformations.

Signs and symptoms

- Dental cavities (lack of floride causes enamel to be weak and teeth to decay)
- Weak bones

Management

Community level	Health centre level	Hospital level
Refer to health centre	• Counsel on rich food sources (fish, seaweed, bone meal, meats and dairy product, grains, vegetables and nuts). **NB:** In areas where drinking water is fluoridated and the floride content is above 0.7 parts per million. Supplemetation is not recommended. **Refer to hospital**	• Treat as HC and • Fluorine tabs: <6 yrs 250 micrograms daily > 6 years :500 micrograms to 1mg daily **Refer to specialist if no improvement.**

chapter

13

Psychiatric Conditions

13.1 Bipolar disease

Description

It is a disorder characterised by periods of prolonged and profound depression that alternate with periods of elevated mood (mania or hypomania). Bipolar disorder is characterised by episodes in which the person's mood and activity levels are significantly disturbed which consists of some occasions of an elevation of mood and increased energy and activity (mania) and on others of lowering of mood and decreased energy and activity (depression).

Signs and symptoms

- Manic episode: of at least one week
- Elevated mood
- Irritability
- Grandiosity
- Diminished need for sleep
- Excessively talkativeness
- Flight of ideas

Risk factors

- Substance abuse
- Genetic (heritability of bipolar disorder is 79-93%)
- Physical environmental and social factors.

Diagnostic criteria and investigations

- Family history
- Based on signs and symptoms
  - Bipolar I disorder: an episode of mania
  - Bipolar II disorder: an episode of hypomania and depression

Management

Community level	Health centre level	Hospital level
• Psycho-education • **Refer** to the health centre	**The acute manic psychotic episode** • Haloperidol 5mg IM, stat **AND/OR** • Diazepam 10mg IM, stat Then refer to the hospital	**The acute manic psychotic episode** Haloperidol 5mg IM, 8 hourly prn **AND/OR** Diazepam 10mg IM, 8 hourly prn, UP TO 40 MG within

Long Term Management

- Psycho-educate user and family. Manage comorbid psychiatric conditions substance use, and medical conditions.
- Address psychosocial stressors and disability.
- Refer for occupational therapy as needed.
- Consider needs for residential care

Manic symptoms

Together with the treatment already prescribed for patients, increase dose/add:

- Olanzapine 5-20mg nocte

Important note:

- If the patient is already on Olanzapine, increase the doses
- If the patient is on Risperidone or Quetiapine, remove them and add olanzapine

Euthymic

Continue same treatment

Depressive symptoms

Together with the treatment already prescribed for patients, increase/add:

- quetiapine 100-300mg nocte

Important note:

- if the patient is already on quetiapine, increase the doses
- if the patient is on risperidone or olanzapine, remove them and add quetiapine

Referral to specialist if:

- Mixed or rapid cycling bipolar disorder
- Depressive episodes in bipolar patients not responding to treatment
- Manic episodes not responding to treatment

13.2 Depression

Description

It is a mood disorder characterised by at least five of the following symptoms that have been present for at least a period of two weeks. Depressed people may present with anxiety symptoms and medically unexplained somatic symptoms like headache.

Signs and symptoms

General appearance: • Neglect of dressing & grooming • Poor eye contact	**Thoughts**: • Recurrent thoughts of death or suicide • Reduced ability to think and concentrate	**Affect:** • Sadness for most of the day, almost every day for 2 weeks (CORE criteria)
Hallucination Condemnatory auditory hallucinations	**Depression**	**Delusion:** • Guilt • Hypochondriasis • Nihilistic • Self-referential • Persecutory
Interest • Loss of interest or pleasure in activities that are normally pleasurable • Decreased energy or increased fatigability (CORE criteria)	**Behaviour:** • Loss of confidence or self Esteem • Unreasonable feelings of Self-guilty • Psychomotor agitation or retardation • Sleep disturbance • Change in appetite • Somatic symptoms	**Speech:** Depressive stupor

Causes and risk factors

- Heredity
- Loss of a parent in early childhood
- Painful childhood experiences
- Introvert personality
- Hormonal imbalance
- Traumatic emotion experiences e.g. rape

Diagnostic criteria and investigations

- History
- Physical examination to rule out physical problem
- Blood tests (thyroid test)

Management

Community level	Health centre level	Hospital level
• Psycho education (teaching about nature of illness) • Mobilise village health worker for monitoring support and follow-up • Talk to the patient and find out about her/his problem and how he/she feels • Avoid being judgmental • Utilisation of favorable person e.g. friend/family member • **Refer** to the health centre for identification, follow up and support.	• Establish rapport • Keep information confidential • Psychiatric assessment • Physical assessment to rule out physical ailments • **Refer** to hospital.	Use of more than one antidepressant should be avoided. Duration of treatment depend on previous episodes; First episode- treat for 6-12 months to prevent relapse, 2nd & 3rd episode –treat for 2-3 years and > 3 episodes – lifelong medication should be considered. • Fluoxetine; initial dose 20mg/day in the morning, then increase dose by 20mg if no response to a max of 60mg/day **OR** • Citalopram tablets, initially 10mg/day in the morning, increase if necessary to a maximum of 60mg daily; elderly maximum 40mg daily **OR** • Amitriptyline 10-50mg nocte, increase by 25mg every 1-2 weeks to a max dose of 50-100mg (the usual dose is 12.5 - 25mg nocte) **OR** • Imipramine 10 -20mg nocte daily may increase gradually to a max dose of 50-100mg (the usual dose is 10 - 20mg nocte).

Community level	Health centre level	Hospital level
		If patient has severe psychosis: • Haloperidol 5mg I.M 8 hourly to a maximum of 20mg in 24 hourly till acute attack is controlled **ADD** • Risperidol 1 – 2mg nocte **OR** • Haloperidol 3 - 5mg, BD **Refer** to specialist if: • Suicidal ideation • Major depression with psychotic features • Bipolar disorder • Failure to respond to available antidepressants • Patients with concomitant medical illness, e.g. heart disease, epilepsy • Poor social support systems • Pregnancy and lactation • Children and adolescent

13.3 Suicide/self-harm

Description

Suicide is the act of deliberately killing oneself. Self-harm is a broader term referring to intentional self-inflicted poisoning or injury, which may or may not have a fatal intent or outcome. Any person over 10 years of age experiencing any of the following conditions should be asked about thoughts or plans of self-harm in the previous months and about the acts of self-harm in the past years.

Signs and symptoms

- Emotional distress
- Hopelessness
- Extreme agitation
- Violence
- Social isolation
- Suicidal thoughts and ideations
- Alcohol use and drug disorders

Risk factors

- Depression
- Family history of suicide
- Alcohol or drug abuse
- Social stress and isolation e.g. loneliness (divorced, separated, widowed)
- Failed expectations
- Personality disorder
- Incurable diseases like cancer
- Social media and cyber bullying

Diagnostic criteria and investigations

Questinnaire to assess suicide risk - The SAD PERSONS assessment tool [Patternson et al 1983].

Item	Score	Item	Score
Sex = Male	1	Psychosis	2
Age <19 or >45	1	Separated/widowed/divorced	1
Depression or hopelessness	1	Serious attempt (e.g. hanging, stabbing)	2
Previous suicide attempt	1	No social support	1
Excessive alcohol or drug use	1	Stated future intent	2

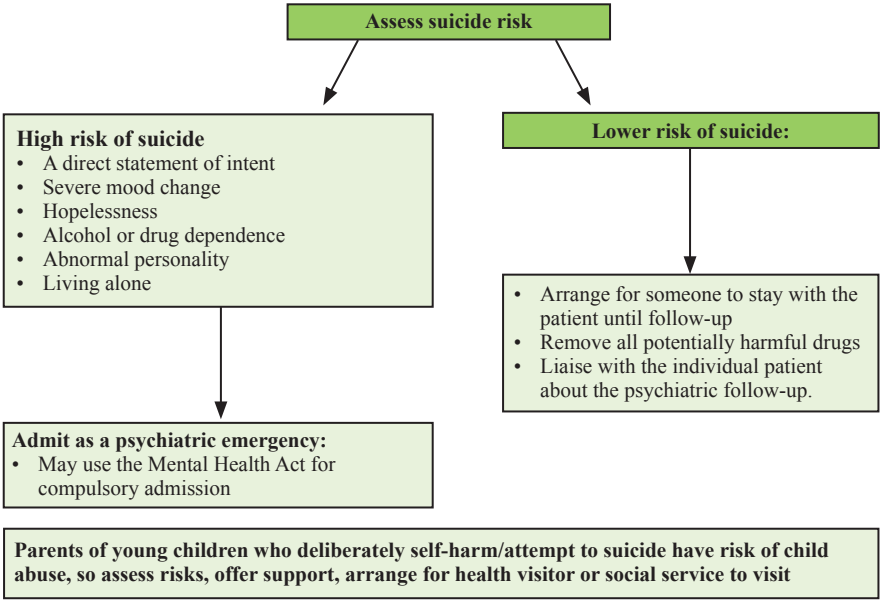
Total score < 6 (may be safe to discharge); 6-8 (refer to psychiatric assessment) and > 8 = urgent admission

Management

Community level	Health centre level
• Remove means of self-harm • Try to establish a relationship with person before asking questions about self-harm and ensure confidentiality • Take detailed history which include finding out if he has any ideas of self-harm or others harm and or feeling like committing suicide, ask him to explain reasons for harming himself, how many suicidal attempts, how have you tried to kill yourself, did you want to die. What are one's feelings about unsuccessful attempt, what were the circumstances of each attempt, did you plan to attempt or did you do it on the spur of the moment **Refer to the health centre**	• Counsel about importance of living • Has a person attempted a medically serious act of self-harm, if yes, look for signs of poisoning or intoxication, attend to Signs and symptoms that require urgent medical treatment such as bleeding from self-inflicted wound, loss of consciousness, extreme lethargy, apply first aid management and treatment appropriately. • If yes, refer for admission, but if at night sedate under close observation as one can use anything to kill self, and refer accordingly. • If there is physical harm, attend to those. • **Refer to hospital**

iii. Hospital level

- Treat as HC at causality



NB: Pharmacological management will depend on harm done or risk of harm; medication use is based on patient's underling disorder.

13.4 Schizophrenia

Description

A psychotic disorder characterised by loss of contact with environment by noticeable deterioration in the level of functioning in everyday life and by disintegration of personality expressed as disorder of feeling thought (as delusions), perception as hallucinations) and behaviour (Miriam Webber)

Signs and symptoms

General appearance Patient may be unkempt and there is deterioration in self-care due to decline in **occupation and social function**	**Thoughts:** 1. Thought insertion 2. Thought withdrawal 3. Thought broadcasting 4. Formal thought disorders (e.g. neologism)	**Affect:** 1. Flat or inappropriate affect
Hallucination: 1. Voices commenting 2. Voices discussing or arguing 3. Audible thoughts 4. Other persistent hallucinations if occurs frequently or accompanied by delusional thinking or sustained overvalued idea.	**Delusion:** 1. Delusional perception 2. Persistent delusional beliefs are completely impossible.	**Passivity/ Delusion of control:** 1. Made will 2. Made acts 3. Made affect 4. Somatic passivity 5. Thought interference
Interest 1. Loss of interest (avolition), aimlessness, idleness, a self-absorbed attitude and social withdrawal over one year (referred to as simple schizophrenia)	**Speech** 1. Incoherent or irrelevant speech (formal thought disorder) 2. Paucity of speech (alogia)	**Behaviour** 1. Catatonic behaviour 2. Social impairment

Risk factors

- Heredity
- Biological such as head injuries, substances abuse, and epilepsy
- Psychological such as stressful life events.

Diagnostic criteria and investigations

Presence of 2 or more of the following symptoms over a 1-month period:

a. Delusions
b. Hallucinations
c. Abnormal speech
d. Disorganized behaviour
e. Negative symptoms

(At least 1 of which must be a, b or c)

Risk factors

- Heredity
- Biological such as head injuries, substances abuse, and epilepsy
- Psychological such as stressful life events

Diagnostic criteria and investigations

Presence of 2 or more of the following symptoms over a 1-month period:

a. Delusions
b. Hallucinations
c. Abnormal speech
d. Disorganised behaviour
e. Negative symptoms

(At least 1 of which must be a, b or c)

Management

Community level	Health centre level
• Calm approach-avoid provoking or arguing with the patient • **Refer** to health centre	• Individual counseling depending at the condition of that moment • Family therapy • Vital signs **Note:** If a patient is not on any treatment, start treatment as for acute psychotic episode e.g. **Treatment:** • Haloperidol 5-10mg IM stat, **AND** • Diazepam 10mg IM stat. • **Then Refer to hospital**

Hospital level

- Family therapy
- Cognitive behaviour therapy
- Life skills empowerment
- Community programmes and supportive employment

Acute Management

The acute manic psychotic episode
- Haloperidol 5 mg IM, 8 hourly prn

AND/OR
- Diazepam 10 mg IM, 8 hourly prn ,up to 40 mg within 24 hours

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Maintenance therapy
- Sodium valproate 200 - 600 mg BD **OR** Carbamazepine 200 - 600 mg BD

AND
- Olanzapine 5 mg nocte OR Risperidone 1 - 2 mg nocte **OR** Quetiapine 50-100 mg BD

For childbearing women:
- Lamotrigine 25 - 100 mg BD (adjust the doses accordingly, based on response)

↓

Long term Management
- Psycho-educate user and family. Manage comorbid psychiatric conditions substance use, and medical conditions.
- Address psychosocial stressors and disability.
- Refer for occupational Therapy as needed.
- Consider needs for residential care

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Manic symptoms	Euthymic	**Depressive symptoms**
Together with the treatment already prescribed for patients, increase dose/add: • Olanzapine 5-20mg nocte **Important note:** • If the patient is already on Olanzapine, increase the doses • If the patient is on Risperidone or Quetiapine, remove them and add olanzapine	Continue same treatment	Together with the treatment already prescribed for patients, increase/add: • Quetiapine 100 – 300 mg nocte **Important note:** • If the patient is already on quetiapine, increase the doses • If the patient is on risperidone or olanzapine, remove them and add quetiapine

If extrapyramidal side-effects occur with the lowest effective dose of antipsychotic medication:

Anticholinergic agent:
- Biperiden, oral, 2 – 4mg daily according to individual response

  OR
- Orphenadrine, oral, 50 - 100mg daily according to individual response.

Referral to a specialist if:

- First psychotic episode
- High suicidal risk or risk of harm to others
- The elderly
- No response to treatment
- Concurrent medical or other psychiatric illness
- Poor social support
- Children and adolescents
- Pregnant and lactating women
- Intolerance to medicine treatment
- Epilepsy with psychosis

13.5 Epilepsy

Description

A group of disorders in which fits or seizures occur as a result of spontaneous abnormal electrical discharge in any part of the brain. They take many forms, but usually take the same pattern on each occasion for a given individual.

Classification of epilepsy:

1. *Generalised seizures:* Tonic–clonic seizures (Grand mal), absence seizures with 3 Hz spike-and- wave discharge (Petit mal), myoclonic seizures and tonic, clonic and atonic seizures
2. *Focal seizures (originating within one hemisphere):* Characterised according to one or more features: a) Simple or Complex, b) Aura, c) Motor (without impaired awareness, e.g. Jacksonian seizures), d) Awareness and responsiveness altered or retained (e.g. with impaired awareness, in temporal lobe seizures), and e) a focal seizure can evolve into bilateral convulsive seizure – secondary generalisation
3. *Unknown:* (insufficient evidence to characterise as focal, generalised or both)

Signs and symptoms

- Fall down with loss of consciousness
- Jerky movements (tonic and clonic movements)
- Biting of tongue
- Incontinence
- Unconscious

Risk factors

- Unsupervised home delivery
- Substance abuse
- Untreated frequent hyperpyrexia
- Complicated deliveries
- Head injury

Causes

- *Primary causes:* the cause is unknown, but heredity or constitutional factor leading to a low fit threshold, brain damage, intracranial
- *Secondary causes:* brain injuries which can be during pregnancy, labor and delivery in children. In adults brain injury due to injuries in RTA and even assaults leading to brain damage

- *Intracranial causes:* space occupying lesions-tumor, brain abscess, meningitis, encephalitis
- *Vascular problems:* involving blood vessels leading to decreased blood flow to the brain
- Substance abuse
- Degenerative diseases-dementia
- Carbon monoxide poisoning
- Others-eclampsia, high temperature in children, hypertension, D/M, kidney failure.

Note: only after two attacks of fit can epilepsy be diagnosed provided no other identified causes are present e.g. TB meningitis, alcohol intoxication, head injury, space occupying lesions.

Diagnostic criteria and investigations

- History
- At least two episodes of fits
- A witnessed occurrence of fits

Management

Community level	Health centre level

• **First Aid care:**
  • Avoid any dangerous object to avoid injury.
  • Moved to safe environment if necessary.
  • Airway clearance (remove food and foreign body in the month, loosen any clothing like ties that may affect breathing)
  • No restraining during seizure as it can lead to fractures
  • Allow proper ventilation
  • Avoid putting anything in the mouth during fit
  • After fit, do not wake the patient.
  • Position him on the side with neck extended
  • Avoid exposing to cold
  • Clean him if messed
  • When waking up, explain to him about the fit and take to the nearest health centre
• **Refer t**o health centre.
	• Treat as CL during seizure episodes.
	• Give diazepam 5mg IM stat, if seizure is not improving.
	• Health education on epilepsy, precipitating factors and importance of compliance.
	Note: Seizures in children, please refer to standard treatment guideline for children.

Hospital level

Anti-epileptic drug choices:

- Depend on type of seizure and underlying illness like HIV

	Generalised tonic–clonic seizures (grand mal)	***Focal seizures with or without secondary generalisation***	***Myoclonic seizures***	***Absence***
First-Line treatment	**Sodium valproate** **Lamotrigine** Carbamazepine	**Carbamazepine** **Lamotrigine** Sodium valproate	**Sodium valproate**	**Sodium valproate**
Second-Line Treatment (mono-therapy or adjunctive therapy)	Carbamazepine Topiramate Levetiracetam Phenobarbital Clonazepam Phenytoin	Levetiracetam Topiramate Pregabalin	Clonazepam Lamotrigine	Lamotrigine
If symptoms worsen, add			Carbamazepine	

Note: Bold: First-line anti-epilepsy drug.

Antiepileptic drugs and side effects

Medication	**Average daily doses**	**Systemic SE**	**Neurologic SE** All – Sedation
Carbamazepine	400-1600mg 10-20mg/kg/day	Aplastic anaemia, ↓WBC, rash. Hepatotoxicity, ↓Na	Diplopia, convulsion, ataxia
Sodium valproate	500-2500mg 15-40mg/kg/day	Hepatotoxity, ↑NH3, ↑Weight, Hair loss	Tremor
Lamotrigine	100-300mg 5-15mg/kg/day	Rash (SJ Syndrome)	Tremor, blurred vision, indomnia, headache
Lamotrigine	50-200mg/kg/day <5 yr, 3-5, >5 yr, 2-3 mg/kg/day	Rash	Cognitive slowing
Phenytoin	200-400mg	Gum hyperplasia	Dizziness, ataxia

Levetiracetam	1000 – 3000mg 20-40mg/kg/day (>4yr)	GI upset (rare)	Emotional liability
Topiramate	100-400mg	Weight, Hypohidrosis, kidney stones, glaucoma, Metabolic acidosis	Cognitive slowing

Special population consideration

WOMAN OF CHILD BEARING AGE	CHILD/ADOLESCENT	PERSON LIVING WITH HIV
Concern: Risk of antiepileptic medication to foetus • Advise folate (5mg/day) to prevent neural tube defects, in all women of childbearing age. **AVOID VALPROATE.** • **! If pregnant:** Avoid polytherapy (multiple medications in combination increase the risk of teratogenic effects during pregnancy), if medication are stopped, they should always be tapered, advise delivery in hospital, at delivery give 1mg vitamin K i.m. to newborn to prevent haemorrhagic disease. • **If breast feeding,** carbamazepine preferred to other medication.	Concern: Effect of antiepileptic medication on development and/or behaviour For children with behavioural disorder, avoid phenobarbital	• Valproate is preferred due to fewer drug-drug interaction • Avoid phenytoin and carbamazepine if possible

Psychoeducation interventions

- Provide information about convulsion/epilepsy and importance of medication
- Provide information on how to manage and care for convulsion at home
- Provide information on when to get medical help.

Referral to specialist if

- All new patients, for diagnosis and initiation of therapy by a doctor
- Patients with seizures other than generalised tonic clonic seizures, including absence seizures
- Increased number of seizures or changes in the seizure type

- Patients who have been seizure free on therapy for 2 years or more (to review therapy)
- Pregnancy or planned pregnancy
- Development of neurological Signs and symptoms
- Adverse drug reactions
- Suspected toxicity

Note: Never combine sodium valproate with phenobarbitone. In all epileptic patients, give folic acid 5mg 24 hourly to protect CNS anomalies in the foetus.

Refer to specialist if:
- Seizures are not controlled with above doses.

13.5.2 Status epilepticus

Description
This is a medical emergency with continuous seizures for 30 minutes or longer (or two or more seizures without recovery of consciousness between them over a similar period).
Status epilepticus has a mortality of 10–15%.

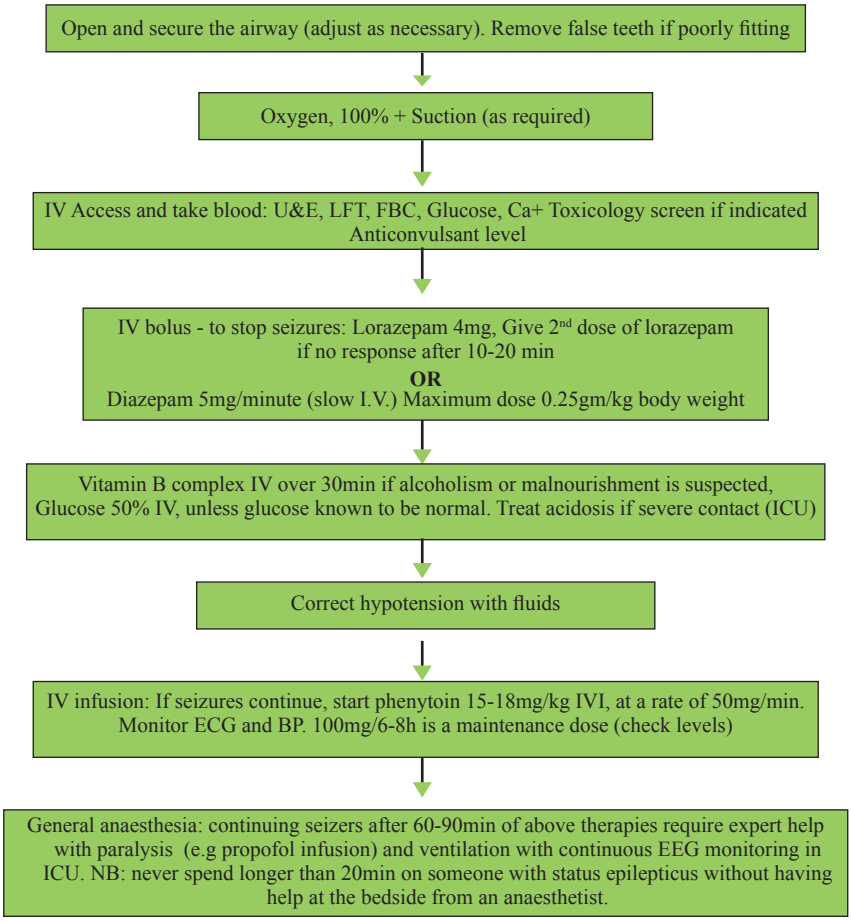
Causes and risk factors
- Non compliance with treatment.
- Alcohol
- Substance abuse

Signs and symptoms
- Fall with a sudden loss of consciousness
- Jerky movements
- One attack followed by the other without recovery in between episodes

Management

Community level	Health centre level	Hospital level
• Give first aid care as at community and health post level in epilepsy and immediately **refer** to the health centre	• Give first aid care • Diazepam 10mg IV slowly or rectally, if convulsion doesn't stop after first dose, give second dose of diazepam of same dose • **Note:** Do not give more than 2 doses of diazepam. • **Refer** urgently to hospital	Give first aid care • Protect airway, give oxygen • Dextrose 5%, 80ml as bolus. **Children:** • Protect airway, give oxygen • Dextrose 50% (I.V) 15ml (1ml/min) as a bolus **AND** • Diazepam 5mg/minute (slow I.V). Maximum dose 0.25mg/kg body weight.

Hospital level



13.5.3 Epilepsy with psychotic features

Description

Generalised epileptic seizures accompanied with psychotic features which does not occur only after one had had an attack. (Post-ictal confusion and psychosis)

Signs and symptoms

Epileptic seizures showing disturbed behaviour

Causes and risk factors

- Uncontrolled epileptic attacks

Management

Community level	Health centre level	Hospital level
• Apply first aid care for epileptic attacks **Refer** to the health centre	• Give first aid care **Refer** to hospital	Give first aid care • Haloperidol 5mg IM 8 hourly until symptoms improved. **Maintenance therapy** Give low dose of adjunctive antipsychotic therapy

13.6 Substance use disorders

13.6.1 Alcohol use disorders

Description

A condition resulting from different pattern of alcohol consumption include acute alcohol intoxication, harmful alcohol use, alcohol dependence syndrome, and alcohol withdrawal state.

Acute alcohol intoxication: a transcend condition following intake of alcohol resulting in disturbance of consciousness, cognition perception, affect or behaviour. Harmful use of alcohol is a pattern of alcohol consumption that is causing damage to health. Physical (liver disease) or mental (episodes of depressive disorder). It is associated with social consequences (family or problems at work).

Alcohol dependency: a cluster of physiological behavioural and cognitive phenomena in which use of alcohol takes on a much higher priority for a given individual than other behaviours that once had a greater value.

Alcohol withdrawal: state refers to a group of symptoms that may occur upon cessation of alcohol after its prolonged daily use. It is a major cause of break down in relationship, trauma hospitalisation, prolonged disability and early death.

Signs and symptoms

- Individuals hiding or denying that they are drinking
- Involvement in fighting
- Defensiveness, guilt
- Drinking more or longer than intended-problem of cutting down
- Drinking more than you used to, to get same effect
- Impairment/decline in usual activity
- Withdrawal symptoms

Risk factors

- Boredom
- Social isolation
- Personality e.g. introvert
- Poverty
- Stress
- Family history

Diagnostic criteria and investigations

- Blood tests e.g. liver function test to signs of more advanced disease secondary to liver cirrhosis are jaundice
- Physical examination: ascites, testicular atrophy and gynecomastia
- Hepatomegaly and palmar erythema
- Also use C.A.G.E questionnaire which determine extent of use

Management

Community level	Health centre level	Hospital level
• Support group that encourages abstinence. • Treatment supporter/ buddy to support adherence to abstinence. • **Refer** to health centre	• Alcohol detoxification maybe managed on an outpatient basis in most patients **Acute detoxification:** Thiamine 300mg OD for 2 weeks **and** Diazepam 10mg stat, • Then 5mg TDS for 3 days • Then 5mg BD for 2 days • Then 5mg OD for 2 days • Then STOP **Note: Higher doses may be needed in individual patients and should be referred to hospital.**	• Patients who didn't respond to acute detoxification treatment (see health centre level). **Severe symptoms of detoxification/ withdrawal:** • Diazepam slow IV 10mg (Not IM) • Repeat doses after 5 to 10 minutes if required • If not sufficient, use 10mg every 5 to 10 minutes for another 1-2 doses • If not sedated, continue with doses of 20mg until occurs. **For severe agitation and restlessness:** **Note:** Neuroleptic medicines, e.g. haloperidol, are associated with reduced seizures threshold. Consider only for severe agitation and restlessness persisting after adequate of benzodiazepines. • Haloperidol 0.5 - 5mg IM

Community level	Health centre level	Hospital level
		• Haloperidol 0.5 - 5mg IM • Repeat after 4–8 hours as required to a maximum of 20mg / day. • Once patient has responded and is able to take oral haloperidol 1.5–5 mg BD. • When administering glucose-containing fluids: • Thiamine, 300mg OD **OR** • Vitamin B-Complex IM, OD **Refer for rehabilitation at Rehabilitation Centre, Lesotho**

13.6.2 Stimulants (marijuana, cocaine)

Description

Stimulants are commonly referred to as substances that would induce cardiovascular stimulation, elevated mood and reduction in the need of sleep.

Hallucinogens are substances that would produce hallucinations, loss of contact with reality, and an experience of expanded or heightened consciousness

Signs and symptoms

Cocaine (at least one of the following must be present)	Marijuana (at least one of the following must be present)
1. Tachycardia (sometimes bradycardia) 2. Cardiac arrhythmias 3. Hypertension (sometimes hypotension) 4. Sweating and chills 5. Nausea or vomiting 6. Evidence of weight loss 7. Pupillary dilatation 8. Psychomotor agitation (sometimes retardation) 9. Muscular weakness 10. Chest pain 11. Convulsions	1. Increased appetite 2. Dry mouth 3. Conjunctival injection (reddening of eyes) 4. Tachycardia

Risk factors

- Wealthy family
- Peer pressure
- Marital and relationship problems (single and divorced people are more prone)
- Stress at work and vulnerability of certain occupations
- Poor income
- Poor education
- Advertising problem
- Antisocial personality disorder
- Changing gender roles in females (men its still 6 times higher in risk)

Diagnostic criteria and investigations

Intoxication	Withdrawal
• Appetite that is better than normal • Dryness of the mouth • Marked increased in heart rate (hypertension) • Pupillary dilatation • Confusion	• Dysphoric mood • Decreased energy and fatigue • Vivid and unpleasant dreams • Sleep changes • Marked increased appetite • Psycho motor

Management

Community level	Health centre level	Hospital level

• Advise stopping the substance completely, verbalize your intensions to support the person
• Identify client individual's needs
	• Provide psycho-education/ counselling for cessation
	• Emphasize that the level/pattern of substance use is causing harm to health.
	• Assess for depression, suicide risk and psychosis, if found refer immediately to hospital.
	• If found aggressive, provide emergency treatment:
	  • Diazepam IM 5mg, stat
	  • Haloperidol IM 5mg, stat
	• Then **Refer** to hospital
		• These patients usually do not require admission
		• Treat as per health centre

13.6.3 Tobacco use (including smoking, sniffing, chewing)

Description

Tobacco disorder is characterised by smoking, chewing, sniffing of tobacco products

Signs and symptoms

- Insomnia
- Bizarre dreams
- Lability of moods
- Nausea or vomiting
- Swearing
- Tachycardia
- Cardiac arrhythmias

Risk factors

- Stress
- Peer pressure

Management

Community level	Health centre level	Hospital level
• Encourage health education by VHW	• Psychoeducation if available Nicotine replacement therapy (nicotine in the form of gums, tablets, patches and nasal spray)	• Treat as HC

13.6.4 Opiate (heroin, nyaope etc) withdrawal

Description

Opioid withdrawal is generally poorly tolerated, but not dangerous, except in very frail debilitated patients or during pregnancy, with an increased risk of miscarriage in the first trimester and of preterm delivery in the third trimester.

Signs and symptoms

Signs and symptoms of opiate intoxication:	Signs and symptoms of opiate withdrawal:
• Pinpoint pupils • Drowsiness • Clammy skin • Euphoria • Respiratory depression • Hallucinations	• Nausea / vomiting » Myalgia • Gooseflesh • Abdominal cramps • Diarrhoea • Restlessness / agitation • Rhinorrhoea and lacrimation

Risk factors

- Stress
- Peer pressure

Management

Community level	Health centre level	Hospital level
• **Refer** to health centre	• Symptomatic treatment • **Refer** to hospital	• Symptomatic treatment

13.7 Dementia

Description

Dementia is a neurodegenerative syndrome with progressive decline in several cognitive domains. The initial presentation is usually of memory loss over months or years. The conditions cause changes in person's mental ability, personality and behaviour. Dementia is not part of normal ageing although it can occur at any age; it's more common in older people.

Signs and symptoms

- Decline in memory (severe decline of recent memory) and orientation (awareness of time, place, and person)
- Mood or behavioural problems such as apathy (appearing uninterested) or irritability
- Loss of emotional control-easily upset, irritable, or tearful
- Difficulties in carrying out usual work, domestic, or social activities

Risk factors

- Cardiovascular diseases e.g. myocardial infarction or transient ischemic attacks, cerebro-vascular incidence
- Uncontrolled epilepsy with multiple attacks
- Heredity

Management

Community level	Health centre level	Hospital level
• Psycho-education for community members including family members **Refer** to hospital	• Treat as CL	Appropriate care and support, according to level of impairment • Ambulatory care is preferred to hospitalisation if feasible. • Family counselling and support. **For mild to moderate conditions:** • Donepezil, 5mg nocte **If psychotic features are present, add:** • Anti-psychotic in low doses e.g risperidone (0.5-1mg) nocte **OR** quetiapine 50-75 mg nocte if risperidone is not tolerated. Start quetiapine from 25mg and increased daily until the desired dose is reached. • ARVs for AIDS related dementia; exclude opportunistic diseases of CNS (refer to ART clinic/corner) **Refer to specialist if:** • Patients, in whom a treatable underlying condition is suspected for specialised investigations including a CT scan.

13.8 Attention Deficit/Hyperactive impulsivity disorder (ADHD)

Description

Adult attention-deficit/hyperactivity disorder (ADHD) is a mental health disorder that includes a combination of persistent problems, such as difficulty paying attention, hyperactivity and impulsive behaviour. Adult ADHD can lead to unstable relationships, poor work or school performance, low self-esteem, and other problems.

Signs and symptoms

- Impulsiveness
- Disorganisation and problems prioritising
- Poor time management skills
- Problems focusing on a task

- Trouble multi-tasking
- Excessive activity or restlessness
- Poor planning
- Low frustration tolerance
- Frequent mood swings
- Problems following through and completing tasks
- Hot temper
- Trouble coping with stress

Risk factors

- Heredity
- Brain injury
- Smoked, drank alcohol or used drugs in pregnancy
- Environmental toxins - such as lead, found mainly in paint and pipes in older buildings
- Premature delivery
- Low birth weight

Diagnostic criteria

- Physical exam
- Information gathering

Management

Community level	Health centre level	Hospital level
• **Refer** to hospital	• **Refer** to a hospital	• Psychotherapy • Occupational therapy **Adults:** Methylphenidate 10-20mg mono therapy **Caution:** Always consult with a doctor, preferably a psychiatrist, where possible when prescribing neuroleptic drugs to-children-the elderly or during pregnancy and lactation.

13.9 Parkinsonism

Description

Is a syndrome characterised by tremor, rigidity, bradykinesia and postural disturbances. It may be primary, i.e. progressive degeneration of neurons, or secondary, i.e. drug induced.

Signs and symptoms

- Tremors/shaking: usually begins in the limbs, often hands or fingers
- Bradykinesia; slowed movement, simple tasks may be difficult and time consuming
- Muscular rigidity: muscle stiffness may occur in any part of the body
- Impaired posture in balance
- Loss of automatic movement e.g. decreased ability to blinking the eyes or smiling
- Speech changes: hesitate before talking, speech may be more of a tone
- Writing changes

Risk factors

- Hereditary
- Environmental exposure: certain toxins
- Gender: men are more prone than women

Diagnostic criteria and investigations

Is clinical and based on the core features of bradykinesia with resting tremor and/or hypertonia.

Management

Community level	Health centre level	Hospital level
• **Refer to a hospital**	• **Refer to a hospital**	• Educate the patient on the disease. • General supportive therapy and advice about lifestyle modification, physiotherapy and occupational therapy. **Treatment** • Biperiden 2mg OD **For severe case** • Carbidopa/levodopa 25/100 mg orally 8 hourly. Increase by 25mg as levodopa every 1–2 days until the desired response is achieved. **Maximum dose** 800mg as levodopa.

Community level	Health centre level	Hospital level
		AND/OR • Bromocriptine 5-10mg 24 hourly for 1 week. • Increase dose from week according to response: **Week 2:** by 2.5mg daily **Week 3:** by 2.5mg 12 hourly **Week 4:** by 2.5mg 8 hourly daily **Week 5:** by 5mg 8 hourly daily **NB** - A key decision is to start supplementation of dopaminergic signalling with levodopa. Efficacy of this therapy reduces with time, requiring larger and more frequent dosing with worsening side effects and response fluctuations and end of dose response. Starting late may therefore be wise. Do not withdraw medication suddenly. **Refer to specialist if;** • No improvement with treatment • Increasing on/off phenomenon

13.10 Anxiety disorder

Description

Anxiety is an emotional response to a perceived or anticipated stress. It is diagnosed as a disorder when it is excessive or persistent and impacts daily functioning. Anxiety disorders often present with medically unexplained symptoms such as non-cardiac chest pain, abdominal discomfort, neck and back muscle tension.

Types of anxiety disorders

- Generalised anxiety disorder
- Panic disorder
- Phobias
- Post-Traumatic Stress Disorder
- Obsessive Compulsive Disorder
- Social Anxiety Disorder

Signs and symptoms

Medically unexplained symptoms such as:

- Non-cardiac chest pain
- Abdominal discomfort
- Neck and back muscle tension
- Worries and fears

Diagnostic criteria and investigtions

Diagnosed as a disorder if symptoms are excessive or persistent and impacts daily functioning for 1 to 6 months and above.

Management

Community level	Health centre level	Hospital level
• Social support • **Refer to heath centre**	• Maintain calmness and empathy • Diazepam 10mg IM, stat **Then Refer to hospital**	• Psychotherapy. • Most patients can be treated as outpatients, but some need admission. ***Acute management*** For rapid relief of an acute episode or intense anxiety: • Diazepam, IM, 5-10mg/stat • Then, diazepam oral 5-10mg nocte, 1-2 weeks ***Maintenance therapy*** • Psychotherapy • Fluoxetine, oral, 20–40mg in the morning **OR** Citalopram, oral, 10–40mg in the morning. **NB:** Generally, require higher doses than depression and duration of treatment (12-24 months), taper off within the last 3months **Refer to specialist as required.**

chapter

14

Renal and Urinary Tract Conditions

14.1 Urological Disorders

Disorders of the genitourinary system.

14.1.1 Urinary tract infection (UTI)

UTIs include cystitis (infection of the bladder/lower urinary tract) and pyelonephritis (infection of the kidney/upper urinary tract).

14.1.1.1 Acute Cystitis

Description

This is an acute infection of the lower urinary tract by bacteria. Escherichia coli is the commonest causative organism. Other micro-organisms may be involved, especially in patients previously managed in hospitals. It occurs predominantly in women, especially sexually active and older.

Signs and symptoms for adults

- Urinary urgency and frequency
- A sensation of bladder fullness or lower abdominal discomfort
- Suprapubic tenderness
- Flank pain and costovertebral angle tenderness (may be present in cystitis but suggest upper UTI)
- Bloody urine
- Fevers, chills, and malaise (may be noted in patients with cystitis, but more frequently associated with upper UTI)
- Burning or pain on passing urine (dysuria)
- Frequent passing of small amounts of urine
- In more severe cases there is lower abdominal pain and tenderness
- Urine is turbid

Signs and symptoms for neonates

- Fever
- Hypothermia
- Poor feeding
- Sepsis
- Vomiting
- Prolonged jaundice
- Failure to thrive
- Renal failure

Signs and symptoms for infants and children

- Failure to thrive
- Persistent fever
- Abdominal pain

- Increased frequency of passing urine
- Dysuria
- Enuresis or urgency

Note*

Pelvic inflammatory disease must be excluded. In young male, urethral stricture must be excluded.

In old men (> than 60) BPH or prostate cancer must be ruled out

Causes

- Escherichia coli
- Staphylococcus saprophyticus
- Healthcare-associated urinary tract infections (mostly related to urinary catheterisation) include: E. coli (27%), Klebsiella (11%), Pseudomonas (11%), the fungal pathogen Candida albicans (9%), and Enterococcus (7%)

Risk factors

- Age
- Sex
- Spermicide use
- Diaphragm use
- Urinary catheters
- Diabetes
- Being uncircumcised
- Chronic prostatitis
- Vesico ureteral reflux
- Voiding dysfunction

Differential diagnosis

- Sexually Transmitted Infections
- Urogenital malignancies

Diagnostic criteria and investigations

- Urine dipstick (multi-sticks) in all patients suspected with UTI
- Urine Microscopy, Culture & Sensitivity (MC&S) if leucocytes and nitrite are positive or there is high index of suspicion
- Ultrasound and voiding cystourethrogram (VCU) at tertiary level if recurrent urine infection and suspicion of anatomical malformation of urinary tract.
- Microscopic hematuria is found in about half of cystitis cases
- Low-grade proteinuria is common
- A positive nitrate test is highly specific for UTI, but it occurs in only 25% of patients with UTI

Note: Nitrate in children less < 2 years implies obstruction.

Management

Community level	Health centre level	Hospital level
• **Refer** to health centre	• Encourage liberal fluid intake. **Adults:** • Potassium Citrate solution dilute 10 ml in a cup of water, to be taken 3 times a day. • Nitrofurantoin, oral, 100mg 6 hourly for 5 days **OR** • Co-trimoxazole 800/160mg; 12 hourly for 7 days **OR** • Ciprofloxacin 500mg 12 hourly for 5-7days **OR** • Ciprofloxacin 500mg immediately **AND** 500mg orally 8 hourly for 7 days • Add analgesic a gents e.g. paracetamol 1g 8 hourly **For uncomplicated cystitis,** treat symptomatically with fluids and analgesics. **Children:** • 2 months-12 years: Co-trimoxazole 8mg/kg/day 12 hourly in divided doses.	• Treat as HC and if there is no improvement, • Conduct further investigations and give **Gentamicin, IM, 5mg/kg as a single dose** **For pregnant women** • Nitrofurantoin, oral, 100mg 6 hourly for 5 days. **Refer to specialist in cases of:** • Renal impairment • Structural abnormalities • Renal calculi • Renal abscess

Community level	Health centre level	Hospital level
• **Refer** to health centre	• > 12 years: Co-trimoxazole 400/80-800/160mg 12 hourly for 7 days. **OR** • Ciprofloxacin 40-50mg/kg/day orally 8 hourly for 7 days. Refer the following: • All children < 2 months • All males • Recurrent infections • Persons who have recently had urinary tract instrumentation • Infection not responsive to therapy (i.e. symptoms do not subside) • Complication - pyelonephritis, septicaemia	

14.1.1.2 Recurrent UTI

Description

Recurrence of a UTI >3 times within a one-year period.

Signs and symptoms

- A feeling of pain or burning during urination
- Pain or pressure in the pelvic are
- A strong erge to urinate
- Frequent urination in small amounts

Risk factors

- Frequent intercourse
- Vulvovaginal atrophy
- Change in local bacterial flora
- History of UTIs during premenopause or childhood
- Non-secretor blood type

Diagnostic criteria and investigations

Send urine for microscopy, culture and sensitivity as treatment is determined by the results

Management

Community level	Health centre level	Hospital level
• **Refer** to health centre	• **Refer** to hospital	• Cotrimoxazole 80/400 mg, oral, 1 tablet at night. • Treat according to microscopy, culture and sensitivity To reduce risk of recurrence in patients with >3 infections/year requires continuous prophylaxis for 6 months

14.1.1.3 Catheter Associated Urinary Tract Infection

Description

The patient has had an indwelling urinary catheter in place for more than 2 days on the date of presentation.

Signs and symptoms

- Fever for more than 38°C
- Tenderness above the pubic bone with no other cause
- Pain or tenderness on the area of the back over the kidneys with no other cause
- Urinary urgency
- Urinary frequency
- Painful or difficulty in urination
- Patient has urine culture with no more than 2 species of microorganisms identified.
- Bacteremia of more than 105 cfu/ml

Differential diagnosis

- Structural Abnormalities

Diagnostic criteria and investigations

- Urinalysis
- Urine, Microscopy, Culture and Sensitivity
- Blood Culture

Community level	Health centre level	Hospital level
• **Refer to hospital**	• **Refer to hospital**	• Remove the catheter give • Nitrofurantoin, oral, 100mg 6 hourly for 5 days **OR** • Co-trimoxazole 800/160mg; 12 hourly for 7 days **OR** • Ciprofloxacin 500mg 12 hourly for 5-7days **OR** • Ciprofloxacin 500mg immediately and 500mg orally 8 hourly for 7 days **Add:** • Cephalosporin e.g. ceftriaxone

14.1.2 Prostatitis

14.1.2.1 Acute prostatitis

Description

An infection or inflammation of the prostate gland

Signs and symptoms

- Fever
- Chills
- Low back and waist pain
- Urinary urgency and frequency
- Nocturia, dysuria
- Difficulty in urination with occasional haematuria

Causes

Gram-negative bacteria like E. coli, Pseudomonas, Streptococcus faecalis, Gonococcus and Chlamydia.

Risk factors

- Age
- Related to sexual practices
- Anatomical abnormalities or blockages of the urinary tract

Differential diagnosis

- Prostate cancer

Diagnostic criteria and investigations

- Urine analysis and culture
- White blood cell count, ESR
- In septicaemia, blood culture
- Rectal examination reveals a tender prostate. The rectum feels hot from the inflammation Avoid prostatic massage as this could lead to septicaemia

Management

Community level	Health centre level	Hospital level
• **Refer** to health centre	• Encourage high oral fluid intake and stool softeners • Paracetamol 500mg-1g orally 8 hourly for 1 day. • Ciprofloxacin 750 mg 12 hourly **AND** • Doxycycline 100mg 12 hourly for a minimum of 14 days and a maximum of 21 days **OR** • Cotrimoxazole 160 mg/800mg orally12 hourly for 14 days to a maximum of 21 days • **Refer to hospital if not responsive**	• Treat as HC **AND/OR** • Hospitalisation may be required in acute retention of urine and in severe cases. • Insert suprapubic catheter and do not pass urethral catheter for retention of urine. • Follow up should be for at least 4 months

14.1.2.2 Chronic prostatitis

Description

This usually follows inadequately treated acute prostatitis. Diagnosis and management are difficult.

Management

Community level	Health centre level	Hospital level
Refer to health centre	**Refer to hospital**	**Refer** to specialist if: • No response to treatment to acute prostatis • Urinary retention present. • Chronic/relapsing prostatitis

14.2 Nephropathies/Upper Urinary Tract Infections

These are infections from the kidneys to the urinary bladder.

14.2.1 Acute Glomerulonephritis (Acute nephritic syndrome)

Description

Acute inflammation of the renal glomeruli of the kidneys. It is a collection of signs (a syndrome) associated with disorders affecting the kidneys, more specifically glomerular disorders in which an immunologic mechanism triggers inflammation and proliferation of glomerular tissue that can result in damage to the basement membrane enough to permit proteins (proteinuria) and red blood cells (hematuria) to pass into the urine. Acute poststreptococcal glomerulonephritis (PSGN) is the archetype of acute GN. It is characterised by having a thin glomerular basement membrane and small pores in the podocytes of the glomerulus.

Signs and symptoms

- Common in children >3 and adolescents
- Haematuria (passing smoky, red or tea-coloured urine)
- Oedema: puffiness of the face/around the eyes, less commonly generalised body swelling
- Discomfort in the kidney area (abdominal or back pain)
- May be anorexic
- General weakness (malaise)
- High Blood Pressure, commonly presenting as headaches, visual disturbances, vomiting and occasionally
- Pulmonary oedema with dyspnoea.
- Convulsions (in hypertensive crisis)
- Oliguria as renal failure sets in
- Evidence of primary streptococcal infection:
- Usually as acute tonsillitis with cervical adenitis
- Less often as skin sepsis.

Causes

Infectious

- Immune reactions (usually 1-5 weeks after a streptococcal skin or throat infection)
- Nonstreptococcal post infectious GN may also result from infection by other bacteria (other streptococci, staphylococci, and mycobacteria. Salmonella typhosa, Brucella suis, Treponema pallidum, Corynebacterium bovis, and actinobacilli)
- Viruses e.g. Cytomegalovirus (CMV), coxsackievirus, Epstein-Barr virus (EBV), hepatitis B virus (HBV), rubella, rickettsiae (as in scrub typhus), and mumps virus
- Parasitic or fungal etiology organisms include Coccidioides immitis and the following parasites: Plasmodium malariae, Plasmodium falciparum, Schistosoma mansoni, Toxoplasma gondii, filariasis, trichinosis, and trypanosomes

Non-infectious

- Non-infectious causes of acute GN may be divided into primary renal diseases, systemic diseases, and miscellaneous conditions or agents.
- Multisystem systemic diseases that can cause acute GN include the following:
- Vasculitis
- Collagen-vascular diseases
- Hypersensitivity vasculitis
- Cryoglobulinemia
- Polyarteritis nodosa
- Henoch-Schönlein purpura
- Goodpasture syndrome

Primary renal diseases that can cause acute GN include the following:

- Membranoproliferative glomerulonephritis (MPGN)
- Berger disease (IgG-immunoglobulin A [IgA] nephropathy)
- “Pure” mesangial proliferative GN
- Idiopathic rapidly progressive glomerulonephritis
- Miscellaneous non-infectious causes of acute GN include the following:
- Guillain-Barré syndrome
- Irradiation of Wilms tumor
- Diphtheria-pertussis-tetanus (DPT) vaccine
- Serum sickness
- Epidermal growth factor receptor activation and its inhibition by cetuximab

Risk factors

- Because nephritic syndrome is not a disease, just a collection of symptoms, the Risk factors depends on the underlying etiology.
- Nephrotoxic drugs
- Skin and throat infections
- Age (children >3 and adolescents)
- Gender (common in males)

Diagnostic criteria and investigations

- Urine: protein, microscopy for RBCs and casts, WBCs
- Blood: urea and creatinine levels, AST, electrolytes
- Ultrasound: kidneys
- Throat and skin swab (where indicated): for Culture and Sensitivity

Management

Community level	Health centre level	Hospital level
• Conduct Health education and importance of proper consultation • **Refer** to health centre	Monitor urine output, BP, daily weight • Restrict fluid input (in oliguria) • Restrict salt and protein in the diet (in oliguria) • Treat any underlying causes including hypertension **Adult:** • Phenoxymethyl penicillin 500mg every 6 hourly for 10 days **OR** • Amoxycillin 500mg every 8 hourly for 10 days **OR** • Amoxycillin-Clavulanic Acid 500/125mg 8 hourly 5-7 days. If allergic to penicillin: • Erythromycin 500mg every 6 hourly for 10 days. **Children:** • Phenoxymethyl penicillin 10-20mg/kg 6 hourly for 10 days **OR** • Amoxycillin 15mg/kg 8 hourly for 10 days	• Treat as HC • Bed rest • Diet – salt restriction while oedematous and hypertension -protein restriction if serum urea is above (values) • **Refer to nephrologist or specialist physician if no improvement**

Community level	Health centre level	Hospital level
	OR • If allergic to penicillin: • Erythromycin 15mg/kg 6 hourly for 10 days **Note:** Ciprofloxacin, doxycycline and cotrimoxazole are unsuitable and should not be used for treating primary streptococcal infection **Refer to hospital if:** • Cross heamaturia (microscopic) • Oedema • Hypertension in children • Complications	

14.2.2 Acute pyelonephritis

Description

Acute pyelonephritis is an inflammation of the kidney tissue, calyces, and renal pelvis. It is commonly caused by bacterial infection that has spread up the urinary tract or travelled through the bloodstream to the kidneys. May be complicated by shock and septicaemia.

Symptoms and signs

- Often very ill
- Fever and rigors
- Backache
- Pain on passing urine
- Vomiting
- Toxaemia
- Renal angle tenderness
- Urine is turbid and/or bloodstained and tests positive for nitrites

Causes

- **Bacteria** E. coli (70–80%) and Enterococcus faecalis, Pseudomonas aeruginosa, Klebsiella
- **Mechanical:** any structural abnormalities in the urinary tract, vesicoureteral reflux (urine from the bladder flowing back into the ureter), kidney stones, urinary tract catheterisation, ureteral stents or drainage procedures (e.g., nephrostomy), pregnancy, neurogenic bladder (e.g., due to spinal cord damage, spina bifida or multiple sclerosis) and prostate disease (e.g., benign prostatic hyperplasia) in men
- **Constitutional:** diabetes mellitus, immunocompromised states

Risk factors

- Related to Risk factors of UTI
- Behavioural: change in sexual partner within the last year, spermicide use
- Positive family history (close family members with frequent urinary tract infections)
- Hospitalisation
- Age (boys, elderly males and females in all ages)
- Gender (common in females)

Diagnostic criteria and investigations

- Analysis of the urine may show signs of urinary tract infection (the presence of nitrite and white blood cells on a urine test strip)
- Blood tests such as a complete blood count may show neutrophilia.
- Microbiological culture of the urine, with or without blood cultures and antibiotic sensitivity testing are useful for establishing a formal diagnosis

Management

Community level	Health centre level	Hospital level
• **Refer to health centre**	• Health education • Oral Rehydration Salt 1000ml to 2000ml stat for dehydration. • Encourage liberal fluid intake per body weight and ambient temperature recommendations • Prevent and treat constipation, encourage complete voiding to avoid urine stasis • **Refer to hospital.**	**Adult:** • Normal saline 0.9 % **AND** • Paracetamol 500mg - 1g 6 – 8 hourly **OR** • Diclofenac orally 25-50mg 8 hourly, after meals **OR** • Ibuprofen orally 200-400mg 12 hourly, after meals **AND** • Ceftriaxone 1g IV stat **OR** • Gentamycin 7mg/kg IV stat **OR** • Trimethoprim/sulfamethoxazole 160mg/800mg orally12 hourly for 14 days **OR** • Ciprofloxacin 500mg orally 12 hourly for 7 days **Refer all complications to urologist or physician specialist.**

Community level	Health centre level	Hospital level
		Pregnant women • Nitrofurantoin 100mg bd x 7 days • Ceftriaxone 1g IV stat **Refer all complications to a urologist or physician specialist** **Children** • Co-amoxiclav iv 50-75mg/kg /day as a single dose (not used in infants <6 weeks-consult paediatrician) **OR** • Ampicillin im/iv 100mg/kg/day • Trimethoprim/sulfamethoxazole 160mg/800mg orally 12 hourly for 14 days

14.2.3 Tubulo-intestitial nephritis

Description

A group of inflammatory, inherited and other diseases that affect renal tubules and surrounding interstitial tissue.

Signs and symptoms

- Fever
- Rash
- Haematuria
- Pyuria
- Electrolyte abnormalities
- Acidosis
- Renal failure

Risk factors

- Infections (e.g. pyelonephritis, TB)
- Drugs (e.g. NSAIDs, penicillins allergy)
- Toxins (mushrooms, myeloma light chains)

Diagnostic criteria and investigations

- Urinalysis (will show leucocytes and eosinophils)
- Non- oliguric acute renal failure with rapid deterioration
- Renal biopsy (tertiary)

Management

Community level	Health centre level	Hospital level
• **Refer to health centre**	• **Refer to hospital**	**Treat the cause** **Child** **Age-based dosage:** • 3 months-1 year: Paracetamol 60-120mg 6-8 hourly. • 1-5 years: Paracetamol 120-250mg 6-8 hourly. • 6-12 years: Paracetamol 250-500mg 6-8 hourly. **Weight-based dosage** • Paracetamol 10-15 mg/kg every 6-8 hours, may repeat dose every 6 hours. Do not exceed 5 doses per day **AND**. • Ceftriaxone 1g IV stat **OR** • Gentamicin 7mg/kg IV stat **AND** • Trimethoprim/sulfamethoxazole 160 mg/800mg orally12 hourly for 14 days. **OR** • Ciprofloxacin 500 mg orally 12 hourly for 7 days. **AND** • Steroids to accelerate recovery and prevent long-term scarring.

14.2.4 Nephrotic syndrome

Description

Nonspecific kidney disorder characterised by four signs of diseases: large proteinuria, hypoalbuminemia, hyperlipidaemia and oedema. Essentially, loss of protein through the kidneys (proteinuria) leads to low protein levels in the blood (hypoalbuminemia), which causes water to be drawn into soft tissues (oedema). Secondary problems, such as cavity ascites, pericardial effusion, pleural effusion, hyperlipidaemia or hyperlipemia, and increased risk of thrombosis follow.

Signs and symptoms

- Proteinuria
- Hypoalbuminemia
- Hyperlipidaemia, and oedema that begins in the face
- Lipiduria
- Hyponatremia

A few other characteristics seen in nephrotic syndrome are:

- Puffiness around the face
- Pitting oedema over the legs
- Fluid in the pleural cavity
- Fluid in the peritoneal cavity
- Generalised oedema throughout the body
- Normotensive but hypertension (rarely) may also occur
- Anaemia
- Dysponea
- Erythrocyte sedimentation rate is increased
- Foamy or frothy urine
- Rash associated with systemic lupus erythematosus, or the neuropathy associated with diabetes
- Muehrcke's nails

Causes

Primary Causes

- Minimal change disease (MCD)
- Focal segmental glomerulosclerosis (FSGS)
- Membranous glomerulonephritis (IMN)
- Membranoproliferative glomerulonephritis (MPGN)
- Rapidly progressive glomerulonephritis (RPGN)

Secondary Causes

- Diabetic nephropathy
- Systemic lupus erythematosus
- Sarcoidosis
- Syphilis
- Hepatitis B
- Sjögren's syndrome
- HIV
- Amyloidosis
- Multiple myeloma
- Vasculitis
- Genetic disorders e.g congenital nephrotic syndrome
- Drugs

Risk factors

- Age – more common in children 2-5 years even though it can affect any age
- Gender – more common in boys than girls

Diagnostic criteria and investigations

- Clinical examination
- Urinalysis
- Plasma proteins
- Serum lipids
- Fasting blood glucose. NB: HBA1C
- Serology - Hepatitis B, C, HIV

Management

Community level	Health centre level	Hospital level
• **Refer to health centre**	• Restrict salt intake • Record and monitor fluid intake and output • Record and monitor vital signs • Record baseline weight • Avoid alternative medicines **Refer to hospital**	• Treat as HC **and/or** • Advise to take normal to high protein intake **Adult** • Furosemide (Furosemide), oral, 40 mg daily, increasing to 2 g daily in divided doses. **OR** • Spironolactone 25-50mg 8 hourly **Children** • Spironolactone 1-3mg/kg/day in children **AND** • Acetyl salicylic acid 75mg daily • **Refer to specialist if no improvement**

14.3 Kidney Failure

Description

A medical condition whereby the kidneys are functioning at less than 15% of their capacity. It is divided into Acute and Chronic Kidney Failure.

14.3.1 Acute Renal Failure/Acute Kidney Injury (AKI)/disease

Description

This is a deterioration of kidney function within hours and days (usually 7 days). It is also defined as;

- Increase in serum creatinine by 0.3mg/dl within 48hrs or
- Increase in serum creatinine of more than 1.5 times known or presumed baseline, to have occurred in the last 7 days or
- Urine volume of less than 0.5mls/kg/hr for 6 hours
    - oliguria i.e. urine volumes <400 mls/day
    - anuria i.e. urine volumes <100 mls/day

AKI can be reversed if treated accurately and treatment is according to the cause of injury or dialysis

Signs and symptoms

- History of fluid or blood loss or severe infection, burns, peritonitis or diarrhoea and vomiting
- Symptoms of dehydration, shock or anaemia

Causes

Diseases	Causes
Renal artery	• Hypovolemia, due to sudden interruption of blood supply to the kidney after accidents trauma, surgery and eclampsia • Congestive cardiac failure • Hepato-renal syndrome • Drug overdose, chemical overload like antibiotics and chemotherapy together with bee sting
Renal artery	• Renal artery thrombosis • Large or medium vessel vasculitis
Small vessel disease	• Thrombotic microangiopathy` • Renal atheroembolism • Small vessel vasculitis

Diseases	Causes
Renal Glomerular Diseases	• Lupus Nephritis • Post Infectious Glumerulonephritis • Infective Endocarditis • Membrano proliferative glomerulonephritis (MPGN)
Acute tubular necrosis	• Ischaemia • Nephrotoxic drugs (Paraquat, Aminoglycosides) • Rhabdomyolysis (crush syndrome releasing myoglobin, potassium, and phosphorus) • Radiocontrast agents
Acute interstitial nephritis	• Drugs • Infection
Intratubular obstruction	• Cast nephropathy • Drugs
Post renal Post renal obstruction	• Renal calculi • BOO (Bladder Outflow Obstruction) • Tumours • Retroperitoneal Fibrosis • Papillary Necrosis
Renal vein	Renal Vein Thrombosis

Diagnostic criteria and investigations

- Urinalysis
- Blood Urea Nitrogen (BUN), creatinine, uric acid
- Repeated blood and urine cultures
- Abdominal/Renal ultrasound scan (KUB) to exclude urinary tract obstruction
- Plain X-ray of abdomen

Management

Community level	Health centre level	Hospital level
• **Refer to health centre**	• **Refer to hospital**	• 0.9% Sodium Chloride, IV, in cases of diarrhoea and vomiting • Blood transfusion in severe bleeding • Plasma replacement in cases of severe burns • Give furosemide (frusemide), IV, 80mg when fluid volume has been replaced adequately

Community level	Health centre level	Hospital level
		Treatment of hyperkalaemia: • 10% Calcium gluconate, IV, 10-20ml over 2-5 minutes • Sodium bicarbonate 8.4% 44 mEq, IV, over 5 minutes **(NOTE: Do not mix calcium gluconate and bicarbonate in the same delivery system)** • Regular insulin 10 units in 50-100ml glucose 50% • Treat underlying causes **Refer all patients with clinical indications for dialysis:** • Intractable hyperkalemia • Uremic symptoms (nausea, malaise and pruritis) • Electrolyte abnormalities (hyponatraemia, hyperkalaemia) not controlled by conservative means • Severe metabolic acidosis (bicarbonate less than 10mmol/L after bicarbonate treatment) • Real or impending uraemic symptoms (seizures, pericarditis) • Hypertensive Crises/Encephalopathy • Chronic Kidney Disease Stage V

14.3.2 Chronic renal failure

Description

Chronic renal failure includes conditions that affect the kidney with the potential for progressive loss of kidney function over 3 weeks or for complications resulting from decreased kidney function. Decreased eGFR below 60ml/min/1.73m2, with or without evidence of kidney damage for at least 3 months

Signs and symptoms

Symptoms occur only in advanced renal failure:

- Reduced concentration
- Anorexia, nausea, vomiting
- Gastrointestinal bleeding

- Hiccups
- Breathlessness on exertion
- Thirst
- Nocturia
- Muscle cramps
- Paraesthesia
- Pruritus

Early Signs

- Earlier stages detected through laboratory tests in serum creatinine and estimation of GFR
- Measurement of urinary albumin excretion can identify some but not all
- Screening of asymptomatic individuals at increased risk could allow early detection of CKD

Late Signs

- Lethargy
- Bleeding tendency
- Pallor
- Hypertension
- Pericarditis
- Peripheral neuropathy
- Peripheral oedema
- Asterixis (flapping tremor)

Causes

- Hypertensive renal disease
- Diabetes mellitus
- HIV and its treatment
- Glomerulonephritis
- Pyelonephritis
- Obstructive uropathy
- Renal calculi
- Polycystic kidney disease

Risk factors

- Related to the causes

Diagnostic criteria and investigations

- Urinalysis
- Hb, WBC, sickling, platelet count, Blood film comment
- Urea, Electrolytes

- Creatinine
- Calcium, Phosphate
- Alkaline phosphatase
- Lipids
- Chest X-ray
- Fasting blood glucose

Note: All patients with or without proteinuria and serum creatinine > than 150 µmol/L should be referred to renal specialist for determination of aetiology and scheme of management.

Management

Community level	Health centre level	Hospital level

• **Refer** to health centre	• Health education
	• Diet
	• Avoid extra salt
	• Exercise
	• Drinking water
	• Careful use of medication including alternative and traditional medicines
	• Understanding the Risk factors
	Refer to hospital
		• Aggressive management of causative diseases
		• Refer for kidney replacement therapy
		  • Kidney Transplant
		  • Dialysis
		  • Hemodialysis
		Refer if:
		• Peritoneal dialysis Electrolyte abnormalities (hyponatraemia, hyperkalaemia) not controlled by conservative means
		• Severe metabolic acidosis (bicarbonate less than 10mmol/L after bicarbonate treatment)
		• Real or impending uraemic symptoms (seizures, pericarditis)
		• Hypertensive Crises/Encephalopathy
		• Chronic Kidney Disease Stage V

14.3.3 Benign Prostrate Hypertrophy (BPH)

Description

It is a condition in men in which the prostate gland is enlarged and not cancerous. It is also called benign prostatic hyperplasia or benign prostatic obstruction.

Signs and symptoms

Lower urinary tract symptoms suggestive of benign prostatic hypertrophy may include

- Urinary frequency: urination eight or more times a day
- Urinary urgency: the inability to delay urination
- Trouble starting a urine stream
- A weak or an interrupted urine stream
- Dribbling at the end of urination
- Nocturia: frequent urination during periods of sleep
- Urinary retention
- Urinary incontinence: the accidental loss of urine
- Pain after ejaculation or during urination
- Urine that has an unusual color or smell

Causes

Symptoms of benign prostatic hyperplasia most often come from

- Blocked urethra
- Prostatitis
- Trauma

Risk factors

- Age 50 years and older
- Family history of BPH
- Medical conditions such as obesity, heart and circulatory disease, and type 2 diabetes
- Lack of physical exercise
- Erectile dysfunction

Differential diagnosis

- Prostate Cancer

Diagnosis and investigations

- Physical exam
  - Digital rectal exam or rectal exam
- Medical tests
  - Urinalysis
  - Prostate specific antigen (PSA) blood test
  - Urodynamic tests
  - Cystoscopy
  - Transrectal ultrasound
  - Biopsy

Management

Community level	Health centre level	Hospital level
• **Refer to health centre**	**Lifestyle Changes** • Regulate intake of liquids, particularly before going out in public or before periods of sleep • Avoiding or reducing intake of caffeinated beverages and alcohol • Avoiding or monitoring the use of medications such as decongestants, antihistamines, antidepressants, and diuretics • Training the bladder to hold more urine for longer periods • Exercising pelvic floor muscles • Preventing or treating constipation **Refer to the hospital**	• Reinforce life style changes as in HC • Medication • **Alpha blockers;** Tamsulosin oral, 0.4mg daily, **OR** Doxazosin oral 4mg daily • **Phosphodiesterase-5 inhibitors;** sildenafil • 5-alpha reductase inhibitors; finasteride 5mg, dutasteride • **Refer to specialist if no improvement**

chapter

15

Respiratory Conditions

15.1 Common cold and influenza

Description

Colds and influenza are self-limiting viral conditions and quite contagious; begin to clear within 3 days with colds and 7 days in influenza. It may last up to 14 days. Influenza is a highly contagious airborne disease that occurs in seasonal epidemics and manifests as an acute febrile illness with variable degrees of systemic symptoms.

Signs and symptoms

- Headache
- Feeling of weakness
- Muscle pains
- Non-productive cough
- Sore throat
- Runny nose
- Fever
- Inflammation of the throat, usually no pus

Causes

- Influenza virus

Differential diagnosis

- Covid-19
- Pneumonia
- Pulmonary TB

Diagnostic criteria and investigations

Based on signs and symptoms

- Chest X-ray to rule out pneumonia (if necessary)
- Ag-RDT/PCR
- Sputum for GeneXpert
- FBC plus differential count

Community level	Health centre level	Hospital level
• Paracetamol 500mg-1g 8 hourly • **Refer to health centre.**	• Treat as CL **AND** **Adult:** • Cough medication 10ml – 15 ml three/four times a day. • Chlorpheniramine 4-6 hourly a day 5-7 days • Vitamin C 250mg 8 hourly a day • Multivitamin 1 tab 12-24 hourly a day **Children** 6 years and above • Paracetamol 250mg 4–6 hourly when needed not exceeding 4 doses daily. • Cough mixture 5ml three times a day for 5-7 days. • Chlorpheniramine 4-6 hourly a day • Vit C 250mg once 4-6 hourly a day • Multivitamin 1 tab once /twice a day 5 years and less: • Paracetamol 125mg 4–6 hourly when needed not exceeding 4 doses daily. **Refer to hospital**	**Treat as HC**

15.2 Asthma

Description

Asthma is a chronic inflammatory disease of the bronchial airways, which manifests as recurring wheezing episodes of wheeze, cough, chest tightness and shortness of breath, which is usually reversible with treatment. It is characterised by increased swelling and narrowing of the airways and production of extra mucus within the airways, which make breathing difficult. It affects both children and adults.

Signs and symptoms

- Episodic breathlessness
- Tightness of the chest
- Cough - often nocturnal
- Wheeze
- Nocturnal symptoms. Any of the above symptoms waking up the patient at night
- Tachypnoea (fast breathing)
- Use of accessory muscles of respiration

- Neck and/or abdominal muscles
- Rhonchi/wheeze

Signs of severe attack

- Inability to complete full sentences in one breath
- Rapid pulse > 110/minute in adults and adolescents or >130/ minute in children 2-5 years
- Rapid respiration > 30/minute in adults and adolescents or > 50/minute in children 2-5 years
- Peak Expiratory Flow Rate (PEFR) is reduced < 50% of expected (for age, sex and height)

Signs of a life threatening attack

- Cyanosis
- Pulsus paradoxus
- Silent chest on auscultation
- Drowsiness or confusion
- Exhaustion
- Peak Expiratory Flow Rate (PEFR) less than 33 % of expected value
- SpO_2 less than 92% on room air.

Classification of asthma according to severity

Components of Severity		Classification of Asthma Severity (0-4 years of age)			
		Intermittent	Persistent		
			Mild	Moderate	Severe
Impairment	Symptoms	≤2 days/ week	>2 days/week but not daily	Daily	Throughout the day
	Night time Awakenings	0	1-2x/month	3-4/month	>1x/week
	Short-acting $beta_2$ agonist use for symptom control (not prevention of EIB)	≤2 days/ week	>2 days/week but not daily	Daily	Several times per day
	Interference with normal activity	None	Minor limitation	Some limitation	Extremely limited
Risk	Exacerbations requiring oral systemic corticosteroids	0-1/year	≥2 exacerbations in 6 months requiring oral systemic corticosteroids, or ≤4 wheezing episodes/1 year lasting <1 day AND risk factors for persistent asthma		
		Consider severity and interval since last exacerbation. Frequency and severity may fluctuate over time. Exacerbations of any severity may occur in patients in any severity category.			
Recommended Step for Initiating Therapy		Step 1	Step 2	Step 3 and consider short course of oral systematic corticosteroids	
		In 2-6 weeks, depending on severity, evaluate level of asthma control that is achieved, If no clear benefit is observed in 4-6 weeks, consider adjusting therapy or alternative diagnoses.			

Source: NAEPP Asthma Guidelines, 2018

Components of Severity		Classification of Asthma Severity (5-11 years of age)			
		Intermittent	Persistent		
			Mild	Moderate	Severe
Impairment	Symptoms	≤2 days/week	>2 days/week but not daily	Daily	Throughout the day
	Night time awakenings	≤2x/month	3-4x/month	>1x/week but not nightly	Often 7x/week
	Short-acting beta$_2$ agonist use for symptom control (not prevention of EIB)	≤2 days/week	>2 days/week but not daily	Daily	Several times per day
	Interference with normal activity	None	Minor limitation	Some limitation	Extremely limited
	Lung functions	• Normal FEV_1 between exacerbations • FEV_1 80% predicted • FEV_1/FVC >85%	• FEV_1 = >80% predicted • FEV_1/FVC >80%	• FEV_1 = 60-80% predicted • FEV_1/FVC >75-80%	• FEV_1 = 60% predicted • FEV_1/FVC >75%
Risk	Exacerbations requiring oral systemic corticosteroids	0-1/year (see note)	≥2 year (see note) →		
		← Consider severity and interval since last exacerbation. Frequency and severity may fluctuate over time for patients in any severity category. →			
		Relative annual risk of exacerbation may be related to FEV_1			
Recommended Step for Initiating Therapy		Step 1	Step 2	Step 3 medium-dose ICS option	Step 3 medium-dose ICS option, or step 4
				and consider short course of oral systematic corticosteroids	
		In 2-6 weeks, depending on severity, evaluate level of asthma control that is achieved, and adjust therapy accordingly.			

Source: NAEPP Asthma Guidelines, 2018

Components of Severity		Classification of Asthma Severity (≥12 years of age)			
		Intermittent	Persistent		
			Mild	Moderate	Severe
Impairment Normal FEV_1/FVC: 8-19 yr 85% 20-39 yr 80% 40-59 yr 75% 60-80 yr 70%	Symptoms	≤2 days/week	>2 days/week but not daily	Daily	Throughout the day
	Night time awakenings	≤2x/month	3-4x/month	>1x/week but not nightly	Often 7x/week
	Short-acting beta$_2$ agonist use for symptom control (not prevention of EIB)	≤2 days/week	>2 days/week but not daily and not more than 1x on any day	Daily	Several times per day
	Interference with normal activity	None	Minor limitation	Some limitation	Extremely limited
	Lung function	• Normal FEV_1 between exacerbations • FEV_1 80% predicted • FEV_1/FVC >85%	• FEV_1 = >80% predicted • FEV_1/FVC >80%	• FEV_1 = 60-80% predicted • FEV_1/FVC >75-80%	• FEV_1 = 60% predicted • FEV_1/FVC >75%
Risk	Exacerbations requiring oral systemic corticosteroids	0-1/year (see note)	≥2 year (see note) →		
		← Consider severity and interval since last exacerbation. Frequency and severity may fluctuate over time for patients in any severity category. →			
		Relative annual risk of exacerbation may be related to FEV_1			
Recommended Step for Initiating Therapy		Step 1	Step 2	Step 3	Step 3
				and consider short course of oral systematic corticosteroids	
		In 2-6 weeks, evaluate level of asthma control that is achieved, and adjust therapy accordingly.			

Source: NAEPP Asthma Guidelines, 2018

Recognition and assessment of the severity of attacks in children

	Moderate	Severe
Respiratory rate	> 40 per minute	> 40 per minute
Chest in drawing/recession	Present	Present
Peak Expiration Flow (if > 5 years old)	50–70% of predicted	below 50% of predicted
Speech	normal or difficult	unable to speak
Feeding	difficulty with feeding	unable to feed
Wheeze	Present	Absent
Consciousness	Normal	Impaired

Recognition and assessment of the severity of attacks in adults

	Moderate	Severe
Talks in	Phrases	Words
Alertness	usually agitated	agitated, drowsy or confused
Respiratory rate	20–30 per/minute	often >30 per minute
Wheeze	Loud	loud or absent
Pulse rate	100–120 per minute	above 120 per minute
Peak Expiration Flow after initial nebulisation	approx. 50–75%	<50%; may be too short of breath to blow in PEF meter

Risk factors

- Chronic rhinitis
- Viral respiratory infections
- Exercise
- Medications (NSAIDs, Beta- blockers such as propranolol)
- Environmental allergens
- Emotional factors, stress and hyperventilation
- Allergens e.g. house dust mite, cockroach droppings, grass, pollen and animal hairs
- Environmental factors e.g. air pollution, climatic changes
- Strong scents (perfumes and soaps)
- Smokes (including cigarette smoke and car fumes)
- Viral infections

- Emotions and hyperventilation
- Drugs e.g. aspirin, NSAIDS and beta-blockers
- Occupational exposure to industrial chemicals, dust and drug manufacturing
- Mould

Diagnostic criteria and investigations

- Based on history of signs and symptoms and clinical findings and no other investigations required in most cases.
- Auscultation: Expiratory (rhonchi)/wheeze and decreased respiratory sounds in severe cases.
- Peak Expiratory Flow Rate (PEFR)

80 to 100%	Normal lung function
50% to 80%	Moderate asthma
less than 50%	Severe Asthma

- **Chest X-ray** - to rule out other causes
- **FBC with differential counts** - mildly high eosinophil count
- **Bronchodilator reversibility (BDR) test** - improvement of 12% or more in FEV1
- Spirometry

INTERMITTENT	**PERSISTENT**		
	Mild	Moderate	Severe
FEV1> 80% of predicted	FEV1 > 80% predicted	FEV1 > 60% but < 80%	FEV1< 60% predicted
FEV1/FVC normal	FEV1/ FVC normal	FEV1/ FVC reduced by 5%	FEV1/ FVC reduced by >5%

Management

Community level	Health centre level	Hospital level
• Avoid known triggers/allergens, such as dust (dust mite) where possible • Avoid smoking • Education on asthma self-management, device use and technique • Provide airway support while waiting for referral.	• MDI/ (Spacer) Salbutamol (intermittent or persistent mild) 2 puffs PRN. Both adults and children with the patient taking 3-4 breaths after each puff. Repeat after every 15-30 minutes maximum 10 doses If there is no improvement • Salbutamol nebuliser 0.5% (Nebulise with salbutamol 5mg, 4 to 6 hourly depending on the severity and age and response) • Injection Hydrocortisone 100 -200mg im/iv stat. • Oxygen therapy. **Refer to hospital.**	Treat as HC • Patients are managed according to the level of severity of attacks as shown on table below **Adult** • Inhaled salbutamol (short acting) 6 hourly 200mcg **OR** • Salbutamol 4mg orally 8 hourly for 5 days **AND** • Beclomethasone inhaler 200-400mcg 12 hourly for one month **OR** • Beclomethasone inhaler 1000mcg - 2000mcg 12 hourly for one month **AND** • Prednisolone 10 mg orally 8 hourly for 5 days **Children:** • Inhaled salbutamol (short-acting) 6 hourly 200mcg via spacer **AND** • Beclomethasone inhaler 100-200mcg 12 hourly **OR** • Beclomethasone 400mcg 12 hourly **Refer to specialist if no**/poor response to treatment

Level of severity of asthmatic attacks

	Intermittent	Mild	Moderate	Severe
Category	I	II	III	IV
Day time symptoms	≤ 2/week	3-4/ week	>4/week	Continuous
Night time symptoms	≤1/month	2-4/month	>4/month	Frequent
PEFR if predicted	≥ 80%	≥80%	60-80%	< 60%
Therapy	A	A/	A/B/D/	A/C/D/

Acute exacerbation of asthma

Initial Management in the community salbutamol inhaler, using pressurised metered dose inhaler (pMDI) with a spacer. Give 1-2 puffs via a spacer and mask if needed (e.g. Volumatic or aerochamber, or large plastic mineral water bottle) with the patient taking 3-4 breaths after each puff. Repeat after every 15-30 minutes maximum 10 doses. If there is no improvement seek care at a health facility with a nebuliser.

Acute exacerbation of asthma	Acute moderate/severe exacerbation of asthma
Initial management in hospital: • **Adults:** Oxygen by nasal prongs 2-6 L/min **OR** face mask 4-8 L/min **OR** non-rebreather mask 10-15 L/min, **AND** Salbutamol, nebulised, 2.5-5mg repeated initially after 15-30 minutes, then every 2-4 hours until improved. **AND** Ipratropium bromide, nebulised, 500mg 4-6 hourly **AND** Hydrocortisone, IV, 200mg stat. then 100mg 6 hourly until clinical improvement. • **Children:** Oxygen by nasal prongs 2-6 L/min **OR** face mask 4-8 L/min **OR** non-rebreather mask 10-15 L/min, **AND** Salbutamol, nebulised, 2.5-5mg every 2-4 hours until improved, **AND** Ipratropium bromide, nebulised, 250mg 4-6 hourly **1-5 years**; 125mg 4-6 hourly (max. dose for children is 1 mg/24 hours) **AND** Hydrocortisone, IV, 12-18 years; 100mg 6-8 hourly 1 month-12 years; 2-4 mg/kg 8 hourly then C.	• Maintenance treatment in hospital (where patient is still distressed after 3-4 initial doses of nebulised salbutamol): • Aminophylline, IV, • Adults 250mg slow injection over 20 minutes repeat after 30 minutes with a continuous infusion by perfusor, if necessary, at a rate not exceeding 0.5mg/kg/hour over 24 hours, **OR** • Aminophylline, IV infusion, • Adult 250mg in 500ml of 5% dextrose or 0.9% sodium chloride, 6 hourly for 24 hours. • Children: 5mg/kg over 20 minutes as a slow infusion or by perfusor at 1mg/ kg/hour (max. 500mg)

Acute exacerbation of asthma	Acute moderate/severe exacerbation of asthma
• Maintenance Treatment in Hospital: • Adults: 2.5-5mg repeated every 6 hours until improved. • Children: 2.5-5mg every 6 hours until improved, **AND** • Ipratropium bromide, nebulised, • Adults 500mg 4-6 hourly • Children 6-12 years; 250mg 4-6 hourly 1-5 years; 125mg 4-6 hourly (max. dose for children 1mg/24 hours) **Note:** 8-4 For children < 12 years with severe symptoms consider; ipratropium bromide, 250mg repeated every 20-30 minutes, for the first 2 hours, then 4-6 hourly as necessary **AND** • Prednisolone, oral, initial dose given on admission and subsequently given as a morning dose. (Once on prednisolone, stop IV hydrocortisone after 24 hours) • Adults: 30-40mg daily for 7 days until stable. Taper off dose over a period of 2 weeks if patient has been on long term steroids. • Children: 1-2mg/kg for 3-5 days.	

Chronic asthma

Asthma must be distinguished from chronic obstructive pulmonary disease, which is often mistaken for asthma. The history is a reliable diagnostic guideline and may be of value in assessing treatment response.

Differences between asthma and COPD

Asthma	COPD
Young age onset, usually <20 years	Older age onset, usually 40 years.
History of hay fever, eczema and/or allergies.	Symptoms slowly and worsen over a long period of time.
Family history of asthma.	History of heavy smoking (>20 cigarettes/ day for ≥15 years), heavy cannabis use or previous TB
Symptoms are usually worse at night or in the early hours of the morning, during an upper respiratory tract infection, when the weather changes or when upset	Symptoms are persistent and not only at night or during the early morning
Symptoms are intermittent with periods of normal breathing in between	Long history of daily/frequent cough, before the onset of shortness of breath
Increase 20% in PEF 10 minutes after receiving a ß2-agonist.	Little improvement in PEF 10 minutes after receiving a ß2-agonist.

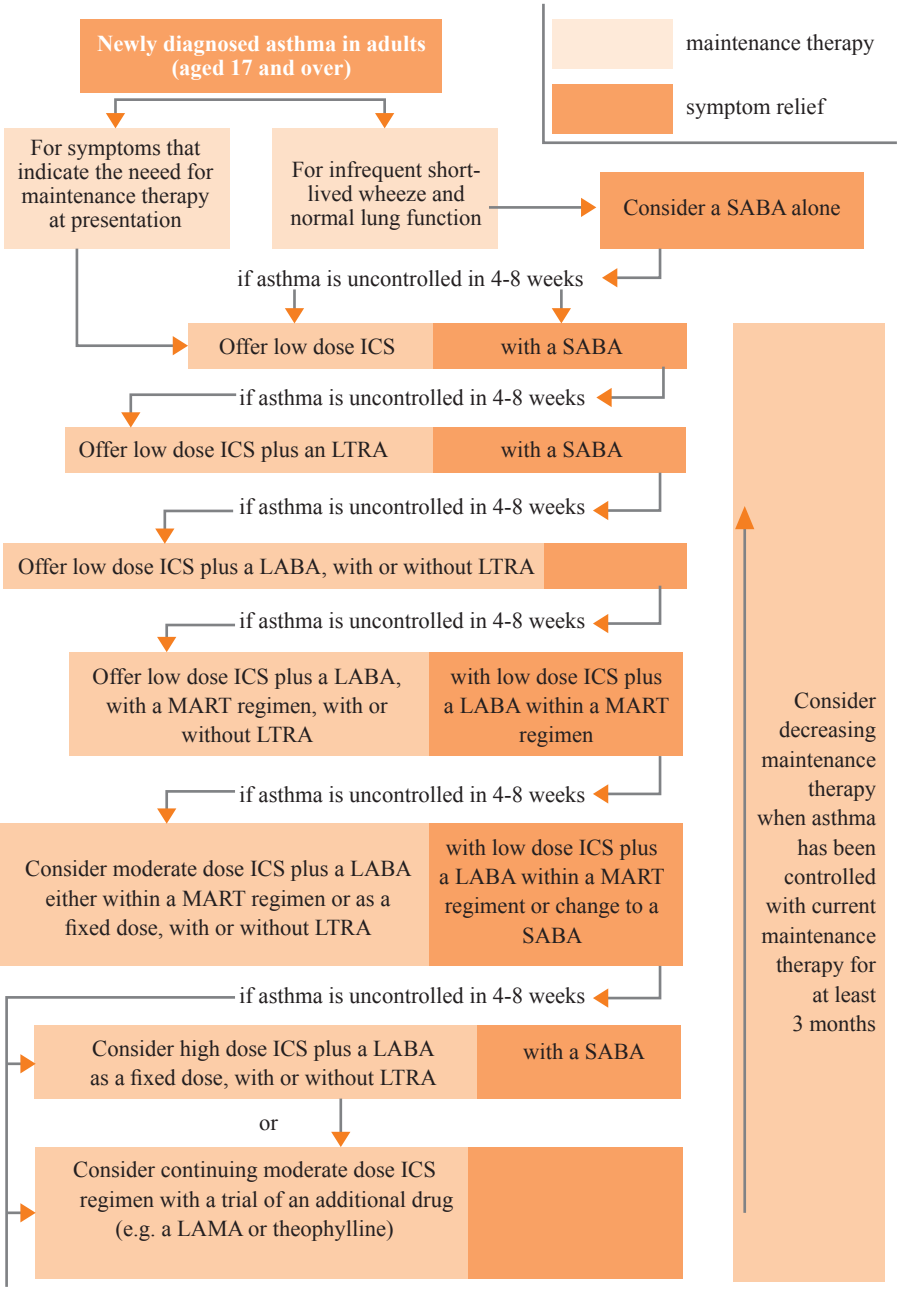
Management

General measures

Patient education to include advice on smoking cessation, decrease exposure to triggers, e.g. house dust mite, pollens, grasses, pets, smoke, fumes, etc.

Medical treatment

Algorithm: Pharmacological treatment for chronic asthma in adults aged 17 and over


Newly diagnosed asthma in adults (aged 17 and over)
maintenance therapy
symptom relief
For symptoms that indicate the neeed for maintenance therapy at presentation
For infrequent short-lived wheeze and normal lung function
Consider a SABA alone
if asthma is uncontrolled in 4-8 weeks
Offer low dose ICS
with a SABA
if asthma is uncontrolled in 4-8 weeks
Offer low dose ICS plus an LTRA
with a SABA
if asthma is uncontrolled in 4-8 weeks
Offer low dose ICS plus a LABA, with or without LTRA
if asthma is uncontrolled in 4-8 weeks
Offer low dose ICS plus a LABA, with a MART regimen, with or without LTRA
with low dose ICS plus a LABA within a MART regimen
if asthma is uncontrolled in 4-8 weeks
Consider moderate dose ICS plus a LABA either within a MART regimen or as a fixed dose, with or without LTRA
with low dose ICS plus a LABA within a MART regiment or change to a SABA
if asthma is uncontrolled in 4-8 weeks
Consider high dose ICS plus a LABA as a fixed dose, with or without LTRA
with a SABA
or
Consider continuing moderate dose ICS regimen with a trial of an additional drug (e.g. a LAMA or theophylline)
Consider decreasing maintenance therapy when asthma has been controlled with current maintenance therapy for at least 3 months

Pharmacological treatment of chronic asthma in adults aged 17 and over

- Offer a short-acting beta2 agonist (SABA) as reliever therapy to adults (aged 17 and over) with newly diagnosed asthma
- For adults (aged 17 and over) with asthma who have infrequent, short-lived wheeze and normal lung function, consider treatment with SABA reliever therapy alone
- Offer a low dose of an ICS as the first-line maintenance therapy to adults (aged 17 and over) with:
- Symptoms at presentation that clearly indicate the need for maintenance therapy (for example, asthma-related symptoms three times a week or more, or causing waking at night) or
- Asthma that is uncontrolled with a SABA alone
- If asthma is uncontrolled in adults (aged 17 and over) on a low dose of ICS as maintenance therapy, offer a leukotriene receptor antagonist (LTRA) in addition to the ICS and review the response to treatment in 4–8 weeks
- If asthma is uncontrolled in adults (aged 17 and over) on a low dose of ICS and an LTRA as maintenance therapy, offer a long-acting beta2 agonist (LABA) in combination with the ICS, and review LTRA treatment as follows:
- Discuss with the person whether or not to continue LTRA treatment
- Take into account the degree of response to LTRA treatment
- If asthma is uncontrolled in adults (aged 17 and over) on a low dose of ICS and a LABA, with or without an LTRA, as maintenance therapy, offer to change the person's ICS and LABA maintenance therapy to a MART regimen with a low maintenance ICS dose
- If asthma is uncontrolled in adults (aged 17 and over) on a MART regimen with a low maintenance ICS dose, with or without an LTRA, consider increasing the ICS to a moderate maintenance dose (either continuing on a MART regimen or changing to a fixed-dose of an ICS and a LABA, with a SABA as a reliever therapy)
- If asthma is uncontrolled in adults (aged 17 and over) on a moderate maintenance ICS dose with a LABA (either as MART or a fixed-dose regimen), with or without an LTRA, consider:
- Increasing the ICS to a high maintenance dose (this should only be offered as part of a fixed-dose regimen, with a SABA used as a reliever therapy) or
- A trial of an additional drug (for example, a long-acting muscarinic receptor antagonist or theophylline) or
- Seeking advice from a healthcare professional with expertise in asthma.

Chronic Asthma - Initial management	Chronic Asthma - Maintenance treatment
• **Salbutamol, inhaled,** Adults and children 100 microgram, 2 puffs as often as needed and (If inhaled, Salbutamol is needed more than once daily) • **Budesonide, inhaled,** Adults 200 microgram (one puff 12 hourly) **Children** • > 10 years; 200 micrograms (one puff 12 hourly) • < 10 years; 100 micrograms (one puff 12 hourly) **OR** • Fluticasone, Inhaled - MDI, • Adults 125-250 microgram (2 puffs 12 hourly) • Children 50 microgram (2 puffs 12 hourly) **OR** • Beclometasone (Beclomethasone), inhaled, • Adults and children 100 microgram (2 puffs 12 hourly)	• **Salbutamol, inhaled,** Adults and children 100 microgram, 2 puffs as often as needed **AND** • **Fluticasone/Salmeterol, inhaled,** Adults and children over 5 years 100/50-250/50 microgram; 1 puff 12 hourly **OR** • **Budesonide/Formoterol, inhaled,** Adults 160/4.5 microgram (1-2 puffs 12 hourly) • Children over 5 years 80/4.5 microgram (1-2 puffs 12 hourly) **AND** • Montelukast, oral, • Adult 10mg daily Children 4-5mg granules daily **AND** • Prednisolone, oral, Adults 30-40mg daily and tail down slowly over 2-3 weeks period to a low maintenance daily dose of 5mg daily. Children 1mg/kg tailed off by 5mg every third day, reducing to 5-10mg daily or alternate daily, the lowest dose possible with out provoking attacks

Review treatment every 3-6 months with a view to stepping down treatment if client is symptom-free or has minimal symptoms (1-2 times a month).

All patients with chronic asthma should receive continuous education and counselling by healthcare workers.

Patient and caregiver education on inhaler and spacer techniques

Spacer devices

Patients who are unable to use inhalers correctly after adequate counselling may benefit from the use of a spacer.

Inhalation therapy without a spacer in adults

1. Remove the cap from the mouthpiece.
2. Shake the inhaler well.
3. While standing or sitting upright, breathe out as much air as possible.

4. Place the mouth piece of the inhaler between the lips and gently close the lips around it.
5. While beginning to inhale, press down the canister of the metered dose inhaler once to release one puff while breathing in as deeply/slowly as possible.
6. Hold the breath for 5–10 seconds, if possible.
7. Breathe out slowly and rest for a few breaths (30–60 seconds).
8. Repeat steps 2–6 for each puff prescribed.
9. Rinse mouth with water after inhalation of corticosteroids.

Inhalation therapy with a spacer in adults

1. Remove the caps from the inhaler and the spacer.
2. Shake the inhaler well.
3. Insert the mouthpiece of the metered dose inhaler into the back of the spacer.
4. Insert the mouthpiece of the spacer into the mouth and close the lips around the mouthpiece. Avoid covering any small exhalation holes.
5. Press down the canister of the metered dose inhaler once to release one puff into the spacer.
6. Immediately take 3–4 slow deep breaths.
7. Repeat steps 4–6 for each puff prescribed, waiting at least 30 seconds between puffs.
8. Rinse mouth with water after inhalation of corticosteroids.

15.3 Chronic Obstructive Pulmonary Disease (COPD)

Description

COPD is a group of chronic lung diseases characterised by persistent pulmonary symptoms (dyspnoea, chronic cough and sputum production), and airflow limitation. Spirometry is required to diagnose COPD, where the post-bronchodilator FEV1/FVC ratio is <0.7. COPD is likely to worsen over time, even with optimal care. lung damage from COPD cannot be reversed.

Signs and symptoms

- Suspect a diagnosis of COPD in people over 35 who have a risk factor (generally smoking or a history of smoking) and who present with 1 or more of the following symptoms:
- Exertional breathlessness
- Chronic cough
- Regular sputum production
- Frequent winter ‘bronchitis’
- Wheeze.
- When thinking about a diagnosis of COPD, ask the person if they have:
  - Weight loss
  - Reduced exercise tolerance
  - Waking at night with breathlessness
  - Ankle swelling
  - Fatigue
  - Occupational hazards

- Chest pain
- Haemoptysis (coughing up blood)

These last two symptoms are uncommon in COPD and raise the possibility of alternative diagnosis.

- One of the primary symptoms of COPD is breathlessness. The Medical Research Council (MRC) dyspnoea scale should be used to grade the breathlessness according to the level of exertion required to elicit it.

MRC dyspnoea scale:

Grade	Degree of breathlessness related to activities
1	Not troubled by breathlessness except on strenuous exercise
2	Short of breath when hurrying or walking up a slight hill
3	Walks slower than contemporaries on level ground because of breathlessness, or has to stop for breath when walking at own pace
4	Stops for breath after walking about 100 metres or after a few minutes on level ground
5	Too breathless to leave the house, or breathless when dressing or undressing
Adapted from Fletcher CM, Elmes PC, Fairbairn MB et al. (1959) The significance of respiratory symptoms and the diagnosis of chronic bronchitis in a working population. British Medical Journal 2: 257–266.	

Differential diagnosis

- Asthma
- Flu
- Bronchiolitis
- Myocardial infarction
- Pneumonia
- Pulmonary oedema
- Anxiety disorder
- CCF
- COVID-19
- Lung cancer
- Acute bronchitis

Diagnostic criteria and investigations

Signs and symptoms

Table 3: Clinical features differentiating COPD and asthma

	COPD	Asthma
Smoker or ex-smoker	Nearly all	Possibly
Symptoms under age 35	Rare	Often
Chronic productive cough	Common	Uncommon
Breathlessness	Persistent and progressive	Variable
Night-time waking with breathlessness and/ or wheeze	Uncommon	Common
Significant diurnal or day-to-day variability of symptoms	Uncommon	Common

- Full Blood Count: to identify anaemia or polycythaemia
- Chest X Ray: To rule out other causes
- Spirometry:
- Reversibility testing:

When diagnostic uncertainty remains, or both COPD and asthma are present, use the following findings to help identify asthma:

- A large (over 400 ml) response to bronchodilators
- A large (over 400 ml) response to 30 mg oral prednisolone daily for 2 weeks
- Serial peak flow measurements showing 20% or greater diurnal or day-to-day variability

Clinically significant COPD is not present if the FEV1 and FEV1/FVC ratio return to normal with drug therapy.

Additional investigations

Investigation	Role
Sputum culture	To identify organisms if sputum is persistently present and purulent
Serial home peak flow measurements	To exclude asthma if diagnostic doubt remains

Investigation	Role
Electrocardiogram (ECG) and serum natriuretic peptides[a]	To assess cardiac status if cardiac disease or pulmonary hypertension are suspected because of: – a history of cardiovascular disease, hypertension or hypoxia or – clinical signs such as tachycardia, oedema, cyanosis or features of cor pulmonale
Echocardiogram	To assess cardiac status if cardiac disease or pulmonary hypertension are suspected
CT scan of the thorax	To investigate symptoms that seem disproportionate to the spirometric impairment To investigate signs that may suggest another lung diagnosis (such as fibrosis or bronchiectasis) To investigate abnormalities seen on a chest X ray To assess suitability for lung volume reduction procedures
Serum alpha 1 antitrypsin	To assess for alpha 1 antitrypsin deficiency if early onset, minimal smoking history or family history
Transfer factor for carbon monoxide (TLCO)	To investigate symptoms that seem disproportionate to the spirometric impairment To assess suitability for lung volume reduction procedures

Management

Medical treatment

Note: Correct inhaler technique should be demonstrated and checked regularly.

Management of acute exacerbations

Progression of disease (measured by symptoms and deterioration in lung function) in COPD is variable, but is greater in patients who experience COPD exacerbations which are defined as:

- worsening of dyspnoea
- increased cough
- increased sputum production or purulence or
- greater than usual day to day variability of symptoms

Severe exacerbations are defined as being sufficiently severe to prompt use of an oral corticosteroid course and/or an antibiotic. COPD exacerbations are not always associated with significant decreases in pef or fev1, and are defined by symptoms and, when severe, measures of respiratory failure. Most are precipitated by viral and/or bacterial infection and are more common in winter.

Community level	Health centre level	Hospital level	
• Quit smoking, • Physical exercise, Avoidance of noxious respiratory particles should form the mainstay of management.	• Treat as CL.	**Acute therapy** Salbutamol, nebulisation, 5mg. Nebulise continuously (refill the nebuliser reservoir every 20 minutes) at a flow rate of 6–8L/minute. If a poor response to nebulised salbutamol: **ADD** Ipratropium bromide 0.5mg (UDV) with the first refill of the nebuliser reservoir. Patients who fail to respond within 1 hour must be discussed with a specialist. (Patients with COPD have fixed airway disease and unlike asthmatics, PEF is not a reliable measure of their disease). Once clinically stabilised, nebulise with: • Salbutamol, nebulisation 5mg **OR** fenoterol 1.25–2.5mg. • Repeat 4–6 hourly **AND** • Corticosteroids (intermediate-acting) e.g. Prednisone, oral, 40mg immediately. Follow with: • Prednisone, oral, 40mg daily for 5 days.	**Chronic therapy** **GRADE A:** • As initial therapy: Short acting β2-agonist (SABA) e.g.: • Salbutamol, MDI, 200 mcg 6 hourly as needed (educate on correct inhaler use - use a large volume spacer if inhaler technique remains poor). If no response in symptoms: **GRADE B:** **ADD** • Long-acting β2-agonist (LABA), e.g.: • Formoterol, inhalation 12mcg 12 hourly. **GRADE C and D** (frequent exacerbations (≥2 per year)): • Short acting β2-agonist (SABA) e.g.: • Salbutamol, MDI, 200mcg 6 hourly as needed using a large volume spacer. **AND** • LABA/ICS combination, e.g.: • Salmeterol/ fluticasone, inhalation, 50/250mcg 12 hourly. **AND** Refer COPD patients for additional assessment and management.

Community level	Health centre level	Hospital level	
		OR In patients who cannot use oral therapy: • Hydrocortisone, IV, 100mg 6 hourly until patient can take oral medication. **Once oral medication can be taken, follow with:** • Corticosteroids (intermediate-acting) e.g.: Prednisone, oral, 30mg daily for 5 days. Monitor response and clinical signs. **Acute infective exacerbation of chronic bronchitis:** • Amoxycillin, oral, 500mg 8 hourly for 5 days. **OR** Severe penicillin allergy: • Doxycycline, oral, 100mg 12 hourly for 5 days. Non-responsive to first course of antibiotic therapy or in patients with a moderate to severe exacerbation and who have increased sputum purulence plus ≥ 1 of the following symptoms should receive an antibiotic: » increased dyspnoea, » increased sputum volume • Amoxycillin/clavulanic acid, oral, 875/125mg 12 hourly for 5 days. **OR** **Severe penicillin allergy:** • Azithromycin, oral, 500mg daily for 3 days.	

15.4 Bronchitis

Description

- Bronchitis is an inflammation of the bronchial tubes, the airways that carry air to the lungs. It causes a cough that often brings up mucus. It can also cause shortness of breath, wheezing, a low fever, and chest tightness. There are two main types of bronchitis: acute and chronic.
- Acute bronchitis involves inflammation of the bronchi due to infection or irritation. It is initially, a viral infection of the bronchi. This is may be followed by secondary bacterial infection.

Signs and symptoms

- Acute onset of cough
- Purulent sputum production (sputum green/yellow)
- Symptoms of upper respiratory tract infection
- Pyrexia
- Cough
- Production of mucus (sputum), which can be clear, white, yellowish-gray or green in colour - rarely, it may be streaked with blood
- Fatigue
- Shortness of breath
- Slight fever and chills
- Chest discomfort

Causes

- Viral infections - usually (influenza A and B, parainfluenza, respiratory syncytial virus, and coronavirus)
- Bacterial infections (less commonly and occur as superinfections) (Mycoplasma spp, Chlamydia pneumoniae, Streptococcus pneumoniae, Moraxella catarrhalis, and Haemophilus influenzae)

Risk factors

- **Cigarette smoke.** People who smoke or who live with a smoker are at higher risk of both acute bronchitis and chronic bronchitis.
- **Low resistance**. This may result from another acute illness, such as a cold, or from a chronic condition that compromises your immune system. Older adults, infants and young children have greater vulnerability to infection.
- E**xposure to irritants on the job.** Your risk of developing bronchitis is greater if you work around certain lung irritants, such as grains or textiles, or are exposed to chemical fumes.
- **Gastric reflux.** Repeated bouts of severe heartburn can irritate your throat and make you more prone to developing bronchitis.

Differential diagnosis

- Flu
- Asthma
- COPD
- Pneumonia

Diagnostic criteria and investigations

- It can be difficult to distinguish the Signs and symptoms of bronchitis from those of a common cold especially in the first few days
- Chest X-ray: to rule out pneumonia, PTB, other conditions
- Sputum: to rule out PTB and other allergies
- Lung function tests: to rule out asthma and/emphysema

Complications

- Pneumonia most common complication
- COPD

Management

a) Most cases of acute bronchitis get better without treatment, usually within a couple of weeks
b) Because most cases of bronchitis are caused by viral infections, antibiotics aren't effective

Community level	Health centre level	Hospital level
• Get plenty of rest. • Try to stay at home and avoid contact with other people. • Refer if not getting better. • Drink lots of fluid – this helps prevent dehydration and thins the mucus in your lungs, making it easier to cough up • Paracetamol or Ibuprofen **NB:** ibuprofen is not recommended for asthmatic patients	• Antibiotics usually given if you have an increased risk of developing complications, such as pneumonia. Following are a group with high risk of developing complications: • Premature babies • Elderly people over the age of 80 • People with a history of heart, lung, kidney or liver disease • People with a weakened immune system, which could be the result of an underlying condition or a side effect of a treatment like steroids • People with cystic fibrosis **Adult:** • Amoxycillin 500mg 8 hourly for 7 days; **OR** • Erythromycin 500mg 6 hourly for 7 days.	Treat as HC. **Refer** to a specialist if no improvement.

Community level	Health centre level	Hospital level
	Children: • Amoxycillin 20-50mg/kg/day 8 hourly for 7 days **OR** • Erythromycin 20-50mg/kg/day 6 hourly for 7 days **Note:** For children give antibiotics only if the following are present: • High temperature • Nutritional deficiency • Cardiac disease • Previous pneumonia • Immunocompromised **Refer to the hospital if no improvement.**	

15.5 Pneumonia

Description

Pneumonia is an inflammatory condition of the lung primarily affecting the small air sacs known as alveoli. The alveoli are filled with pus and fluid, which makes breathing painful and limits oxygen intake.

Signs and symptoms

- Purulent sputum
- Cough, fever and chills of sudden onset
- Crepitations
- Rapid or laboured breathing (intercostal retractions)
- Tiredness and weakness
- Anorexia or difficulty in breathing
- Chest pain- sticking in character and worse with coughing or breathing deep
- Dullness to percussion on the affected side
- Decreased breath sounds on the affected side

Causes and risk factors

- Bacterial (Streptococcus Pneumonia, Staphylococcus aureus, E faecalis, E faecium, Pseudomonas aeruginosa, Klebsiella pneumonia, Haemophilus influenza, Escherichia coli, Mycoplasma species, Moraxella catarrhalis)
- H1N1 co-infection
- Chronic obstructive pulmonary diseases
- Bronchiectasis
- SARS-Cov-2

Differential diagnosis

- Covid-19
- Asthma
- COPD
- CCF

Diagnostic criteria and investigations

- Based on symptoms and signs
- Chest X-ray
- Sputum Gram stain
- Culture and sensitivity on sputum and/or blood
- Cytology (sputum; pleural effusion) If +ve refer patient for bronchoscopy and biopsy
- Wheeze (more common with viral pneumonia)

Management

<table>
<tr><th>Community level</th><th>Health centre level</th><th colspan="2">Hospital level</th></tr>
<tr><td rowspan="2">• Health education
• Paracetamol 1g PO 6 to 8hrly.</td><td rowspan="2">• Treat as HC AND/OR
• Oxygen therapy if saturation is below 94%
• Benzyl penicillin 2 MU IM stat if not severely ill
Followed by:
• Amoxycillin 500mg 8 hourly for 7 days
OR
• Erythromycin 500mg 6-8 hourly for 10 days.</td><td>Community-acquired pneumonia without features of severe pneumonia (see below for definition) and without co-morbidity and in patients</= 65 years of age or co-morbidity (e.g. COPD, HIV, cardiac failure, diabetes)</td><td>Ampicillin, IV, 1g 6 hourly.</td></tr>
<tr><td>In hemodynamically stable patients with respiratory rate <25 breaths per minute and the temperature is - <37.8°C switch to:</td><td>• Amoxycillin, oral, 1g 8 hourly.
Severe penicillin allergy:
• Moxifloxacin, oral, 400mg daily for 5 days
If poor response after 48 hours, exclude TB and consider atypical bacterial pneumonia, which requires treatment with a macrolide</td></tr>
</table>

Community level	Health centre level	Hospital level	
		Community-acquired pneumonia without features of severe pneumonia (see below for definition) in patients >65 years of age or co-morbidity (e.g. COPD, HIV, cardiac failure, diabetes)	Ceftriaxone, IV, 2g daily.
		In haemodynamically stable patients with respiratory rate 30 breaths/min)	• Mechanical ventilation may be required (refer to a centre, if needed). Ceftriaxone, IV, 2g daily
		In haemodynamically stable patients with respiratory rate <25breaths/min and temperature < 37.8^{0}C switch to	• Amoxycillin/clavulanic acid, oral, 875/125mg 12 hourly for 5 days. In severe penicillin allergy: • Moxifloxacin, oral, 400mg daily for 5 days If poor response after 48 hours, exclude TB and consider atypical bacterial pneumonia, which requires treatment with a macrolide
		Severe pneumonia (cyanosis, confusion, hypotension or respiratory rate >30 breaths/min):	• Mechanical ventilation may be required Ceftriaxone, IV, 2g daily
		In haemodynamically stable patients with respiratory rate <25 breaths/min and temperature < 37.8^{0}C switch to:	• Amoxycillin/clavulanic acid, oral, 875/125mg 12 hourly for 5 days **AND** • Azithromycin, 500mg, slow IV (over not less than 60 minutes) daily for 3 days

Community level	Health centre level	Hospital level	
			Severe penicillin allergy: Moxifloxacin, IV, 400mg daily
		In haemodynamically stable patients with respiratory rate <25 breaths/min and temperature <37.8°C switch to	• Moxifloxacin, oral, 400mg daily for 5 days **Note:** There is no need to add a macrolide, as moxifloxacin has adequate cover for the atypical bacteria
		Severe pneumonia:	• Ceftriaxone IM /slow IV 1-2 g/day • Paracetamol 1g 4–6 hourly (max 4 doses per day) for pain and fever **Note:** Paediatric dosing as in childhood illnesses • **Refer to specialist if:** • Moderate or severe respiratory distress • Fever of 39.5°C or above • Confusion • Respiratory rate 30 breaths/min or more • Heart rate 120 beats/min or more • Systolic BP less than 90 mmHg, diastolic BP less than 60 mmHg • Cyanosis, age above 60 years • Multilobar consolidation Concurrent severe illness, e.g. diabetes, heart failure epilepsy

15.5.1 Pneumonia, Aspiration

Description

Following aspiration, a patient may develop pneumonitis or pneumonia. Aspiration pneumonitis develops within hours of the aspiration event and is more common in previously healthy people who aspirate gastric acid. Antibiotics will not benefit these patients unless there is infection present. Pneumonia following aspiration of gastric contents and/or commensal organisms from the oropharynx usually occurs in debilitated patients and presents with symptoms and signs of community-acquired Pneumonia, but may have a more indolent onset and is more frequently complicated by lung abscess or empyema. There may be solid (food) particles or other foreign bodies aspirated. The organisms involved are polymicrobial, i.e. Gram-positive and anaerobes.

Risk factors

Aspiration pneumonia should be suspected in patients with episodic or prolonged decreased level of consciousness, e.g. in

- Alcohol intoxication
- Drug overdose
- Epileptic attack
- Strokes or
- Swallowing problems

Complications

- Lung abscess
- Empyema

Community level	Health centre level	Hospital level
• Treated at hospital	• Treated at hospital	Continue therapy until there are no features of sepsis. • Amoxycillin/clavulanic acid, IV, 1.2g 8 hourly, until patient is apyrexial and stable for 24 hours. **AND** • Gentamycin 80mg IV, 8 hourly. **AND** • Metronidazole 500mg IV, 8 hourly **Follow with:** • Amoxycillin/clavulanic acid, oral, 875/125mg 12 hourly. **Severe penicillin allergy:** • Moxifloxacin, IV, 400mg daily, until patient is apyrexial for 24 hours. **Follow with:** • Moxifloxacin, oral, 400mg daily.

15.5.2 Hospital-Acquired (Nosocomial) Pneumonia

Description

Hospital-Acquired Pneumonia (HAP) is a lower respiratory tract infection that was not incubated at the time of admission and that presents clinically 2 or more days after admission. Pneumonia that presents earlier should be regarded as community-acquired.

Signs and symptoms

- As for community-acquired pneumonia

Causes

- Bacteria
- Virus
- Fungi

Risk factors

- Prolonged intubation
- Prolonged ICDT use
- Poor IPC protocols
- Immunocompromised state
- Pre-existing lung diseases
- Multiple organ failure

Diagnostic criteria

- History
- Clinical findings
- FBC plus Diff
- X-ray chest
- Culture and sensitivity

Management

Community level	Health centre level	Hospital level
• **Refer** to hospital	• **Refer** to hospital	**NB:** Must be guided by culture and sensitivity. • Amoxycillin/clavulanic acid, IV, 1.2g 8 hourly, until the patient is apyrexial and stable for 24 hours. **AND** • Gentamycin 80mg IV, 8 hourly.

Community level	Health centre level	Hospital level
		AND • Metronidazole 500mg IV 8 hourly Severe penicillin allergy: • Moxifloxacin, IV, 400mg daily, until the patient is apyrexial for 24 hours. **Follow with:** • Moxifloxacin, oral, 400mg daily

15.6 Bronchiolitis in children

Description

- It is a common chest infection in young children, caused by a viral infection of the lungs. The infection causes inflammation and mucus to build up in the airways, making it more difficult to breath.

Signs and symptoms

- Cough
- Running/blocked nose
- Fast breathing
- Noisy breathing/wheeze
- Laboured breathing
- Irritability
- High fever (>38°C)
- Difficulty in eating and drinking
- Ear infection
- Dehydration

Causes

- Viruses – Respiratory Syncytial Virus (RSV), flue and common cold viruses

Risk factors

- Chronic lung disease (including bronchopulmonary dysplasia)
- Haemodynamically significant congenital heart disease
- Age in young infants (under 3 months)
- Premature birth, particularly under 32 weeks
- Neuromuscular disorders
- Immunodeficiency

Differential diagnosis

- Pneumonia, COVID-19, pTB

Diagnostic criteria and investigations

- Investigation are normally not necessary but the following maybe done
- Signs and symptoms
- Chest X-ray
- FBC and diff- WBC
- SpO2
- Viral testing – nasal swab

Management

- Mostly supportive and fluids
- NB: Generally, no role of antibiotics except when complications, such as pneumonia or other bacterial infections, develop

15.7 Respiratory neoplasms

Signs and symptoms

- Chronic cough
- Difficulty in breathing
- Weight loss
- Night sweats
- Sputum production
- Chest pain/ shoulder pain/ back pain
- Swelling of the face/neck
- Cachexia/emaciated
- Decreased breath sounds over the affected area
- Consolidation on CX-ray

Risk factors

- Age - common in older age
- Sex – more in men because of use of other compounding factors
- Tobacco smoking- increases the chances of cancer to develop
- Alcohol use – predisposes to malignancy
- Family history – positive family > more chances of developing cancer
- Genetic predisposition- genetics also predisposes to cancer
- Occupational exposure – some occupations predispose to malignancy, duration of exposure.

Differential diagnosis

- PTB
- Pneumoconiosis
- COPD

Diagnostic criteria and investigations

- History
- Clinical findings
- FBC
- Urea and creatinine
- LFT's
- Sputum- GeneXpert - to rule PTB
- X-ray chest – to rule out other lung pathologies
- Cytology – positive suggestive of cancer
- Biopsy – definitive diagnosis
- CT chest - assess for metastasis

Management

- Refer to Oncology Chapter for management

15.8 Pneumoconiosis (Silicosis, Asbestosis, Black lung disease/Coal worker Mine disease)

Description

- It is group of interstitial lung diseases caused by the lung's reaction following inhaling certain dust. The main causes of pneumoconiosis are workplace exposure. Primary pneumoconiosis are
  - Silicosis – inhalation of silica dust
  - Asbestosis – inhalation of asbestos fibres
  - Coal worker pneumoconiosis (CWP) also called Black Lung Disease – inhalation of coal mine dust
- Cough
- Difficulty in breathing
- Fatigue
- Loss of appetite
- Pleuritic chest pain
- Loss of weight

Risk factors

- Prolonged exposure to dust particles
- Smoking
- PTB
- Lung cancer
- Immunocompromised

Differential diagnosis

- PTB
- COPD
- Asthma
- Allergic reactions
- Lung cancer
- Sarcoidosis

Diagnostic criteria and investigations

- History
- Signs and symptoms
- CX-ray
- Histology
- Cytology
- Sputum – GeneX/cytology
- FBC plus differential counts
- LFTs
- Spirometry

Complications

- Lung cancers – mesothelioma, squamous cell carcinoma, adenocarcinoma(mets)

Management

- No drug cure for pneumoconiosis
- Transplant can be done as the only cure

15.9 Empyema and lung abscesses

Description

- Empyema is defined by a purulent fluid collection in the pleural space. It is mostly caused by pneumonia.
- Lung abscess is a parenchymal necrosis with confined cavitation that result from a pulmonary infection

Signs and symptoms

Empyema	Lung Abscess
• Cough with purulent expectoration	• Bad breath
• Shortness of breath	• Fever
• Dry cough	• Chest pain
• Fever	• Excessive sweating/night sweats
• Chest pain	• Weight loss
• Headache	• Fatigue
• Confusion	• Loss of appetite
• Loss of appetite	• Difficulty in breathing
• General discomfort	• Foul smelling sputum with pus. May have blood.
• Malaise	
• Crackles on auscultation	
• Decreased breath sounds on auscultation	• Decreased breath sounds on auscultation over the abscess.

Causes and risk factors

Empyema	Lung Abscess
• Complicated pneumonia	• Bacterial
• Partially treated pneumonia	• Parasites
• Ruptured lung abscess	• Fungi
• Pleural effusion complication	• Immunocompromised
• PTB	• Malignancies
• Penetrating chest injury/surgery	• Bronchial obstruction
	• Aspiration pneumonia
	• Lung cancer, HIV

Differential diagnosis

- PTB
- Pneumonia
- Lung cancer
- COPD

Diagnostic criteria and investigations

- FBC plus differential counts
- CX-Ray
- Fluid aspirate – GeneXpert, culture and sensitivity
- Sputum - GeneXpert, culture and sensitivity
- C-reactive protein.
- CT scan abdomen and chest
- USG abdomen to rule out hepatic abscess
- LFTs

Complications

- Respiratory insufficiency
- Systemic septicemia
- Septic embolism to the brain
- Bronchopleural fistula
- Lung collapse and
- Amyloidosis
- Pyopneumothorax
- Fibrothorax
- Empyema neccessitans

Management

Community level	Health centre level	Hospital level
• **Refer** to hospital	• **Refer** to hospital	Non-antimicrobial treatment: • Chest drain • Surgery Antimicrobial therapy: If a complication of pneumonia: antimicrobial therapy as indicated for the management of community acquired pneumonia (but the duration of therapy should be prolonged until drainage is complete).

Community level	Health centre level	Hospital level
		If not a complication of pneumonia: • Amoxycillin/clavulanic acid, IV, 1.2g 8 hourly, until patient is apyrexial for 24 hours. **AND** • Metronidazole 500mg IV 8 hourly Follow with: • Amoxycillin/clavulanic acid, oral, 750/125mg 8 hourly. Treatment duration is until drainage is complete. **Severe penicillin allergy (and not a complication of pneumonia):** • Moxifloxacin, IV, 400 mg daily, until the patient is apyrexial for 24 hours. Follow with: • Moxifloxacin, oral, 400mg daily. Treatment duration is until drainage is complete.

chapter

16

Skin Conditons

16.1 Acne vulgaris

Description

This is an inflammatory disease of the sebaceous glands. The sebaceous glands become infected and acne develops. It is the most common skin disease in adolescence but may occur in adults. There is obstruction of the canal of the gland, due to increased growth of the canal lining (keratinisation). This produces the comedone (primary lesion). When it is open it forms blackhead or white head if it is closed.

Signs and symptoms

- Possible itching
- Psychological stress due to the presence of the acne
- Blackheads, white heads, pustules and tender red bumps on the face, chest, back or shoulders
- In severe cases, scarring may occur

Causes

- Propionibacterium acne
- Micro-organisms and their enzymes play a role in making the condition worse
- Dead skin cells
- Oil production
- Hormonal imbalance

Risk factors

- Age related

Management

Community level	Health centre level	Hospital level
• Health education on avoiding squeezing pimples and keep skin moisturized. • Reduce pilo-sebaceous duct obstruction by cleansing with soap containing antiseptic agents such as chlorhexidine and water, 12 hourly a day.	• Treat as CL **AND/OR** • Calamine lotion nocte **OR** • 5% Benzoyl peroxide gel at night for a week. Wash off in the morning and if ineffective and tolerated increase to 12 hourly on 2-3 weeks. Avoid contact with nose, mouth and eyes.	• Treat as HC **AND/OR** • Doxycycline 100mg OD for 3 months. • Hormonal therapy with combination oral pill **OR** • **Refer** for specialist care if no response.

Community level	Health centre level	Hospital level
• Avoid oily cosmetics and hair spray. • Prevent skin exposure to sunlight and ultraviolet light • Discourage excessive facial washing • **Refer** to health centre	In severe cases of nodular acne: • Doxycycline 100mg 12 hourly for 14 days **Refer to hospital if:** • No improvement after 2 months. • Development of severe complications	

16.2 Furuncles, carbuncles and boil (abscess)

Description

A furuncle is a localised painful infection of a hair follicle, involvement of multiple, adjacent follicles is termed carbuncle. An abscess is a localised infection of the dermis. Most common causative organism is Staphylococcus aureus. Common locations are face, neck, axillae, buttocks, perineum and thighs.

Signs and symptoms

- Furuncles appear as firm, tender, red nodules
- Carbuncles begin similarly but become larger in size and can develop multiple draining sinus tracts
- Lesions first form but then become soft with yellow centre and open spontaneously

Causes

- Staphylococcus aureus

Risk factors

- Diabetes
- Problem with the immune system
- Poor nutrition
- Poor hygiene
- Exposure to harsh chemicals and direct sunlight

Diagnostic criteria and investigations

- Clinical investigations
- Based on the signs and symptoms

Management

Community level	Health centre level	Hospital level
• Encourage general hygiene • Do not pop the boil with a needle as this could make the infection worse • When the boil starts draining, wash with antibacterial soup until all the pus is gone. • Apply warm compresses and soak the boil in warm water. • **Refer to health centre**	• Treat as CL **AND/OR** • Drainage of abscess • Paracetamol 1g three time a day • **Refer** to the hospital in case of deep abscess.	• Treat as HC **AND/OR** • Cloxacillin 500mg 6 hourly for 5- 7 days. • Over 10 years: Cloxacillin 250mg 6 hourly for 7 days **Inpatients:** • Cloxacillin IV 1g 6 hourly and if there is an improvement switch to cloxacillin oral. **OR** • Clindamycin IV 600mg 8 hourly and change to oral clindamycin 300mg 8 hourly when there is an improvement for 5 days. • **For penicllin hypersensitive patients:** **Adult:** • *Erythromycin 500mg 6 hourly for 7 days.* • Treat as above. **AND/OR. Adult:** ***Refer** for specialist care if:* • No response to antibiotic therapy.

16.3 Impetigo

Description

Impetigo is a contagious infection of the skin due to Staph. Aureus and Streptococci that occurs mainly in children. It may be contagious or follow minor trauma, eczema or scabies. If untreated, it may lead to acute nephritis.

Signs and symptoms

- Itching
- Sores on the face or legs
- Often starts around the nose because many people carry staphylococci there
- Vesicles containing serous fluid that rapidly becomes purulent
- Vesicles surrounded by redness
- Pustules rupture and form yellow crusts which darken later.
- The lesions enlarge and spread rapidly -the remains of the vesicles are usually visible around the edges of the crusts
- Other common sites are -the scalp (often secondary to either ringworm or lice in the scalp), the buttocks (usually secondary to scabies) -the arms and legs

Causes

- Staphylococcus aureus and Streptococci.

Risk factors

- Poor hygiene
- Age related (children and elderly)
- Low immune system
- Open wounds and cuts
- Diabetes
- Exposure to harsh chemicals on the skin)

Diagnostic criteria and investigations

- Clinical investigation
- Based on the signs and symptoms

Management

Community level	Health centre level	Hospital level
• Health education on good hygiene both personal and household. • Wash and soak sores in soapy water to soften and remove crusts • Keep breaks in the skin clean • Cut fingernails short • **Refer t**o health centre	• Treat as CL **AND/OR** • Povidone iodine10 % solution; apply 8 hourly for 5-7 days. **OR** • Povidone iodine ointment 5 or 10% **OR** Zinc oxide ointment apply 8 hourly for 5-7 days. • **Refer** to the hospital if staphylococcal infection is suspected.	• Treat as HC **AND/OR** • Cloxacillin 500mg 6 hourly for 10 days (2g to 4g/day divided dose). **Refer for specialist care if:** • No improvement in 10 days • Complications such as glomerulonephritis

16.4 Erysipelas

Description

Erysipelas is an infection of the skin by streptococcal bacteria involving the dermis that characteristically extends into the superficial lymphatics. Commonly affected areas are the face, arms and legs. It must be treated quickly because death can occur.

Signs and symptoms

- Weakness
- Pain
- Chills, fever and vomiting
- The lesions
- Red, swollen, tender hot area of the skin, with well-defined edges

- The area can be oedematous and it pits when pressed
- Each day, the area of redness and swelling gets bigger
- Occasionally a vesicle or blister will form on the surface of the infected skin

Causes

- Streptococcus pyogenes strains

Risk factors

- Poor hygiene
- Low immune system
- Obesity
- Diabetes
- Venous insufficiency
- Lymphoedema

Diagnostic criteria and investigations

- Bacteria culture
- CBC
- Based on signs and symptoms
- Physical examinations

Management

Community level	Health centre level	Hospital level
• Health education on: leg elevation and applying wet, hot packs for 15 minutes 6 hourly to help relieve the pain and stop the infection from spreading. • **Refer** to health centre	• Treat as CL **AND/OR** **Adult:** • Phenoxymethyl penicillin 500mg 6 hourly for 7 days **AND** • Paracetamol 1g tds or Ibuprofen 400mg tds for 7 days. • **Refer** to the hospital if no improvement.	• Treat as HC **AND/OR** • Bed rest with the affected leg elevated. **For in patients:** • Clindamycin 600mg 8 hourly if allergic to penicillins. **OR** • Cloxacillin 1g IV 6 hourly for 5-10 days.

16.5 Cellulitis

Description

Cellulitis is a diffuse, spreading infection of the skin, usually following some break or injury of the skin. This affects all the layers (epidermis, dermis and subcutaneous tissue), and it does not have clear edges. It is not usually spread from person to person. The skin is swollen, red and tender.

Signs and symptoms

- Pain
- Headache
- Swelling
- The affected area is usually warm, tender and swollen
- There is usually lymphadenitis
- Fever is usually present
- Area is tender, warm, red and firm with an ill- defined border
- Skin dimpling
- Blisters

Causes

- Streptococcus and staphylococcus

Risk factors

- Injury. Any cut, fracture, burns or scrape
- Weak immune system
- Skin condition like eczema, chickenpox, etc
- Chronic swelling of the arms or legs
- History of cellulitis
- Intravenous drug use
- Obesity

Differential diagnosis

- In a child, osteomyelitis must be excluded
- Deep vein thrombosis

Diagnostic criteria and investigations

- Wound culture and blood test
- Based on the signs and symptoms

Management

Community level	Health centre level	Hospital level
• Health education on good hygiene practices	• Treat as CL. **AND/OR** • Povidone iodine 24 hourly for 5 days. **AND**	• Treat as HC **AND/OR**

Community level	Health centre level	Hospital level
• Apply hot compresses using a clean cloth in heated saline water for 20 minutes 4 times a day. • Keep area of infection at rest and elevated • **Refer** to health centre	• Paracetamol 500-1g 6-8 hourly 5-10 days. **AND** • Cloxacillin 500 mg 6 hourly for 10 days (2g to 4g/day divided dose). **Refer to hospital if:** • Severe cases -refer for parenteral antibiotics • Recurrent cellulitis associated with underlying conditions, e.g. varicose ulcers acute, severe or fulminant cellulitis with systemic manifestations	**Adult** • Benzathine penicillin IM 1.2IU as a single dose. **OR** • Cloxacillin 500mg IV 6 hourly for 10 days. **AND** • Gentamycin 5-6 mg/kg once daily. **AND** Gentamycin 5-6 mg/kg 24 hourly.

16.6 Atopic eczema

Description

Eczema is a chronic inflammatory, relapsing skin disorder characterised by vesicles, weeping and crusting in acute phase; and thickened scaly skin in chronic phase. It occurs most frequently in children but even in adults; itchy, red skin. It is often associated with family history of atopy (asthma, hay fever and urticaria).

Symptoms and signs

- Itching

Infancy

- Dry, rough, red, papular and often vesicular eruptions. If vesicles present, lesions weep and then crust over.
- Usually starts after 2 months of age.
- Seen commonly on cheeks, scalp, neck, elbow creases and behind the knees.

Childhood

- Dry papular, scaling lesions. Less weeping and crusting. Usually lesions hypopigmented.
- Intensely itchy and scratched skin.
- Found at wrists, at the elbow creases behind the knee, neck and eyelids.

Adolescence and adulthood

- Dry thickened skin with accentuation of normal lines and folds. Often hyper pigmented.
- Seen commonly at the elbow creases, behind the knees, neck, under breast and on top of feet and hands.

Causes
- Unknown

Risk factors
- Dry skin
- Perspiration
- Irritating clothing
- Emotional stress
- Genetic

Management

Community level	Health centre level	Hospital level
Health education on: • Avoiding exposure to trigger factors, • Keep finger nails short, avoid strong detergents such strong perfumed soap, detergents, antiseptics and foam baths, • Avoid rough occlusive clothing • Avoid scratching • Stop smoking • Use non-soap cleansers that are neutral to low pH, hypoallergic, non-irritant and fragrance free. • Advise for good personal hygiene with regular washing to remove crust. • Use wet wrap if its dry eczema • **Refer** to health centre	• Treat as CL **AND** • Aqueous cream to bath water for 5 days. **AND** • Aqueous cream to dry areas for 5 days. **AND** • Hydrocortisone 1% apply 12 hourly for 5 days **AND** • Chorpheniramine 4mg nocte for 5 days • **Refer** to the hospital if no improvement.	• Treat as HC **AND/OR** • Betamethasone 0.1% applied 12 hourly for 5 days. **OR** • Povidone iodine apply 24 hourly. **AND** **Adult:** • Cloxacillin 500 mg 6 hourly for 10 days (2g to 4g/day divided dose). **AND** • Chlorpheniramine 4mg nocte for 5 days • **Refer t**o skin specialist if no improvement.

16.7 Seborrhoeic eczema

Description
It is a chronic, recurring inflammatory skin disorder of hair follicles and surrounding skin. In its simplest form it is dandruff, which tends to be rather oily. Pruritus may or may not be present, vesicles are not uncommon. It occurs in infants in between the ages of 2 weeks and 12 months, during adolescence and adulthood.

Signs and symptoms
- Reddening, scaling and weeping affecting scalp and flexures
- Dry or greasy scaling scalp

Causes
- Infection (pityrosporum)

Risk factors
- Poor hygiene
- Stress
- Food
- HIV infections
- Food

Diagnostic criteria and investigations
- Based on signs and symptoms
- Clinical examination

Management

Community level	Health centre level	Hospital level
• Health education on hygiene: • Maintain short nails • Avoid scratching • Avoid perfurmed soap • **Refer** to health centre	• Treat as CL **AND** • Aqueous cream for 5 days **OR** • Emulsifying ointment mixed with water (1 or 2 tablespoonfuls of ointment), in a bowl of hot water before being added to the bath to ensure distribution in the bathwater. • Hydrocortisone 1% cream 12 hourly for 5 days **AND** • Clotrimazole cream 12 hourly for 5 days • **Refer** to hospital.	• Treat as HC **AND/OR** For severe dermatitis: • Betamethasone 0.1% topical, apply once daily for 5-7days • Selenium sulphide 2% suspension weekly for 2- 4 weeks. • **Refer** to dermatologist if no improvement.

16.8 Tinea pedis (Athlete's foot)

Description
It is a fungal infection that affects the upper layer of the skin of the foot, especially when it is warm, moist and irritated. The infection can spread to the groin or hands. It spreads by contact, including from floors.

Signs and symptoms
- Intense itching and burning in between the toes and in the sole of the feet.
- Vesicles, scales, and fissures between the toes and in the sole of the feet. May also appear in the hands and groin

- Secondary infection can occur with signs of redness, swelling and purulent discharge
- The skin between the toes become soft, white and moist

Causes

- Infection (fungal), *Trichophyton (T. rubrum or T. mentagrophytes)*

Risk factors

- Frequently wearing enclosed footware
- Poor foot hygiene
- Walking barefoot in public area (shower, saunas)

Diagnostic criteria and investigations

- Clinical examination
- Based on signs and symptoms

Management

Community level	Health centre level	Hospital level
Provide Health education on: • Proper cleaning and drying of feet • Avoid shoes that are too tight and that are made of synthetic materials • In summer, open-toed sandals can be helpful, and shoes should be left off where possible • Wear cotton socks not nylon socks • Wear some form of footwear such as rubber sandals on changing-room floors in workplaces, schools and sports clubs • Discourage the use of shared bathing or swimming areas, whilst infected • **Refer** to health centre	• Treat as CL **AND/ OR** • Benzoic acid compound 12 hourly for 6 weeks. **OR** • Gentian violet 12hourly for 3 weeks. **AND** **Adult:** • Griseofulvin 500mg 4-8weeks **Children:** • Griseofulvin 10mg/ kg/day • **Refer** to hospital if no improvement	• Treat as HC **AND/OR** • Ketoconazole cream 12hourly for 4 weeks. **OR** • Clotrimazole cream 12 hourly for 4 – 12 weeks **AND** • Ketoconazole 200 mg orally 24 hourly for 14 days

16.9 Ringworm of the body (Tinea corporis)

Description

Tinea corporis is caused by a fungal infection. The lesions are often on exposed parts of the body such as the face but can be found anywhere on the body; arms and breast, around the waist, buttocks, groin and back. It is more common in children but also occurs in adults.

Signs and symptoms

- Possibly slight itching
- Patches slowly grow bigger
- As the patch extends a clear area develops in the centre
- Ringed, scaly, centrally clearing lesion
- Lesions usually on exposed surfaces such as the face and arms. Usually on the trunk
- Raised borders
- They can be single or multiple

Causes

- Fungi (Tinea corporis)

Risk factors

- Poor hygiene
- Sharing bedding, towels and clothing
- Participating in sports that features skin to skin contact
- Weak immune system
- Exposure to the sun

Diagnostic criteria and investigations

- Clinical examinations
- Based on signs and symptoms

Management

Community level	Health centre level	Hospital level
Provide Health education: • Good hygiene • Do not eat half cooked food • Wash fruits before eating • Do not share personal items • **Refer** to health centre	Treat as CL **AND/OR** • 6% benzoic acid ointment 12 hourly 4-6 weeks • 3% salicylic acid 12 hourly 4-6 weeks. **OR** • Gentian violet 8 hourly for 2 weeks. **OR** • Clotrimazole cream 12 hourly for 2 weeks • Griseofulvin 500mg 24 hourly 6-8 weeks **Note:** do not give women of child bearing age unless they are using an effective contraceptive • **Refer** to hospital if no improvement.	• Treat as HC **AND/OR** • Ketoconazole cream 12 hourly for 14 days. **AND** • Ketoconazole 200mg 24 hourly for 14 days. **Note:** Avoid exposure to the sun. Griseofulvin can be continued up to 12 months.

16.10 Scabies

Description

A common dermatitis caused by a parasite. The parasite burrows under the skin and lays its eggs. Sensitivity to the parasite results in severe pruritis. The disease is acquired from contact with infected persons, their clothing, or bed linen contaminated with the adult female mite, its eggs, larvae or nymphs.

Signs and symptoms

- Itchiness at night
- Burrows that appear in lines ending in numerous papules, vesicles or numerous pustules
- Lesions (wrists, elbows, genitalia, buttocks, around waist and belt area)
- Pruritis
- Allergic erythematous non-specific papular rash may appear, sparing the head and neck

Causes

- Mites
- Sarcoptes scabiei

Risk factors

- Contact with infected persons their clothing, bed linen contaminated with the adult female mite, its eggs, larvae or nymphs
- Poor hygiene

Diagnostic criteria and investigations

- Based on signs and symptoms
- Clinical examination

Management

Community level	Health centre level	Hospital level
Provide health education: • Avoid close personal contact with person having scabies • Avoid sharing clothes and towels • Cut nails and keep them clean • Wash all the linen and underclothing in hot water • Expose all bedding to direct sunlight • **Refer** to health centre	• Treat as CL **AND/OR** Adults and children above 6 years: • Benzyl benzoate 25% lotion use undiluted and repeat after 3-4 days. The preparation should be applied to the whole body except the head and neck and leave to dry on the skin in adults. A second application should be made the next day, without bathing or washing off the first application. The second application is washed off 24 hours later **AND** • Phenoxymethyl penicillin 500mg 6 hourly for 7 days. **OR** • Cloxacillin 500mg 6hourly for 7 days. **OR** • Sulphur 2% cream OD for 3 days.	• Treat as HC

16.11 Urticaria

Description

This is an acute, chronic or recurrent inflammatory condition. It is characterised by itchy wheals (hives).

Signs and symptoms

- Itching
- Burning
- Stinging sensations
- Any or all parts of the body may be affected
- The wheals differ greatly in size and shape and usually appear suddenly
- These are transient lesions and last for a few minutes to several hours (usually less than 24 hours) then disappear spontaneously leaving no signs of them

Causes

- Allergic
- Toxic or physical
- Aquagenic and extreme temperatures

*Allergic urticaria may be caused by drugs, plant pollen, insect bites or foodstuffs, e.g. milk, eggs, meat.

Risk factors

- Allergens (plant pollen, insect bites, foodstuff)
- Environmental (extreme temperatures)
- Medication

Diagnostic criteria and investigations

- Based on signs and symptoms
- Clinical examination

Management

Community level	Health centre level	Hospital level
• Health education on lifestyles (identify and avoid triggers) • **Refer** to health centre	• Treat as CL **AND/OR** • Calamine lotion applied nocte for 1 day. **AND** • Chlorpheniramine 4mg 8 hourly for 1 day. • **Refer** to hospital if: • No improvement or response after 24 hours.	• Treat as HC **AND/OR** **Adult:** • Promethazine 50mg IM then 25mg 12 hourly for 5 days. **OR** • Loratadine 10mg 24 hourly for 5 days

16.12 Psoriasis vulgaris

Description

Chronic inflammation condition of genetic origin often precipitated or triggered by an event such as infection, injury, drugs or psychological stress. It may be associated with inflammatory arthropathy.

Signs and symptoms

- Scaly, itchy plaques on the extensor surfaces of the knee, elbows, sacrum and scalp
- Lesions are symmetrically distributed
- Well demarcated red plaques with thick silvery scales
- Linear plaques on sites of the skin trauma

Causes

- Genetic factors

Diagnostic criteria and investigations

- Clinical examination

Management

Community level	Health centre level	Hospital level
Health education on: • Precipitating factors • Advise the patient to take HIV test if its acute onset and Risk factors are present • Encourage sun exposure as tolerated • **Refer** to health centre	• Treat as CL **AND** • 10% coal tar cream nocte **AND/OR** • Hydrocortisone 0.1% 12 hourly • **Refer** to hospital.	• Treat as HC **AND** • Chlorpheniramine 4mg PRN or twice a day • Betamethasone 1% apply 12 hourly **AND/ OR** • 5% salicylic acid in emulsifying ointment

chapter

17

Emergencies

Description

Emergencies: any conditions that is life threatening and need immediate attention.

The following conditions are emergencies and must be treated or referred urgently to hospital. Drugs used for treatment must be properly secured and their use recorded (time, dosage, routine) on the patient's notes and on the letter of referral.

Put the IV line and oxygen for all emergencies

17.1 Acute Abdomen

Description

Acute abdomen is sudden onset of severe abdominal pain that may be colicky in nature and may require surgical intervention. Can be due to inflammation, perforation, intestinal obstruction, haemorrhage, colic, pancreatitis among others.

Signs and symptoms

- Pain of acute onset (colic or continues)
- Anorexia, nausea and/or vomiting
- Sick looking
- Abdominal distension
- Rebound tenderness and guarding
- High pitched abdominal sounds
- Shock may be present (cold, clammy skin, tachycardia, hypotension)
- Fever

Causes

- Traumatic e.g. stab, gunshot and other perforations
- Inflammatory e.g. appendicitis
- Mechanical e.g. obstructive conditions
- Vascular e.g. embolism, tissue necrosis
- Congenital e.g. duodenal atresia

Risk factors

- RTA/ MVA
- Assault
- Infections e.g. typhoid
- Congenital malformations

Differential diagnoses

- Myocardial infarction
- Diabetic ketoacidosis

- Gastro-enteritis
- Gastritis
- Malaria
- Pneumonia
- UTI
- Sickle cell crises
- Adrenocortical crises
- Nephrotic syndrome

Diagnostic criteria and investigations

- Ultra sound scan
- X-ray

Note: PV, PR and urine dipstick testing may often give valuable information.

Management

Community level	Health centre level	Hospital level
Refer to hospital	• **Refer** immediately to hospital • Elevate feet • Give 1 litre of normal saline/ ringer's lactate every four hours while being transported • Withhold oral fluids and food • Insert N.G. tube if abdomen is distended or if the patient is vomiting **Note:** Withhold analgesics until diagnosis is established	• Pass a nasogastric tube and aspirate the stomach • Catheterise and monitor urine output • Monitor pulse and blood pressure • Re-examine patient frequently if the diagnosis is uncertain • Resuscitate with IV fluids • Blood transfusion if there is anaemia **When diagnosis is established administer:** **Adult:** • Pethidine IM 50-100mg 8 hourly (maximum 400mg/day). **Children:** Pethidine IM 0.5-2mg/kg repeated 4 hourly for first 3 doses then 8 hourly.

17.2 Acute Myocardial Infarction

Description

Acute Myocardial Infarction (AMI) is the irreversible necrosis of heart muscles secondary to prolonged ischemia and requires prompt treatment, hospitalisation and intensive care management.

Symptoms and signs

- Sudden pain not relieved by rest.
- Unbearable pain, crushing pain
- Shortness of breath
- Wheezing
- Orthopnoea
- Nausea and vomiting
- Apprehension
- Shock
- Systolic B/P below 90mmHg
- Cold, clammy skin
- Weak pulse
- Crepitations in lungs
- Irregular heart beat
- Sudden death can occur

Associated symptoms are

- Pallor
- Sweating
- Arrhythmias
- Pulmonary oedema
- Blood pressure

Causes

- Complete or partial occlusion of a coronary artery.

Risk factors

- Family history
- Sedentary-lifestyle diseases (smoking, DM, high/bad cholesterol, etc.)
- Older age
- Male sex
- Post-menopausal

Diagnostic criteria and investigations

- ECG
- Cardiac markers e.g. troponins
- CXR
- FBC, cholesterol
- Clotting profile (INR, PTT)

Management

Community level	Health centre level	Hospital level
Refer all suspected or diagnosed cases urgently to health centre/hospital	**Refer** all suspected or diagnosed cases urgently to hospital	**Emergency treatment where facilities are available before transfer:** • Cardio-pulmonary resuscitation if necessary (see cardiac arrest) - 100% oxygen continuously by nasal cannula. • Morphine for pain relief 10–15mg IM **OR** • Small IV increments of 1mg/minute and titrate to pain relief, maximum 10mg, IV morphine must be diluted to 10ml with water for injection or 0.9% sodium chloride • Acetyl salicylic acid 150mg as a single dose **Caution:** do not allow systolic BP to decrease by more than 10 mmHg - or pulse rate to increase to above 90 per minute -monitor continuously and also during transfer, pulse, BP respiration depth and rate (count for a full minute)

17.3 Acute Pulmonary Oedema

Description

This is a life-threatening condition where there is accumulation of fluids in the lungs. It leads to difficulty in breathing with wheezing, hence the name Cardiac Asthma.

Causes

- Acute heart failure (common cause)
- Acute kidney failure
- Acute lung injury and acute respiratory distress syndrome (ARDS)
- Aspiration pneumonia
- Drowning or near drowning
- Over hydration with IV fluids
- Hypertensive crisis
- Pancreatitis

- Sepsis
- Trauma
- Burns with ARDS
- Head injury
- Liver failure

Risk factors

- Prior history of pulmonary oedema
- TB
- COPD
- Vascular diseases
- DM and obesity

Signs and symptoms

- Dyspnoea, tachypnea and/cyanosis
- Wheezing
- Crepitations
- Acute bronchospasm
- Cough with frothy blood-tinged sputum
- Anxiety, sweating
- Tachycardia, orthopnoea, chest pain

Caution*

1. It is important to distinguish this condition from an attack of acute bronchial asthma
2. Morphine is contraindicated in acute bronchial asthma

Diagnostic criterion and investigations

- Proper chest examination
- CXR
- ECG
- Arterial blood gasses, FBC, U+E, LFT

Management

Community level	Health centre level	Hospital level
Refer all suspected or diagnosed cases urgently to health centre/hospital	• **Refer** all suspected or diagnosed cases urgently to hospital • Administer oxygen therapy during transfer.	• Place the patient in a sitting (Fowler's position), high semi-Fowler's position or orthopnoeac position • Administer 100% oxygen by face mask **AND**

Community level	Health centre level	Hospital level
		• Furosemide IV 20mg to start diuresis in 15–20 minutes, if no response administer 40–80mg after 30 minutes, if response is inadequate follow with 20–40mg in 2–4 hours. Dose for children 1mg/kg per dose increased by 1mg/kg dose at interval of 6 to 12 hours up to a maximum of 6mg/kg per dose **AND** • Morphine 2.5mg every 5-10 minutes up to a maximum of 15mg. **OR** • Glyceryl trinitrate sublingual 0.5mg 6 hourly may be highly effective in causing dilatation of the veins and redistributing blood volume away from the chest **OR** • Nifedipine sublingual 5mg stat for pulmonary oedema due to a hypertensive crisis or significant systolic hypertension.

17.4 Shock

Description

Shock is a state of circulatory collapse leading to reduction in delivery of oxygen and other nutrients to vital organs which if prolonged leads to irreversible multiple organ failure.

Causes

- Excessive haemorrhage − trauma, peptic ulcer
- Excessive fluid loss − diarrhoea, vomiting, burns
- Acute myocardial infarction

Symptoms and signs

- Feeling faint
- Palpitations
- Sweating
- Restlessness
- Clouding of consciousness
- Pallor
- Cold extremities
- Tachycardia
- Hypotension: Systolic BP <90mmHg

Types of shock are as follows:

Type	Cause	Additional symptoms
Anaphylactic shock	Caused by severe allergic reaction to an allergen, or drug.	Bronchospasm,angio-edema and/or urticaria
Hypovolemic shock	Most common type of shock – primary cause is loss of fluid from circulation due to haemorrhage, burns, diarrhoea, enemas and vomiting etc. Caused by the failure of heart to pump effectively (in myocardial infarction, cardiac failure, etc).	Weak thready pulse, cold and clammy skin. Distended neck veins, weak or absent pulses.
Cardiogenic shock	Caused by the failure of heart to pump effectively (in myocardial infarction, cardiac failure, etc).	Distended neck veins, weak or absent pulses.
Septic shock	Caused by an overwhelming infection, leading to vasodilation	Elevated body Temperature.
Neurogenic shock	Caused by injury to the spinal cord, resulting in sudden decrease in peripheral vascular resistance and hypotension.	Warm and dry skin.

17.4.1. Anaphylactic shock

Description

This is usually a result of a very severe allergic reaction that may occur after an injection or exposure to any allergen. This reaction causes the release of histamine and, although rare, is acutely life threatening.

Signs and symptoms

- Rapid, weak pulse
- Circulatory collapse
- Hypotension
- Rapid, difficult breathing
- Pale, cold clammy skin
- Facial and laryngeal oedema
- Itching
- Wheezing, bronchospasm
- Very anxious, restless
- Unconsciousness
- Rash, urticaria

Causes

- Medicines
- Insect bites or stings
- Domestic reagents
- Pollen in dust

Management

Community level	Health centre level	Hospital level
Refer all suspected or diagnosed cases urgently to health centre/hospital	• **Refer** all suspected or diagnosed cases urgently to hospital **If patient is breathing:** **Adults:** • 100% oxygen 4–6 L/min face mask **Children:** • 100% oxygen 4–6 L/min via nasal cannula • If patient is not breathing: • Secure airway, ventilate with ambubag or ventilator **If there is no heartbeat:** • Lay the patient supine on a hard surface • Perform Cardiopulmonary Resuscitation (CPR) • Rate at least 32 chest compression to 2 ventilations • Compression depth at least 2 inches (5cm) • Allow complete chest recoil after each compression • Minimise interruptions in chest compressions • Avoid excessive ventilation **AND** **Adults:** • 0.9% sodium chloride IV. **OR** • Ringer-Lactate solution • Adrenaline 1:1 000 IV, 1ml subcutaneous or endobronchial is the mainstay of treatment and should be given immediately **OR** • Adrenaline 1:1 000 IV, 1ml diluted with 0.9% sodium chloride to make 10ml - give as a slow IV if unconscious **OR** • Adrenaline SC, 0.5mL undiluted immediately repeat every 10–20 minutes as needed, check that heart rate is not over 140 beats/minute **AND** • Hydrocortisone sodium succinate IV 100 mg stat **AND** • Promethazine 25-50mg IM to counteract ongoing histamine release. **Children** • Half-strength Darrows with 5% dextrose solution; IV at 20mL/kg in first 20–60 minutes **AND**	• Treat as HC

Community level	Health centre level	Hospital level
	• Adrenaline 1:1000 IV 0.1ml/kg **OR** • Adrenaline 1:1000, 0.1ml/kg endotracheal tube for cardio-respiratory arrest; repeat every 5 minutes when necessary for a maximum of three doses **AND** • Hydrocortisone sodium succinate IV 100mg stat **AND** • Promethazine 0.25mg/kg IM to counteract ongoing histamine release. • **Refer** to hospital: Run fluids and refer as soon as possible, there must be a nurse to accompany patient to hospital.	

17.4.2 Hypovolaemic Shock

Description

This clinical condition arises from loss of body fluids resulting in an inadequate supply of blood to vital organs in the body.

Causes

- Severe burns
- Severe bleeding
- Severe reactions to drugs
- Severe dehydration from persistent vomiting and diarrhoea or cholera (epidemic)
- Massive heart attacks
- Severe infection in the blood stream (septicaemia - septic shock).

Signs and symptoms

- Thirst
- Feels cold
- Fully conscious at first followed by decrease of level of consciousness
- Pallor
- Pulse is rapid and feeble
- Blood pressure is below normal: 90/60 mmHg or less
- Skin is cold and clammy
- Confusion, restlessness
- Obvious or concealed bleeding

Management

Community level	Health centre level	Hospital level
Refer all suspected or diagnosed cases urgently to health centre/hospital	**Refer** all suspected or diagnosed cases urgently to hospital • Ensure there is clear airway. • Stop any major bleeding. • Assess the cardiac function. • Place the patient in the anti-shock position (left lateral position with feet up and head down.) • Insert wide-bore intravenous cannula and make sure fluids is running well. • **Replace fluid rapidly by IV Ringers lactate as follows:** **Adult:** fast until BP systolic >100mmHg **Child:** 20Ml/kg fast, then 10mL/kg per hour • If Hb <6g/dl, replace blood loss with packed cells or blood. • Give oxygen therapy via facemask **Find out the cause of the shock and treat accordingly:** • In infections: • Ampicillin 1g IV 6 hourly	• Treat as HC **AND** **In infections:** • Ampicillin 1g IV 6 hourly. **AND** • Gentamycin 80mg IV Stat

17.4.3 Cardiogenic/Cardiac Shock

Description

Cardiogenic shock is decreased cardiac output leading to tissue hypoxia in the presence of adequate intravascular volume.

Signs and symptoms

- Hypotension
- Cold extremities
- Cyanosis
- Arrhythmias
- Tachycardia
- Anxiety
- Pericardial effusion

Causes

- Myocardial infarction
- Cardiomyopathy
- Valvular heart disease

Risk factors

- Heart attack
- Myocarditis
- Endocarditis
- Cardiac arrythmias
- Cardiac tanponade
- Pulmonary embolism
- Heart Failure

Differential diagnosis

- Angina pectoris
- Septic shock
- Pulmonary oedema

Management

Community level	Health centre level	Hospital level
Refer all suspected or diagnosed cases urgently to health centre/hospital	• **Refer** all suspected or diagnosed cases urgently to hospital • Assess airway, breathing circulation. • Oxygen therapy.	• Treat as HC • Do ECG • Treat underlying cause • Furosemide 40mg IV Stat • Thiamine 100mg IV • Ringers lactate or Normal saline IV • Vasopressor e.g. norepinephrine 8-12mcg/min IV infusion or epinephrine 0.5-1.0mg (5-10mL) • Ionotropes e.g. dobutamine iv 5-10mcg/kg/min or dopamine 20-50 mcg/kg/min IV • Aspirin 150mg PO

17.4.4 Septic shock

Description

A widespread infection causing organ failure and dangerously low blood pressure. Septic shock is a life-threatening condition caused by a severe localised or systemic wide infection that requires immediate medical attention.

Signs and symptoms

- High fever or chills
- Intensive body pains
- Tachycardia
- Rapid to difficult breathing
- Rash
- Decreased amount of urine
- Acute confusion
- Dizziness
- Cyanosis
- Hypotension

Causes

- Overwhelming infection by bacterial, fungi and viruses affecting the abdominal/digestive system, lungs, urinary tract and reproductive system

Risk factors

- Immuno suppression
- Other systemic diseases

Differential diagnosis

- Other shocks

Diagnosis and investigations

- Hypotension (systolic blood pressure less than 90mmHg or has fallen by more than 40mmHg from baseline
- As per signs and symptoms stated above
- FBC, U&E, LFTs, blood culture
- Chest X-ray
- Lumbar puncture

Management

Community level	Health centre level	Hospital level
Refer all suspected or diagnosed cases urgently to health centre/hospital	• **Refer** all suspected or diagnosed cases urgently to hospital • Assess airway, breathing circulation. • Oxygen therapy.	• Treat as HC • Oxygen if saturation is less than 94% • Ceftriaxone IV 2g • Fluid challenge; Ringer's lactate or normal saline 500ml boluses every 30 minutes • Monitor BP • Assess urine output and avoid overhydrating • Adrenaline iv infusion: 0.05mcg/kg/min (Dilute 10mg in 1 Litre of normal saline) Titrate rate up according to response

17.5 Cardiac Arrest

Description

Cardiac arrest is the sudden and usually unexpected cessation of effective cardiac output as evidenced by loss of heart beat and palpable pulse, irrespective of the electrical activity captured on ECG tracing. Irreversible brain damage can occur within 2–4 minutes.

Signs and symptoms

- Sudden loss of consciousness
- Absence of carotid and other large vessel pulses
- Loss of spontaneous respiratory

Causes

- Coronary heart disease
- Physical stress
- Inherited disorders e.g arrhythmias
- Structural changes in the heart

Risk factors

- Heart diseases
- DM and obesity
- Gender
- Age (above 60 years)
- Family history

Diagnosis criteria and investigations

- ECG
- CXR
- Cardiac catheterisation

17.5.1 Cardiac arrest in adults

Symptoms and signs

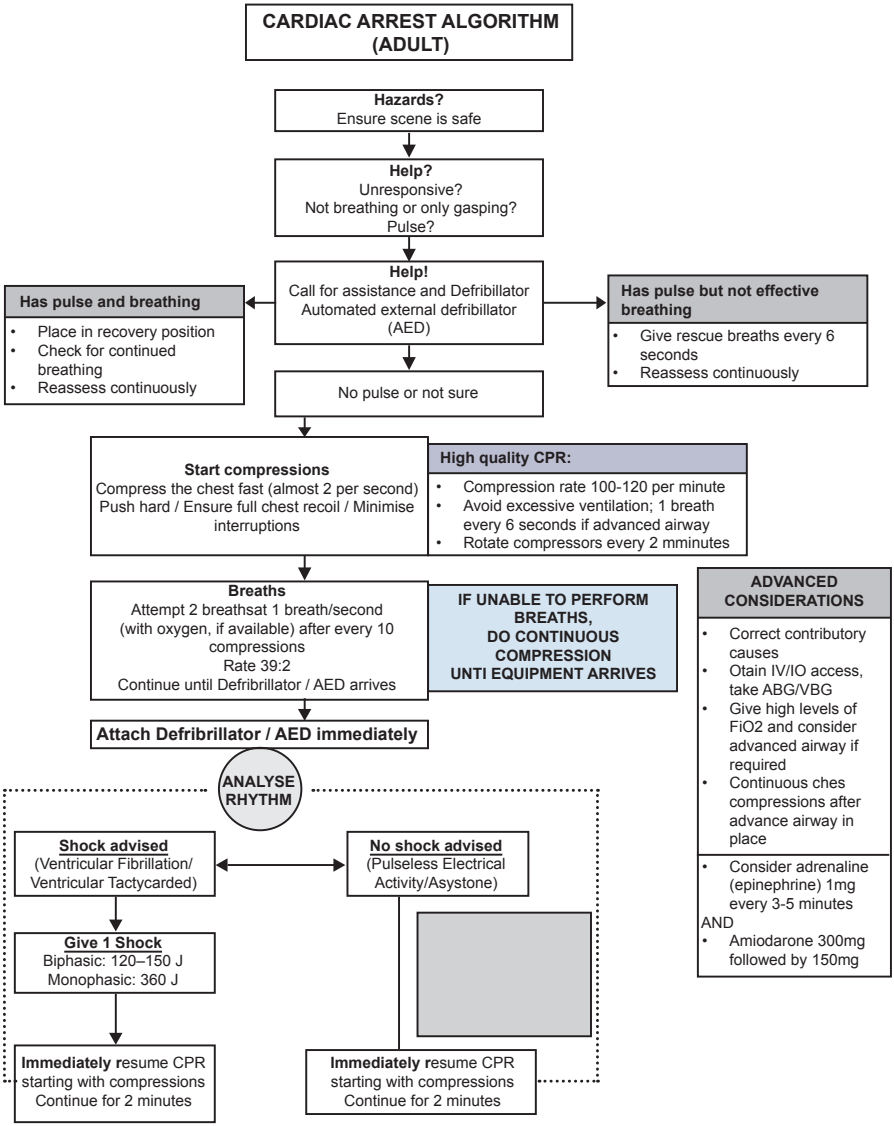
- Sudden loss of consciousness and collapse
- Absent carotid pulse and other large vessel pulses
- Loss of spontaneous respiration
- Pupil dilatation

Management

<table>
<tr><th>Community level</th><th colspan="4">Health centre level</th></tr>
<tr><td>Refer all suspected or diagnosed cases urgently to health centre/hospital</td><td colspan="4">• Refer all suspected or diagnosed cases urgently to hospital
• Clear vomitus or foreign body from the mouth manually
• Cardio pulmonary resuscitation (CPR)
• Place the patient on a firm flat surface
• Diagnose rapidly and mentally note the time of starting
• Commence resuscitation immediately
• Call for skilled help
• A precordial thump is recommended for immediate treatment where a defibrillator is not immediately available
• Initiate CAB sequence of Cardio pulmonary resuscitation (CPR)
• If possible, get someone to document medication and progress OR collect all ampoules used and total them at the end.
• Note: This is an emergency and should be referred to hospital urgently, cardinal objective is to stabilise the patient for immediate referral.</td></tr>
<tr><th colspan="5">Hospital level</th></tr>
<tr><th>A: Airway:</th><th>B: Breathing:</th><th>C: Circulation:</th><th colspan="2">D: Drip, doctor, drugs</th></tr>
<tr><td>• Clear vomitus or foreign body from the mouth manually
• Tilt the head backwards with one hand on the forehead (do not do this where a neck fracture is suspected)
• Lift the chin forward with the fingers of the other hand
• Raise the shoulders to tilt the neck backwards unless a neck</td><td>• Check for breathing; if no breathing then apply artificial respiration (rambubag. Continue until spontaneous breathing occurs.
• Oxygenation with 100% oxygen
• Endotracheal intubation is essential - use a tube of approximately the same diameter as the child's little finger or of a size that you will just fit in a nostril</td><td>• Check for carotid or other large pulse; if no pulse, give a single precordial thump or defibrillate
• Initiate CPR if there is no pulse or no breathing. Initiate CPR at the rate of 30 breaths per second
• Continue until return of the pulse and/or respiration</td><td colspan="2">• IV fluid with either 0.9% sodium chloride. OR
• Ringer-Lactate solution
Call the doctor without stopping CPR:
Initial emergency drug treatment:
• Adrenaline 1:1 000 IV, 1mL diluted with 0.9% sodium chloride from the drip to make 10mL. OR
• Adrenaline 1:1000, 1ml through endo-tracheal tube for cardio-respiratory arrest. Repeat every 5 minutes when necessary for a maximum of three doses. OR</td></tr>
</table>

Hospital level			
A: Airway:	**B: Breathing:**	**C: Circulation:**	**D: Drip, doctor, drugs**
fracture is suspected • Insert artificial airway if available • When the patient is breathing well, lay on the side to protect the airway and support the patient by bending the uppermost arm and leg	• If prolonged ventilation is required, intubation is the best method of securing the airway -pre-oxygenate well before intubation		• Adrenaline subcutaneously, 0.5mL undiluted immediately; repeat every 10–20 minutes as needed. Check that heart rate is not over 140 beats/ minute. • Doctor initiated medication: • Lidocaine 2 % IV 50–100 mg for ventricular tachycardia. **OR** • Atropine 0.5–1mg diluted for bradycardia reassess every minute until the patient shows signs of recovery. **Note:** Consider stopping resuscitation attempts and pronouncing death if: • Further resuscitation is clearly inappropriate clinically, e.g. incurable underlying disease • No success after all the above procedures have been carried out after 30 minutes or longer **Note:** Consider carrying on for longer especially when: • The patient is young • Hypothermia and drowning • Assumed electrolyte imbalance

Cardiac Arrest Algorithm (Adult)



17.5.2 Cardiac arrest in children

Description

The most common underlying cause of cardiac arrest in children is respiratory failure and hypoxia resulting from lung or airway disease or injury.

Signs and symptoms

- Chest pain/ discomfort during exercise
- Fainting/ extreme dizziness during or after an athletic activity
- Excessive fatigue during exercise
- Change in exercise tolerance

Causes

- Croup
- Bronchiolitis
- Asthma
- Pneumonia
- Birth asphyxia
- Inhalation of foreign body
- Pneumothorax

Note: Hypoxia is the most common cause of bradycardia or cardiac arrest in children. Asystole is the most common cardiac arrest rhythm in infancy and childhood, usually preceded by bradycardia. Cardiac arrhythmias are unusual in children, unless due to severe electrolyte abnormalities or drug overdose.

Management

Community level	Health centre level	Hospital level
• **Refer** all suspected or diagnosed cases urgently to health centre/ hospital	• **Refer** all suspected or diagnosed cases urgently to hospital	• Diagnose rapidly and mentally note the time of starting • Commence resuscitation immediately • Call for skilled help • Cardiac massage is recommended for immediate treatment • Place the patient on a firm flat surface • Initiate CAB sequence of CPR as indicated in the CAB table below, if possible, get someone to document medication and progress; or collect all ampoules used and total them at the end.

<table>
<tr><th colspan="4">Hospital level</th></tr>
<tr><th colspan="2">A: Airway:</th><th>B: Breathing:</th><th>C: Circulation:</th><th>D: Drip, doctor, drugs</th></tr>
<tr>
<td>Child over 5 years:
• Make a fist with one hand.
• Place immediately below the child's xiphisternum.
• Grasp the child with the other hand.
• Apply force (1–6 times) in the direction of the upper thoracic spine.</td>
<td>Child under 5 years:
• Place the child face-down on one arm of the health worker.
• Deliver 1–4 sharp blows to the lower thoracic back with the hand.</td>
<td>Check for breathing; if no breathing then apply artificial respiration.
Note: Cardiac massage is useless unless there is an airway and the lungs are being filled with air</td>
<td>• Check the heartbeat on carotid in the older child or femoral OR
• Brachial pulse no pulse, start cardiac compressions or massage; Rate of compressions 80–100 beats/ minute
• Continue with ventilation in between chest compressions.
• Initiate CPR if there is no pulse or no breathing.
• Keep patient covered and warm while resuscitating.
• Ventilate if there is a pulse, but no breathing.
Continue until return of the pulse and/or respiration.</td>
<td>D: drip, doctor, drugs
Initial emergency treatment:
Adult:
• Adrenaline 1:1 000, initially 10 micrograms/kg IV OR via endotracheal tube
• Adrenaline 1:1 000, 1 mL diluted to 10mL from the drip
Children:
• Adrenaline 0.1mL/ kg following and subsequent doses, a 5–10 fold increase is recommended.
• Repeat every 3 minutes when needed for 3–4 doses in bradycardia or slow heart rate. AND
• Atropine IV 0.02mg/ kg to a maximum of 1mg.
Note: after the first dose of adrenaline; administer medication down the endotracheal tube within 2-3 minutes. Adrenaline dose via this route is 10 times the standard dose. Atropine can also be given via the endotracheal tube. AND
• 0.9% sodium chloride; administer a bolus of 5-20 Ml to follow the IV or intraosseous injection of any drug used in resuscitation; especially if the injection is peripheral AND</td>
</tr>
</table>

Hospital level				
A: Airway:		B: Breathing:	C: Circulation:	D: Drip, doctor, drugs
				• Dextrose 10% dextrose solution IV, 5mL/kg. Administration route: • IV via a free-running drip; use 60 drop per mL administrations sets for all drips unless hypovolaemia is thought to be responsible for the cardiac arrest. • Intraosseous route: • Resuscitation drugs, fluids and blood can be safely given by this route.

17.6 Status epilepticus

Description

Status epilepticus is defined as either:

(1) Two or more sequential seizures, lasting more than 5 minutes without full recovery of consciousness between seizures or;

(2) Continuous seizure activity for longer than 5 minutes.

Signs and symptoms

- Fall with a sudden loss of consciousness
- Jerky movements
- One attack followed by the other without recovery in between

Causes

- Concurrent intake of alcohol
- Lack of sleep
- Missed doses of medication
- Discontinued antiepileptic medication without advice of a doctor
- Concurrent diseases like diabetes.

Diagnostic criteria and investigations

- FBC, U & E, LFTs, blood sugar level
- EEG
- MRI/ CT Scan
- Lumbar puncture

Management

General Measures

- **Start treatment immediately.** Do not wait for results of special investigations
- Place the patient in a lateral (recovery) position
- Stabilise the patient i.e. secure airway and check breathing and circulation
- Time seizure from its onset
- Assess oxygenation and give oxygen via nasal cannula/face mask if required
- Check serum glucose, and treat if hypoglycaemic
- Secure intravenous access
- Check electrolytes e.g. sodium, calcium, urea
- Consider poisoning, e.g. isoniazid, theophylline, tricyclic antidepressants and cocaine poisonings

Community level	Health centre level	Hospital level
Refer all suspected or diagnosed cases urgently to health centre/hospital • Give first aid care as at community level in epilepsy and immediately refer to the health centre	• **Refer** all suspected or diagnosed cases urgently to hospital • Seizures should be stopped promptly, as prolonged seizures can cause permanent brain damage. Aim for definitive control within 60 minutes of onset.	Treat as HC • Protect airway, give oxygen • Dextrose 5%, 80ml as bolus **AND** • Diazepam (IV) 10 - 20mg at a rate of 5mg per minute. Repeat in 30 -60 minutes if necessary to a maximum of 200mg in 24 hours; monitor respiration **OR** • Clonazepam orally 0.5mg to 2mg. Once the status epilepticus has been controlled the patient should be maintained on other anti-epileptics. **OR** • Phenobarbitone 200mg (IV) slowly. Repeat after 10 minutes, thereafter it may be repeated every 30 minutes to a maximum of 15mg/ kg/24 hours **OR** • Phenytoin (IV) 150-250mg at a rate not exceeding 50 mg/minute. Continue with 100mg every 6 hours, but do not exceed 15mg/ kg/24 hours.

Community level	Health centre level	Hospital level
	• Diazepam 10mg IV slowly or rectally, if convulsion doesn't stop after first dose, give second dose of diazepam of same dose **Note:** Do not give more than 2 doses of diazepam. • **Refer** urgently to hospital.	Avoid phenytoin if seizures are secondary to poisons with potential cardio-toxic effects. **Note:** These drugs when given together may cause serious respiratory depression. **Seizures continuing after 30 minutes:** • Intubate and ventilate the patient. • Thiopental, IV, 2–4 mg/kg, followed by 50mg bolus every 2–3 minutes to control seizures. • Maintenance dose: 1–5 mg/kg/hour, depending on the presence of epileptogenic activity on EEG. • Beware of hypotension. • Once seizures are controlled for 24 hours, wean off thiopental by decreasing the dose by 1mg/kg every 12 hours. **OR** • Propofol, IV, 1–2mg/kg/dose as a bolus, followed by 2–10mg/kg infusion, titrated to effect • Maintenance dose: 3–5mg/kg/hour **OR** • Midazolam, IV 0.1–0.2mg/kg bolus, followed by 0.05–0.5mg/kg/hour infusion, titrated to effect. **Note:** Continue anaesthetic for 12−24 hours after the last clinical or electrographic seizure, then taper the dose. • Higher initial maintenance doses of phenytoin may be needed in patients who have had previous thiopental exposure. • After thiopental has been weaned off, use daily therapeutic drug monitoring to guide phenytoin doses, until phenytoin levels have stabilised. **Children:** • Protect airway, give oxygen • Dextrose 50% (I.V) 15 ml (1ml/min) as a bolus. **AND** • Diazepam 5mg/minute (slow I.V). Maximum dose 0.25mg/kg body weight.

Community level	Health centre level	Hospital level
		Once seizures are controlled: • Phenytoin, IV/oral, 300mg daily. • Administer the first maintenance dose 12 hours after the loading dose. • Clinical signs that seizures are controlled include autonomic stability and the absence of abnormal movement. • For long-term maintenance therapy, see epilepsy section

17.7 Hyperkalemia

Description

High level of electrolyte potassium in the blood. Potassium is the most intracellular cation. If in high concentration in extracellular fluid, it might lead to sudden death.

Signs and symptoms

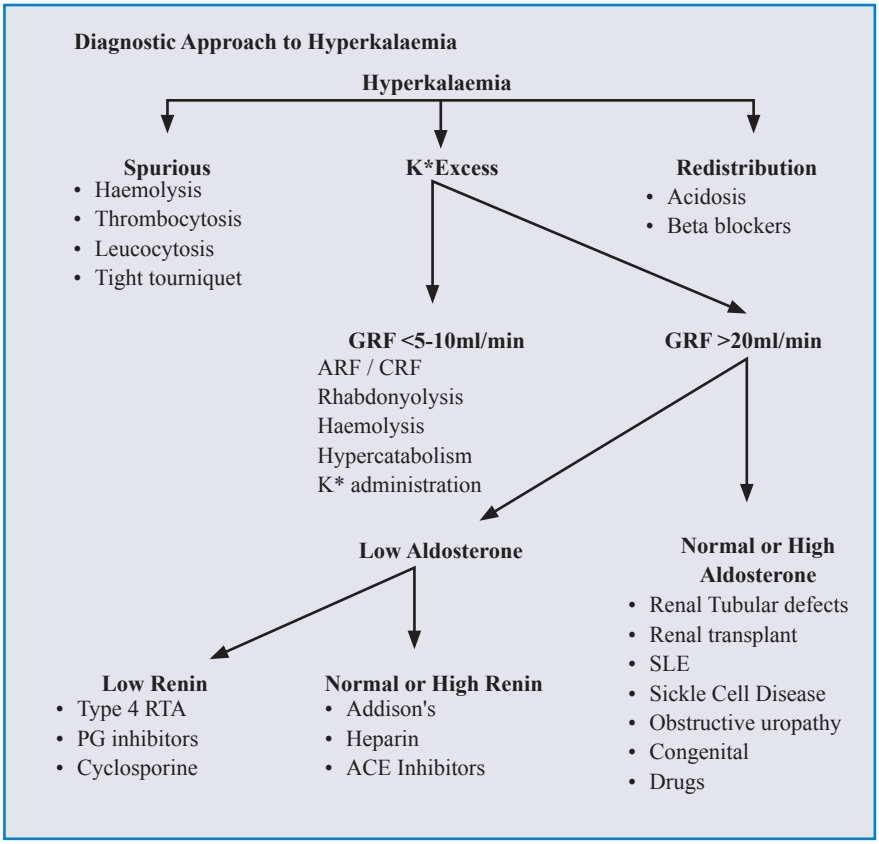
- Paresthesia, fatigue, muscle weakness, decreased tendon reflexes
- Ascending flaccid paralysis, respiratory paralysis
- Cardiac arrhythmias, cardiac arrest

Causes

- Taking too much potassium
- Potassium shift due to blood loss/ dehydration
- Kidney failure

Diagnostic Investigations

- U & E, creatinine, full blood count


Diagnostic Approach to Hyperkalaemia
Hyperkalaemia
Spurious
• Haemolysis
• Thrombocytosis
• Leucocytosis
• Tight tourniquet
K*Excess
Redistribution
• Acidosis
• Beta blockers
GRF <5-10ml/min
ARF / CRF
Rhabdonyolysis
Haemolysis
Hypercatabolism
K* administration
GRF >20ml/min
Low Aldosterone
Normal or High Aldosterone
• Renal Tubular defects
• Renal transplant
• SLE
• Sickle Cell Disease
• Obstructive uropathy
• Congenital
• Drugs
Low Renin
• Type 4 RTA
• PG inhibitors
• Cyclosporine
Normal or High Renin
• Addison's
• Heparin
• ACE Inhibitors

Management

Community level	Health centre	Hospital level			
Refer all suspected or diagnosed cases urgently to health centre/hospital	**Refer** all suspected or diagnosed cases urgently to hospital	Mild Elevation (K+ > 5.5 mmol/l) Kayexalate 15-30g in 50-100ml of water 6 hourly orally or by the retention enema (onset within 1-3 hours/ Duration of effect 4-6 hours Furosemide 40-80mg IV (0,5- 1mg/kg) over 1-2 minutes (provided patient not dehydrated)	Moderate Elevation (k+>6,0 mmol)- Shift potassium intracellularly Glucose 50-100ml of 50% solution with 10 units regular (rapid acting) insulin IV over 15-30 minutes (onset within 30 minutes/ duration of effect 4-6 hours). May follow with 10-20 units insulin +500ml 10% D/W over 1 hour. Monitor blood glucose levels hourly for at least 6 hours • Kayexalate/ furosemide (as above) • Dialysis (preferably haemodialysis)	Severe elevation (K+ >6,5mmol) without ECG changes Nebulised salbutamol 10-20mg over 15 minutes (onset within 15 minutes/ duration of effect 15-90 minutes). Repeat if necessary • Glucose and insulin (as above) • Sodium bicarbonate 50ml of 8,5% solution IV over 5 minjutes if metabolic acidosis is present (onset within 10 minutes/ duration of effect 1-2 hours). Repeat after 15 minutes if necessary, followed by 100-150ml in 1 litre 5 % D/W over 2-4 hours or longer	Severe elevation (K+> 6,5mmol/l) with ECG changes –Protect the heart Calcium gluconate 15-30ml of 10% solution IV over 2-5 minutes first to stabilise the myocardial cell membrane (onset within 1-3 minutes/ duration of effect 30-60 minutes). Calcium must be infused SEPARATELY from sodium bicarbonate to prevent precipitate. • Sodium bicarbonate (as above) • Glucose and insulin (as above) • • Nebulised salbutamol (as above) • Kayexalate/ furosemide/ dialysis (as above) • Monitor effectiveness and watch out for recurrent hyperkalemia and electrolyte abnormalities caused by the therapeutic options above • Search for and treat the cause

17.8 Urinary Retention

Description

Acute urinary retention is a sudden onset of inability to empty urinary bladder (urinate) leading to pain and damage to the systems proximal to the site of obstruction

Signs and symptoms

- Acute urinary retention
- Urgent need to urinate
- Severe lower abdominal pain
- Bladder/lower abdominal distension
- Complete inability to pass urine at all / just dribbling

Causes

- Bladder outlet obstruction
- Urethral stricture/scar tissue due to previous urethritis
- Pelvic organ prolapse
- Urethral stone causing obstruction
- Prostatitis
- Benign prostatic hypertrophy
- Prostate cancer
- Pelvic masses (cancerous and non-cancerous)
- Trauma including long term indwelling urethral catheterisation
- Old urethral injury eg. horse/bicycle riding sitting on hard surfaces
- Neuropathic bladder
- Constipation
- Certain medications (anticholinergic and alpha –adrenergic agonist classes)

Risk factors

- Advanced age
- Male sex
- Orthopaedic surgery
- Spinal/epidural anaesthesia
- Hypertension
- Diabetes mellitus

Diagnostic criteria and investigations

- Rectal digital examination
- Urinalysis, urine microscopy, culture and sensitivity
- U&E
- Prostate specific antigen (PSA)
- Imaging tests like KUB ultrasonography, voiding cystourography, MRI, CT scan cystoscopy

Management

Community level	Health centre level	Hospital level

Refer all suspected or diagnosed cases urgently to health centre/hospital	• **Refer** all suspected or diagnosed cases urgently to hospital	• Insert an indwelling catheter
		• If urethral catheterisation is difficult insert a suprapubic catheter
		• Identify cause of retention
		  • Cystoscopy
		• Do urinary retention investigations as above
		Treat accordingly:
		• 5-alpha reductase inhibitors help to stop or inhibit growth of the prostate
		  • Finasteride, 5mg OD, PO
		• Alpha blockers treat symptoms of BPH making it easier to urinate
		  • Doxazosin, 4mg OD, PO
		  • Tadalafil ,5mg OD PO (10mg 30minutes before sex for erectile dysfunction)
		  • Tamsulosin, 400mcm, OD PO
		• Combination of 5- alpha reductase inhibitors and alpha blockers
		• Antibiotics
		If no improvement, refer to specialist for
		• Laser therapy to treat BPH
		• Prostatic urethral lift
		• trans urethral treatments
		• Urethral dilatation
		• Vaginal pessary insertion

17. 9 Poisoning

Description

Poisoning is the entry into the body of toxic substances in amounts which cause dysfunction of body systems.

Signs and symptoms

- Vomiting
- Diarrhoea
- Lots of secretions e.g. drooling
- Constricted pupil
- Fever
- Hypotension

- Seizures
- Difficulty in breathing
- Unconsciousness/semi consciousness

Causes

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

Risk factors

- Age
- Living in an old home
- Certain hobbies
- Country of origin
- Occupation
- Co-morbidities

Management

Community level	Health centre level	Hospital level
Refer all suspected or diagnosed cases urgently to health centre/hospital	• **Refer** all suspected or diagnosed cases urgently to hospital **Note:** If possible, refer all patients showing signs of poisoning to hospital. Send a note of what is known and what treatment has been given. Also refer patients who have taken slow acting poisons even if they appear well. These include: • Aspirin • Iron • Paracetamol • Tricyclic antidepressants, eg. amitriptyline, imipramine • Paraquat • Delayed-release products	Management airway, breathing, circulation, body temperature and seizures at hospital level is as tabulated below:

Hospital level				
Airway	**Breathing**	**Circulation**	**Body temperature**	**Seizure**
• Often in impaired or unconscious patients • Ensure the airway is cleared and maintained - insert an airway if available • Position patient semi-prone to minimise risk of aspiration of vomitus.	• Assist ventilation if necessary • Give oxygen to correct hypoxia	• Hypotension is common in severe poisoning with Central Nervous System (CNS) depressants. A systolic BP <70mmHg may cause irreversible brain or renal damage. • Carry the patient head down on the stretcher and nurse in this position in the ambulance • Set up an IV infusion. Fluid depletion without hypotension is common after prolonged coma and after aspirin poisoning due to vomiting, sweating and hyperpnoea • Hypertension is less common but may be associated with sympathomimetic poisoning, e.g. amphetamines, cocaine.Cardiac conduction defects and disarrhythmias may occur in acute poisoning, especially with tricyclic antidepressants but these often respond to correction of any hypoxia or acidosis.	• Hypothermia: may develop in patients with prolonged unconsciousness, especially after overdose of barbiturates or phenothiazines, eg. chlorpromazine, trifluoperazine − treat by covering the patient with a blanket. • Hyperthermia: Cool the patient	• Do not treat single brief convulsions • If convulsions are prolonged or recur frequently: • Diazepam 10mg slow IV repeated if necessary (max: 30mg) • Children: Diazepam 200 micrograms (0.2mg)/kg; do not give IM • If IV route is not possible, remove the needle off the syringe and give the dose rectally Warning* • do not attempt gastric lavage in drowsy or comatose patients because • of the risk of inhaling stomach contents • Do not attempt gastric lavage with corrosive or petroleum Products

Use of emetics:

Only consider using emetics:

- In fully conscious patients
- If poison is not corrosive or a petroleum product
- If poison is not adsorbed by activated charcoal.
- If gastric lavage is inadvisable or impossible
- Ipecacuanha syrup 0.14% 30mL followed by 200mL water

Children:

- 6-18mths: Ipecacuanha syrup 0.14% 10mL; older child: 15mL. Repeat once if no response after 20 minutes.
- **Note:** Vomiting usually occurs within 15-45 minutes of the first dose.

Prevention of absorption of the poison

Adult:

- Activated charcoal 50g mixed 100-200ml of water.

Child:

- Activated charcoal 25g (50g if severe) mixed with 100-200ml of water.

Note: If patient is unable to swallow the charcoal/water mixture (slurry), give by gastric lavage tube. It is safe and especially useful for poisons that are toxic in small amounts, e.g. Antidepressants

Specific Poisons

17.9.1. Acute Organophosphate Poisoning

Description

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

Signs and symptoms

- Patient may smell of the chemicals
- Hypersecretion (increased sweating, salivation and bronchial secretion, lacrymation)
- Constricted pupils
- Cold sweat, anxiety, restlessness
- Abdominal pain, diarrhoea and vomiting
- Twitching, convulsions
- Bradycardia/ hypotension
- Severe respiratory distress, cough
- Incontinence

Causes

- Ingestion inhalation and absorption through the skin of organophosphates. May be accidental, e.g. rat poison;
- Intended poisoning, i.e. suicidal or homicidal or
- Occupational hazard, e.g. agricultural workers
- Food contamination

Risk factors

- Mental illness
- Pesticide availability and easy access
- Severe alcohol use

Diagnostic criteria/investigations

- Based on clinical investigations (Esp. serum pseudocholinesterase)
- Chest X-ray

Management

Community level	Health centre level	Hospital level
• Remove contaminated clothing • Wash contaminated skin with lots of cold water and soap • **Refer** immediately to health centre	• Treat as CL **AND/OR** • Establish and maintain the airway - artificial respiration with air or oxygen may be required during the first 24 hours after poisoning • Perform gastric lavage if the poison was ingested • Irrigate eyes with normal saline solution if there is ocular contamination • Refer to hospital for specific treatment • Note: Antidote for organophosphate poisoning (atropine) if necessary.	• Treat as HC **Adult:** • Atropine 2mg per dose; repeat dose every 20-30 minutes until signs of atropinization occur (pupil dilatation, hot dry skin, dry mouth, fast pulse). **Children:** • Atropine 20 micrograms/kg per dose; repeat dose every 20-30 minutes until signs of atropinisation occur (pupil dilatation, hot dry skin, dry mouth, fast pulse). **NB:** Patient may show signs of psychosis **In moderate to severe poisoning only and if not responding to atropine: ADD.** • Pralidoxime mesylate 30mg/kg IM− follow by 1-2 more doses at 4-6 hour intervals depending on the severity of the poisoning and response to treatment IV fluids as needed for dehydration, hypovolaemia and shock **Note***: Pralidoxime: only effective if given within 24 hours of poisoning

17.9.2 Paraffin and petroleum products poisoning

Description

Intoxication due to any hydrocarbon compounds e.g. paraffin, mineral spirit, cleaning solutions, paints etc. Includes paraffin, petrol, paint thinners and organic solvents

Signs and symptoms

- Patient may smell of paraffin or other petroleum product
- Burning sensation in mouth and throat
- Nausea and vomiting
- Cough
- Dyspnoea
- Headache
- Decreased mental status

Causes

- Ingestion, inhalation or dermal absorption of the compound

Risk factors

- Use of cleaning solution
- Paint
- Inappropriate storage
- Inhalation to get euphoric

Diagnostic criteria and investigations

- Clinical investigations
- X-ray

Management

Community level	Health centre level	Hospital level
• Keep patient calm • **Refer** immediately to health centre	• Treatment is supportive and symptomatic - the main danger is damage to lung tissue • Administer plenty of oral fluids (preferably milk). **AND** **Adult:** • Activated charcoal 50g mixed 100-200ml of water PRN every 4 hours **Child:** • Activated charcoal 25g (50g if severe) mixed with 100-200ml of water. • **Refer** to hospital if complications occur, e.g. pulmonary oedema, pneumonia	• Treat as HC **AND/OR** • Activated charcoal is of no value. Observe and examine for chemical pneumonitis. Prophylactic antibiotics are not indicated.

17.9.3 Aspirin and other salicylates poisoning

Description

Acute or chronic poisoning with aspirin or other salicylates

Signs and symptoms

- Hyperventilation
- Nausea and vomiting
- Tinnitus, deafness
- Vasodilation
- Confusion
- Fever
- Coma (if very severe poisoning)
- Complex acid-base disturbances

Causes

- Accidental ingestion
- In appropriate dosing
- Long term treatment
- Suicide or intentional poisoning

Risk factors

- Chronic pain
- Use of over the counter medications

Diagnostic criteria and investigations

- Clinical investigations
- Chest X-ray
- Arterial blood Gas
- Measurement of electrolytes

Management

Community level	Health centre level	Hospital level
• Refer immediately to health centre	• Gastric lavage can be done 1 to 4 hours after poisoning. **If stomach emptying is delayed:** • Activated charcoal 50g 1-2 hours after poisoning repeated as needed - to delay absorption of any remaining salicylate. • Maintain airway and maintain ventilation if necessary.	• Treat as HC. **AND/OR** • Monitor and manage fluids and electrolytes - to correct acidosis, hyperpyrexia, hypokalaemia and dehydration. **Adult:** • Glucose 50% 20ml as IV bolus. **AND** • Diazepam 10mg IV Stat

Management

Community level	Health centre level	Hospital level
	• Look out for and treat hypoglycaemia	**Diazepam:** • 1-6 years: diazepam 1-6mg per day • 6-10 years: diazepam 2-10mg per day IV or rectally in divided doses.

17.9.4 Paracetamol poisoning

Description

Poisoning due to paracetamol overdose (depletion of hepatic glutathione stores)

Signs and symptoms

- Nausea and vomiting
- Fatigue
- Diaphoresis
- Pallor
- Malaise
- Sweating
- Right upper quadrant abdominal pain/tenderness
- Tachycardia
- Hypotension indicate
- Decreased urinary output (oliguria)
- Jaundice
- Coagulopathy
- Hypoglycemia
- Hepatic encephalopathy

Causes

- Excessive use or over dosage of paracetamol

Risk factors

- Chronic alcoholism
- Restricted diet
- Underlying hepatic or renal disease
- mental illness
- Older age

Management

Community level	Health centre level	Hospital level
• **Refer** immediately to Health centre	If poisoning took place <2 hours before: • Gastric lavage • Activated charcoal if antidote is not going to be given orally. • Refer urgently to hospital despite few significant early symptoms	• Treat as HC. **AND/OR** • If poisoning took place <12 hours before: • N-Acetylcysteine: initial infusion: 200 mg/kg in 500mL 5% dextrose over 4 hours. Second infusion: 100 mg/kg in 1000mL 5% dextrose over 16 hours. • Any further N-acetylcysteine is given according to the second infusion regimen OR • Carbocysteine 150mg/kg (3ml/kg of 250mg /5ml syrup 4 hourly for 24 hours. OR • Methionine 2.5g oral; - 4 hourly for a total of 4 doses, started within 10-12 hours after paracetamol ingestion

17.9.5 Iron poisoning

Description

Occurs when someone accidentally or intentionally takes more than the normal or recommended amount of this medication.

Causes

- Over-dosage
- Intentional

Risk factors

- Pregnancy
- Use of over the counter medicine

Signs and symptoms

- Nausea, vomiting, abdominal pain, diarrhoea
- Haematemesis
- Rectal bleeding
- Later: hypotension, coma, hepatic necrosis
- Pallor

Note: Common in children who had mistakenly ingested iron tablets.

Diagnostic criteria and investigations

- Clinical
- Laboratory investigations (FBC, LFTs)

Management

Community level	Health centre level	Hospital level
• **Refer** immediately to health centre	• **Refer** to hospital urgently	• Desferrioxamine; Initial-15mg/kg/hour by continuous IV infusion in sodium chloride 0.9% or Dextrose 5% infusion dissolve initially in water for injections (500mg in 5mL) then dilute with infusion fluid. Reduce after 4- 6 hours so that the total dose does not exceed 80mg/kg/24hrs. • **Referral:** Haemodialysis may be needed to remove desferoxamine-iron complexes in patients with renal insufficiency.

17.9.6 Carbon monoxide poisoning

Description

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

Signs and symptoms

All due to hypoxia

- Headache
- Nausea
- Vomiting
- Weakness, collapse
- Coma, death

Causes

Inhalation of incomplete combusted gas fumes

Risk factors

- Use of gas fires
- Wood coal
- Smoking

Diagnostic criteria and investigations

- Based on signs and symptoms

Management

Community level	Health centre level	Hospital level
• **Refer** immediately to health centre	• Move person to fresh air • Clear the airway • Give artificial respiration as required; continue until adequate spontaneous breathing starts. • Administer oxygen 100% as soon as possible **Refer** to hospital urgently due to possibility of delayed complications.	• Treat as above **AND/ OR** • In severe poisoning: • Mannitol 20% 1g/kg by rapid IV infusion for cerebral oedema.

17.9.7 Barbiturate poisoning

Description

Poisoning due to barbiturates

Signs and symptoms

- CNS depression
- Confusion
- Lethargy with poor coordination
- Ataxia
- Coma
- Hypotension

Causes

- Suicidal
- Errors
- Ungraded exploration in children

Risk factors

- Accidental
- Suicidal

Diagnostic criteria and investigations

- Based on physical exam and clinical history are usually sufficient to make the diagnosis
- Urine analysis

Management

Community level	Health centre level	Hospital level
• **Refer** immediately to health centre	• Gastric lavage • Monitor vital signs and manage symptoms • Activated charcoal may be used to adsorb the Poison • **Refer** to hospital urgently due to possibility of delayed complications.	**Adult:** • Activated charcoal 50g mixed 100-200ml of water. **Child:** • Activated charcoal 25g (50g if severe) mixed with 100-200ml of water. **OR** • Ipecacuanha can be given to induce vomiting

17.9.8 Narcotic analgesic poisoning

Poisoning by morphine, pethidine, codeine and other opioids

Signs and symptoms

- Respiratory depression (They take big volume but rate low)
- Pinpoint pupils
- Coma

Causes

- Addiction
- Taking many opioids at the same time
- Accidental overdose

Risk factors

- Elderly patients may forget that they have taken a dose and mistakenly take another
- Suffering from metabolic disorders
- Prescription drug abuse

Diagnostic criteria and investigations

- Clinical investigations

Management

Community level	Health centre level	Hospital level
• **Refer** immediately to health centre	• **ABC** resuscitation as in general measures above. **AND** • **CAB** resuscitation as in general measures above • **Refer** to hospital if severe. • **Refer** to hospital urgently due to possibility of delayed complications.	**Adult:** • Naloxone 0.8-2mg IV/IM/SC. If respiratory function does not improve; repeat dose every 5 minutes to a maximum of 10mg total dose. **Children**: • Naloxone 10 micrograms/kg IV; If respiratory function does not improve; give one subsequent dose of 100 micrograms/kg.

17.9.9 Warfarin poisoning

Description
Warfarin is an ingredient of some rat poisons. It can cause poisoning if ingested inadvertently. (It inhibits all vitamin dependent clotting factors)

Signs and symptoms
- Hemorrhage ecchymoses
- Subconjunctival hemorrhage
- Epistaxis
- Vaginal bleeding
- Bleeding gums
- Hematuria
- Intracranial hemorrhage

Causes
- Inappropriate dosing
- Decreased vitamin K intake
- Altered protein binding
- Concomitant use with other drugs which compete for drug binding

Risk factors
- Taking warfarin with other OTC drugs
- Diet restriction
- Failure to monitor INR (for patient on warfarin)

Diagnostic criteria and investigations
- Clinical investigation
- Test for prothrombin time

Management

Community level	Health centre level	Hospital level
• **Refer** immediately to health centre	• Ipecacuanha. **OR** • Gastric lavage. **AND** **Adult:** • Activated charcoal 50g mixed 100-200ml of water. **Child:** • Activated charcoal 25g (50g if severe) mixed with 100-200ml of water. **Refer** to hospital if there is major bleeding. • **Refer** to hospital urgently due to possibility of delayed complications.	Treat as HC. **AND /OR** **Adult:** • Phytomenadione (Vitamin K1) 5mg IV - give very slowly. **Child:** • Phytomenadione (Vitamin K1) 1mg IV in slow IV infusion Elevated INR with significant bleeding: Stop warfarin. • Lyophilised plasma, IV, 15mL/kg. **OR** • FFP 15mL/kg.

17.9.10 Alcohol (ethanol) poisoning

Description

Alcohol poisoning may be acute or chronic.

Acute alcohol poisoning

Occurs when more alcohol than the body can process is consumed

Causes

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

Risk factors

- Binge drinking
- Chronic alcoholic
- Body size
- Tolerance

Signs and symptoms

- Confusion
- Vomiting
- Seizures
- Irregular breathing
- Blue-tinged skin or pale skin
- Low body temperature (hypothermia)
- Coma

Diagnostic criteria and investigations

- Blood: alcohol content, glucose level
- Urine: for glucose and protein
- Lumbar puncture to rule out infections of the meninges

Management

Community level	Health centre level	Hospital level
• **Refer** immediately to health centre	• Ipecacuanha emesis or gastric lavage. If indicated, treat hypoglycaemia: • Glucose 50% 20-50mL IV bolus. **Children:** • Glucose 50%1mL/kg If IV glucose is not available: Glucose 50% or sugar solution 50% rectally or by nasogastric tube.	• Treat as **HC .AND/OR** • Assess clinical and biochemical response over the next 15 minutes and repeat glucose 50% IV as necessary until the patient wakes up.

Community level	Health centre level	Hospital level
• **Refer** immediately to health centre	**Once patient wakes up:** • Continue with oral glucose or sugar solution as required, until the patient can eat a meal • **Refer** to hospital urgently due to possibility of delayed complications.	• Monitor hourly blood glucose levels.

17.9.11 Chronic alcohol poisoning

Description

Due to long-term consumption of alcohol.

Signs and symptoms

Features of malnutrition

- Weight loss
- Dry scaly skin
- Brittle discolored hair
- Pale mucous membranes
- Cerebral damage
- Memory loss
- Hallucinations
- Tremors
- Liver disease
- Poor appetite
- Fluid in the abdomen (ascites) as a result of cirrhosis

Causes

- Heavy habitual drinking combined with poor nutrition

Risk factors

- Habitual alcohol consumption
- Age
- Gender
- Combination of alcohol with other drugs
- Other drug use

Diagnosis and investigations

- Clinical investigations
- Blood alcohol concentrations
- Urine tests

Management

Community level	Health centre level	Hospital level
• **Refer** immediately to health centre	• For delirium: • Diazepam 10-30mg orally every 12 hours as needed. **AND** If indicated, treat hypoglycaemia: **Adult:** • Glucose 50% 20-50mL IV bolus, Thiamine IV 100mg **Children:** • Glucose 50%1mL/kg • **Refer** to hospital for further management including:	• Treat as HC. **AND /OR** • Bed rest • Proper diet • Treatment of thiamine deficiency; • Psychiatric assistance and counselling on alcohol, withdrawal, abstinence and lifestyle adjustment

17.9.12 Methyl Alcohol (methanol) poisoning

Description

Methanol is used as an industrial solvent and is an ingredient of methylated spirits.

Signs and symptoms

Similar to alcohol intoxication/poisoning but milder and do not usually appear until 12-24 hours after ingestion and may include:

- Headache
- Dizziness
- Nausea, vomiting
- Vasomotor disturbances
- CNS depression
- Respiratory failure
- Blindness
- Breathing difficulty
- Convulsion
- Bluish coloured lips and finger nails
- Severe abdominal pain
- Fatigues
- Toxic metabolites may cause severe acidosis and retinal/optic nerve damage

Causes

- Accidental through consumption of anti-freeze

Diagnostic criteria and investigations

- History taking

Management

Community level	Health centre level	Hospital level
• **Refer** immediately to health centre	• Gastric aspiration and lavage; only of use if done within 2 hours of ingestion • **Refer** to hospital if severe	• Treat as HC. **AND /OR** • Sodium bicarbonate solution 5% orally. It should be given after gastric lavage **In severe cases:** • Sodium bicarbonate 8.4% 50mL by slow IV - monitor plasma pH. • Ethanol 40%; Give 30-35mL of (eg. whisky, brandy) in 100mL of water every 3 hours • Until the acidosis has been corrected. This delays oxidation of methanol to toxic metabolites • Keep the patient warm • Protect the eyes from strong light

17.9.13 Food poisoning

Description

Illness caused by consumption of food or water that is contaminated by certain pathogenic micro-organisms. Usually affects large numbers of people, after ingestion of communal food in homes, hospitals, hotels and at parties.

Causes

Can be infective or toxic

- Infective: by bacteria, e.g. Salmonella typhimurium, Campylobacter jejuni, Bacillus cereus
- Toxic: by toxins from Staphylococcus aureus and Clostridium botulinum

Signs and symptoms

- Nausea, vomiting
- Headache
- Intermittent abdominal pain (colic) with associated diarrhoea
- Botulism: paralysis of skeletal, ocular, pharyngeal and respiratory muscles
- Fever; especially if poisoning is of the infective type
- May be self-limiting - features disappear without specific treatment
- Bloating

Diagnostic criteria and investigations

- Good history and examination is important for diagnosis
- Stool: examination for culture and sensitivity

Management

Community level	Health centre level	Hospital level
• **Refer** immediately to health centre	• Oral or IV fluids for rehydration as required. • **Refer** to hospital	• Treat as HC. • Treat as per culture and sensitivity results

17.9.14 Hypoglycaemia and hypoglycaemic coma

Description

Hypoglycaemia can rapidly cause irreversible brain damage and/or death. Patient should be referred to hospital immediately.

Signs and symptoms

- Pallor
- Sweating
- Tachycardia
- Abdominal pain
- Hunger
- Headache
- Irritability
- Impaired concentration
- Confusion
- Delirium
- Coma
- Convulsions
- Transient aphasia (speech disorders)
- There may be few or no symptoms if:
- The blood sugar is chronically low
- The patient is very ill
- Malnourished
- People at risk of hypoglycaemia
- Neonates with low birth weight, ill in any way, not feeding well
- Malnourished or sick children who have not eaten for over 8 hours
- Shocked, unconscious, convulsing patients
- Diabetic on treatment developing abnormal behaviour or symptoms

Diagnostic criteria and investigations

- Diagnose with testing strips for blood glucose
- Do not wait, but obtain blood for glucose determination if possible

Management

Community level	Health centre level	Hospital level
• **Refer** immediately to health centre	**If patient is conscious and able to feed** • Administer sweets, sugar, glucose by mouth **If patient is unconscious:** • Dextrose 50 % solution IV, immediately; followed by Dextrose 10 % solution If no access to veins: Dextrose 50% by nasogastric tube	• Treat as HC. • **Refer** to specialised care if no improvement.

17.9.15 Antidepressant poisoning

17.9.15.1 Tricyclic antidepressant poisoning

Description

Patients can deteriorate rapidly. They may have mild or severe poisoning.

Signs and symptoms

Mild to moderate poisoning

- Sedation
- Tachycardia
- Anticholinergic effects:
  - Delirium, urinary retention, or dilated pupils, dry mouth

Severe Poisoning

- QRS widening, ventricular dysrhythmias
- Seizures
- Coma
- Pulmonary oedema
- Hypotension

Management

Community level	Health centre level	Hospital level

• **Refer** immediately to health centre	• **Refer** immediately to hospital	• Tricyclic antidepressants delay gastric emptying, therefore activated charcoal may be effective for a longer period than usual.
		• Serum alkalinisation for all patients with:
		  • ventricular dysrhythmias,
		  • prolonged QRS >100 msec
		  • hypotension unresponsive to fluids or
		  • seizures.
		• Sodium bicarbonate, IV 1–2 mEq/kg as an 8.4% solution, as bolus doses to achieve a pH of 7.45–7.55.
		• Monitor acid-base status, serum potassium and sodium.
		• If sodium bicarbonate is unavailable or fluid restrictions limit intake, consider hyperventilation of intubated patients. In severe cases, inotropic support and anti-arrhythmics may be required

Hypotension is due to myocardial dysfunction and alpha-adrenergic vasodilation; be careful not to fluid overload the patient. For seizures or if sedation is required for restlessness: Treat with benzodiazepines - see Status epilepticus section. **Note**: Phenytoin should be avoided due to potential cardiotoxicity. • **Note:** The use of flumazenil is not recommended in any patient with mixed overdoses possibly including tricyclic antidepressants as it increases the risk of convulsions and dysrhythmias.		

17.9.16 Theophylline poisoning

Signs and symptoms

Patients present with:

- Tachycardia and tachyarrhythmias
- Nausea and vomiting
- Agitation
- Hyperventilation
- Tremor

- Profound hypokalaemia
- Seizures

Management

Community level	Health centre level	Hospital level
• **Refer** immediately to health centre	• **Refer** immediately to hospital	**Vomiting is common:** • Metoclopramide, IV/oral, 10mg 8 hourly as required. • Activated charcoal. • Multiple doses of activated charcoal enhance elimination **Correct hypokalaemia cautiously:** • Potassium chloride, IV, maximum dose 40 mmol/L and maximal rate of 20mmol/hour. **For seizures:** Treat with benzodiazepines • Note: Phenytoin should be avoided (due to potential cardiotoxicity).

17.9.17 Lithium poisoning

Description

Lithium toxicity mostly occurs with chronic therapy and may be precipitated by decreased excretion due to renal dysfunction, diuresis, dehydration, hyponatraemia or drug-drug interactions (e.g. NSAIDs, diuretics, ACE inhibitors and ARBs).

Signs and symptoms include

- Nausea and vomiting
- Diarrhoea
- Nystagmus
- CNS symptoms: tremor, hyperreflexia, choreoathetoid movements, fasciculations, ataxia, agitation, confusion and lethargy

In severe toxicity

- Coma
- Seizures
- Dysrhythmias
- Hypotension

General Measures

- Whole bowel irrigation may be considered with a potentially toxic ingestion or ingestion of sustained-release products.

Monitor

- Vitals signs, mental status and urine output
- If available, do serial lithium levels 6 hourly until peaked and declining.
- Electrolytes and renal function.
- Fluid status: administer sodium chloride 0.9 % to maintain urine flow of 1–2 mL/kg/hour but prevent hypernatremia.
- Cardiac function and treat dysrhythmias (cardiovascular dysrhythmias).
- Thyroid function, in chronic toxicity.

Management

Community level	Health centre level	Hospital level
• **Refer** immediately to health centre	• **Refer** immediately to hospital	**Correct electrolyte abnormalities:** • Major electrolyte abnormalities. For seizures: • Treat with benzodiazepines - Status epilepticus. **Note:** Phenytoin should be avoided due to potential cardiotoxicity. • **Referral:** Early referral for hemodialysis is indicated in severe lithium poisoning and in patients with renal impairment. Discuss with a specialist

17.9.18 Isoniazid poisoning

Description

Acute toxicity can present with the classic triad of seizures, metabolic acidosis and coma. Seizures are generalised tonic-clonic and often refractory to standard anti-convulsant therapy.

General measures

- Supportive management aimed at preventing and managing complications. Treat hyperthermia.

Management

Community level	Health centre level	Hospital level

• **Refer** immediately to health centre	• **Refer** immediately to hospital	**For seizures:**
		• Pyridoxine, crushed tablets orally or via NGT in unconscious patient(s).
		  • 1g for every gram of isoniazid ingested (maximum of 5g), or o 5g for unknown amount ingested.
		  • Benzodiazepines may be used as an interim measure to control seizures:
		• Lorazepam, IV/IM, 4mg, repeat once after 5–10 minutes, if necessary. **OR**
		• Diazepam, IV, 10mg, not faster than 2mg/minute, repeat once after 5– 10 minutes if necessary. **OR**
		• Clonazepam, IV, 2mg, repeat once after 5–10 minutes if necessary. **OR**
		• Midazolam, IM/IV 10mg, repeat once after 5–10 minutes if necessary. **OR**
		• Midazolam buccal, 10mg using the parenteral formulation.
		Note: Phenytoin should not be used to control seizures in INH poisoning, as it does not have GABA agonist properties.
		• **Referral:** Uncontrolled seizures

17.9.19 Calcium channel blocker and beta blocker poisoning

Description

Cardiovascular toxicity results in profound hypotension, bradycardia, decreased systemic vascular resistance and cardiogenic shock. Depressed level of consciousness and metabolic acidosis are consequent upon poor tissue perfusion. Hyperglycaemia and hypokalaemia may occur. Patients who have co-ingested other cardiac medicines and those with preexisting cardiac disease are at increased risk of morbidity. The treatment of suspected cardiogenic shock in calcium channel blocker and beta blocker poisoning follows similar therapeutic principles. The mainstay of treatment is high-dose insulin euglycaemic therapy and catecholamine infusions to improve inotropy and chronotropy.

General measures

Monitor vital signs, ECG and blood glucose. Treat symptomatic patients in consultation with a specialist.

Management

Community level	Health centre level	Hospital level
• **Refer** immediately to health centre	• **Refer** immediately to hospital	• Caution is advised for all decontamination procedures as they increase vagal tone and may exacerbate bradycardia. • Activated charcoal may be considered before the onset of symptoms. • Whole bowel irrigation can be considered for ingestion of modified release preparations. **Treat hypotension:** • Sodium chloride, IV, 0.9%. If hypotension not effectively controlled **ADD:** • Calcium gluconate 10%, IV, 30–60mL given over 15–30 minutes, with ECG monitoring. • This may be repeated a maximum of 4 times. **Treat bradycardia:** • Atropine, IV 0.5–1mg every 2–3 minutes to a maximum of 3mg. Use vasopressors as needed, e.g. adrenaline (epinephrine) infusion for persistent hypotension (Cardiac arrest) or dobutamine for bradycardia (Cardiogenic shock). **Referral** • Refer for management with high dose insulin for resistant hypotension and bradycardia, in a high care or ICU setting. If glucose less than10mmol/L: • Dextrose 50%, IV, 50mL. Followed by: • Insulin, short acting, IV, 1 unit/kg. • Followed by 0.5 unit/kg/hour. • Titrate dose up until hypotension is corrected, to maximum 10 units/kg/hour. • Monitor and correct potassium and glucose.

chapter

18

Injuries and Trauma

Description

Damage to the body produced by energy exchanges that have relatively sudden discernible effects. Allergic reactions may be acutely life threatening. Patients with multiple stings may develop delayed systemic toxicity. Beware of premature discharge from the healthcare facility

18.1 Insect bites and stings

Toxicity due to insect bites and stings usually results in local effects only and systemic effects are rare. Occasionally, hypersensitivity reactions are encountered, varying from minor local inflammation to acute anaphylaxis. Multiple bee stings can result in toxicity and may require ICU care.

18.1.1 Bites

Description

Bites are wounds caused by teeth or jaws

Signs and symptoms

- A puffy, white and reddish bump that appears a few minutes after the bite
- A hard, itchy, reddish-brown bump, or multiple bumps, appearing a day or so after the bite or bites
- Small blisters instead of hard bumps
- Dark spots that look like bruises

Causes

Can be inflicted by animals or reptiles e.g. dog, human or snakes.

Management

Community level	Health centre level	Hospital level
• Provide First Aid **Refer** immediately. **Wounds First Aid:** • Clean the wound thoroughly with plenty of clean water and soap immediately.	Apply chlorhexidine solution 0.05% **OR** • Hydrogen peroxide solution 6%. **OR** • Povidone iodine solution 10%. **Caution:** Do not suture bite wounds **Supportive therapy:** • Treat shock if any or if swelling is significant • Paracetamol 500mg 8 hourly PRN • Reassure and immobilise the patient	Treat as HC **AND** **Adults:** • Amoxycillin/clavulanic acid 625mg/125mg 8 hourly for 5 days. **OR** • Cotrimoxazole 800/160mg 12 hourly for 10 days.

Community level	Health centre level	Hospital level
• Remove any dirt or foreign bodies • Stop excessive bleeding where necessary • Cover the wound with clean material and send to the next level of care	• **Tetanus prophylaxis:** **Note:** giving TIG or TTV to a fully immunised person may cause an unpleasant reaction, e.g. redness, itching, swelling, fever, but with a severe injury this is justified. **Antibiotic use: Give only for infected or high-risk wounds including:** • Presentation >8 hours delayed • Puncture wounds unable to be adequately debrided • Wounds on hands, feet or face • Wounds with underlying structures involved • Wounds in immunocompromised patients. **Adults:** • Amoxycillin/clavulanic acid, oral, 625/125mg 12 hourly for 5 days. **Children:** • Amoxycillin/clavulanic acid, oral, 20-40mg/kg/day 12 hourly for 5 days. **If allergic to penicillin:** **Adults:** • Metronidazole 400mg 8 hourly for 5-7days. **AND** • Doxycycline 100mg 12 hourly for 7days. **Children:** • Metronidazole 10-12.5mg/kg per dose 8 hourly for 5-7 days. **AND** • >8yrs: Doxycycline 2mg/kg per dose 12 hourly for 5-7 days **Refer** to hospital for further medication	**Children:** • Amoxycillin /clavulanic acid20-40mg/kg/day 12 hourly for 5 days. **OR** • Cotrimoxazole 24mg/kg 12 hourly for 10 days. **If patient allergic to penicillin:** **Adult:** • Metronidazole 400mg 8hourly for 5 days. **AND** • Doxycycline 100mg daily for 5-7 days **Children:** • Metronidazole 10-12.5mg/kg for 5 days. **AND** Child >8yrs: Doxycycline 2mg/kg per dose for 5-7 days.

18.1.2 Snakebite

Description

Bite by a snake

Signs and symptoms

- Puncture wounds
- Bleeding, e.g. haematuria, oozing from the site, haematemesis - usually mild but may be uncontrollable
- Pain
- Swelling
- Paralysis
- Excessive salivation
- Other features will depend on the type of snake and poison, i.e. haemolytic, necrotoxic, neurotoxic

Risk factors

- Tropical areas
- Neglected places
- Summer

Management

Community level	Health centre level	Hospital level
Refer immediately	• First aid as below: **Venom on skin:** • Wipe away excess venom • Assess wound for fang penetration • Clean wound • Apply firm crepe bandage or clean cloth to entire limb to ensure constant pressure immobilise limb with a splint **Note:** Do not use tourniquet, it causes more damage to the limbs. • Tetanus prophylaxis. **AND** **Adults:** • Benzylpenicillin fortified; 1.5MU IM **AND** • Chlorpheniramine 2-4 mg stat.	Treat as HC. **AND/OR**. • Administer Antivenom slowly for the first 15 minutes because most allergic reactions will occur within this period. Increase the flow rate gradually until the infusion is completed within one hour - repeat if there is no clinical improvement after the infusion. Black mamba bites may require up to more than standard dose to reverse respiratory paralysis

Community level	Health centre level	Hospital level
	Children: • Benzylpenicillin 50,000 IU/kg IM per dose **AND** • Chlorpheniramine 2-4 mg stat. If allergic to penicillin: **Adults:** • Metronidazole 400mg 8 hourly for 5-7days **AND** • Doxycycline 100mg 12 hourly for 7days. **Children:** • Metronidazole 10-12.5mg/kg per dose 8 hourly for 5-7 days. **AND** • >8yrs: Doxycycline 2mg/kg per dose 12 hourly for 5-7 days **If Venom in eyes:** • Irrigate eyes with plenty of water • Apply chloramphenicol eye ointment 1% • Cover with eye pads **Note:** 90% of snake bites do not require antivenom • **Only use antivenom in patients who really need it.** • **Refer** urgently to hospital if there is: • Signs of systemic poisoning • Local damage • Swelling of hand or foot (site of most bites) within 1 hour of bite • Swelling of elbow or knee within 3 hours of bite • Swelling of groin or chest at any time • Associated bleeding disorder • Snake size or recognition of venomous snake • Significant swelling of head or neck • Muscle weakness or breathing difficulty	**Note:** if there is a history of allergy and signs of systemic poisoning continue to administer antivenom but prepare to treat possible reactions with hydrocortisone succinate and adrenaline **Children:** • Metronidazole 10-12.5mg/kg for 5 days. **AND** Child >8yrs: Doxycycline 2mg/kg per dose for 5-7 days.

18.1.3 Insect stings

Description

They occur when an insect is agitated seeks to defend itself through its natural mechanism or when an insect seeks to feed off the bitten person. Some insects inject formic acid which causes an immediate skin reaction often resulting in redness and swelling in the injured area.

Causes

- Bees, wasps, hornets and ants: - venom is usually mild but may cause anaphylactic shock in previously sensitised persons
- Spiders and scorpions: - most are non-venomous or only mildly venomous

Symptoms and signs

- Swelling
- Discolouration
- Burning sensation
- Pain at the site of the sting
- Headache
- Dizziness

Note: May be signs of anaphylactic shock

Management

Community level	Health centre level	Hospital level
• Give paracetamol • **Refer** to health centre immediately.	• First aid, supportive therapy: if required (e.g. if bite is from highly venomous species), give as in Bites. • If the sting remains implanted in the skin: remove carefully with a needle or knife blade • If severe local reaction occurs: **Adults:** • Chlorpheniramine 4mg 6 hourly not exceeding 24mg daily until swelling subsides. **AND** • Mepyramine cream 6 hourly for 5 days **Children:** • 1-2 yrs: Chlorpheniramine 1mg every 12 hours • 2-5 yrs: Chlorpheniramine 1mg every 6 hours (max: 6mg daily)	• Treat as HC • Hydrocortisone injection in severe cases

Community level	Health centre level	Hospital level
	• 5-12 yrs: Chlorpheniramine 2mg every 6 hours (max: 12mgdaily). **AND** • Mepyramine cream 6 hourly for 5 days. • If bite/sting causes severe pain, e.g. scorpion: • Lignocaine 2% infiltrate 2mL around the area of the bite. **Refer** to hospital: • If systemic manifestations are present	

18.1.4 Animal bite

Bite from domestic or wild animal

The most serious sequale from animal bites is rabies infection. However, the wound can be treated as for general wounds. Here we deal with treatment for prevention of rabies infection.

Management

Community level	Health centre level	Hospital level
• First aid • Clean with anti-septic solution • **Refer** to health centre immediately	• First aid • **Refer** to hospital	• First aid, • Tetanus prophylaxis, **AND** Adults: • Benzylpenicillin fortified; 1.5MU IM. **AND** • Amoxycillin 500mg 8 hourly for 5 days. **OR** • Cotrimoxazole 800/160mg 12 hourly for 10 days. **Children:** • Benzylpenicillin 50,000 IU/kg per dose. **AND** • Amoxycillin 15mg/kg 8 hourly for 5 days. **OR** • Cotrimoxazole 24mg/kg 12 hourly for 10 days. • **If patient allergic to penicillin: Adult:** • Metronidazole 400mg 8hourly for 5 days **AND** • Doxycycline 100mg daily for 5-7 days • **Children:** • Metronidazole 10-12.5mg/kg for 5 days. **AND** • Child >8yrs: Doxycycline 2mg/kg per dose for 5-7 days **AND** Passive immunisation with rabies immunoglobulin (RIG) 150 IU/2ml **AND** Vaccination with rabies vaccine is recommended for all severe exposures to rabies. Infiltrate RIG 20IU/kg stat in and around the wound. Inject IM any remaining RIG at a site distant from the site of Rabies Vaccine inoculation.

Community level	Health centre level	Hospital level
		If it is not possible to give RIG at the start of RV vaccination, it may still be given up to 7 days later even when the wound has started to heal. **Vaccination with rabies vaccine Schedule for all severe exposures to rabies is as follows:** • Day 0 • Day3 • Day 7 • Day 14 • Day 28

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

Note: Since prolonged rabies incubation periods are possible, persons who present for evaluation and treatment even months after having been bitten should be treated in the same way as if the contact occurred recently.

- Do not suture the wound.
- Avoid contact with the patient's saliva and vomitus which is potentially infective.

Observe strict hygiene, and if possible, wear eye protection as patients may spit and infection through the conjunctiva can occur.

If the Veterinary Department confirms rabies infection or if the animal cannot be identified/tested, rabies vaccine +/- rabies immunoglobulin human as per the recommendations in the table below.

Table: Recommendations for rabies vaccinations

Nature Of Exposure	Condition Of Animal		Recommended Action
	At time of exposure	10 days later	
1. Saliva in contact with skin, but no skin lesion	Healthy	Healthy	Do not vaccinate
		Rabid	Do not vaccinate
	Suspect	Healthy	Do not vaccinate
		Rabid	Do not vaccinate

Nature Of Exposure	Condition Of Animal	Recommended Action

2. Saliva in contact with skin that has lesions, minor bites on trunk or proximal limbs	Healthy	Healthy	Do not vaccinate
		Rabid	Vaccinate
	Suspect	Healthy	Vaccinate; but stop course if animal healthy after 10 days
		Rabid	Vaccinate
		Unknown	Vaccinate
3. Saliva in contact with mucosa, serious bites (face, head, fingers, or multiple bites)	Domestic or wild rabid animal or suspect		Vaccinate and give anti-rabies serum
	Healthy domestic animal		Vaccinate; but stop course if animal healthy 10 days

Notes:

- Consumption of properly cooked rabid meat is not harmful
- The 10-day observation period applies only to domestic dogs and cats. Except for threatened or endangered species, all other domestic or wild animals should be killed humanly and tissues tested for rabies using appropriate veterinary laboratory techniques.

18.2 Fractures

Description

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

Causes

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

Signs and symptoms

- Pain
- Tenderness
- Swelling
- Inability to use/move the affected part
- Deformity
- May be open (with a cut) or closed

Diagnostic criteria and investigations

X-ray: 2 views to enable comparison with normal side

Management (all patients)

Community level	Health centre level	Hospital level
General management of Simple fractures • Ensure airway is clear • Treat shock • Elevate any fractured limb. • Immobilise the affected part with a splint, with special attention to neck or spinal injuries **Adult:** • Paracetamol 500mg stat. **Children:** • Paracetamol 125mg/5ml stat • Clean the wound thoroughly **Refer** for further management to the health centre.	• Treat as CL. • Add ibuprofen 200-400mg tds if needed	• Treat as HC • Stop any bleeding • Carry out surgical procedure/ apply POP bandage if needed • Prophylaxis against tetanus, i.e. if not fully immunised or if the wound is suspected to be contaminated. • If there is anaemia: manage accordingly **Note:** Pethidine and morphine should be used with caution for rib fractures and head injuries as they cause respiratory depression.

18.3 Burns

Description

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

Causes

- Thermal, e.g. hot fluids, flame, steam, hot solids

Signs and symptoms

- Pain
- Swelling
- Skin changes (hyperaemia, blisters, singed hairs)
- Skin loss (eschar formation, charring)
- Reduced use of the affected part

Systemic signs and symptoms in severe burns include

- Shock
- Low output
- Generalised swelling
- Respiratory insufficiency
- Deteriorated mental state eg. acids, alkalis and other chemicals
- Electrical, e.g. Domestic (low voltage) transmission in (high voltage) lightening
- Radiation, e.g. exposure to excess radiotherapy or radioactive materials and the sun.

Classification of the severity of burns

Burn injury may be described as mild, moderate or severe burns depending on the;

- Depth of the burn
- % of total body surface area (TBSA) burnt
- The body parts injured e.g. face, hands, feet, perineum burns are considered severe

Categorisation of severity of burns is as follows

Minor/mild burn:

- Adult with <15% TBSA affected or
- Child/elderly with <10% TBSA affected or
- Full thickness burn with <2% TBSA affected and no serious threat to function

Moderate (intermediate) burn:

- Adult with partial thickness burn and 15- 25% TBSA or
- Child/elderly with partial thickness burn and 10-20% TBSA

All above with no serious threat to function and no cosmetic impairment of eyes, ears, hands, feet or perineum.

Major (severe) burn

Adult with:

- Partial thickness burn and >25% or full thickness burn and >10% TBSA Child/elderly with:
- Partial thickness burn >10% or full thickness burn of >5% TBSA affected irrespective of age
- Any burns of the face, eyes, ears, hand, feet, perineum with cosmetic or functional impairment risks
- Chemical, high voltage, inhalation burns

Management of moderate burns

Community level	Health centre level	Hospital level
First Aid • Stop the burning process and move the patient to safety: roll on the ground if clothing is on fire • Pour or shower the affected area with cold water especially in the first hour after the burn (this may reduce the depth of injury if started immediately). • May cleanse the wound with Saline solution or dilute antiseptic solution. • Cover the wound with a clean dry cloth and keep the patient warm • Elevate the injured arm or leg. **Refer to hospital**	• Treat as CL. **AND/OR** *Wound care:* • Do not puncture (except if non- adherent sterile dressing is possible) • Apply antiseptic cream e.g. silver sulphadiazine cream 1% • Apply layers of saline moistened gauze- place enough dry gauze on top to prevent seepage to outer layers and crepe bandage to hold dressings. • Small superficial 2° burns may be dressed with paraffin gauze dressing Change the dressings after 1 -2 days and as necessary thereafter • Burn shield to be applied within 6 hours of burn event and to be left for 48 hours. Silver sulphadiazine to be added for dressings • **Refer to hospital**	• Treat as HC **AND/OR** **Fluid replacement:** • Oral fluids (ORS or others) and /or IV fluids depending on the degree of loss of intravascular fluid. **AND** • Appropriate physiotherapy of joints affected (especially the hand) • Nutritional support to boost healing • Counselling and psychosocial support to patient and relatives. • Health education on burns prevention e.g. epileptic control. **Dietary management** • high protein and energy diet • vitamin c supplementation • ensure or paediasure, nutrient optimum, peptamen junior/ adult

Management of severe burns

Community level	Health centre level	Hospital level
First Aid • Stop the burning process and move the patient to safety: roll on the ground if clothing is on fire • Pour or shower the affected area with cold water especially in the first hour after the burn (this may reduce the depth of injury if started immediately). • May cleanse the wound with Saline solution or dilute antiseptic solution. • Cover the wound with a clean dry cloth and keep the patient warm • Elevate the injured arm or leg.	• Paracetamol 500mg 8 hourly for 5 days. • Do not puncture blisters but aspirate large blisters aseptically. • Expose the patient in a bed cradle. **If wound is infected:** • Apply Nitrofurazone ointment or silver sulphadiazine cream 1% daily. • Dress the wound with paraffin gauze dressing– place enough dry gauze on top to prevent soiling. Flamazin for wound dressing • Change the dressing after 2-3 days and as needed thereafter. • Prophylaxis against tetanus, i.e. if not fully immunised or if the wound is suspected to be contaminated **Fluid replacement:** • ORS and/or IV fluids as needed depending on the degree of dehydration; administer as much as the patient can take for orals and IV fluids have to be calculated per body mass to avoid fluid overload.	• Treat as for mild/ moderate burns. • IV fluid replacement in a total volume 24 hourly according to the calculation in the box below. Use only crystalloids i.e. Ringer's Lactate or Normal saline (0.9%NaCl) and 5 % dextrose. **Note:** these solutions in a ratio of 2:1– i.e. 2 units of ringer's lactate (or saline) followed by 1 unit of glucose infusion 5%; repeat until total required daily volume is reached. **If burn infected:** • Apply silver sulphadiazine cream 1% daily or nitrofurazone ointment. **Note:** contraindicated in pregnancy and breastfeeding. **AND** **Adult:** • Cloxacillin 500mg 6 hourly for 7 days. **AND** • Paracetamol 500-1g 8 hourly for 7 days **Children:** • Cloxacillin 50mg/kg/dose daily for 7 days. **AND** • Paracetamol 10mg/kg 8 hourly for 7 days. **Note:** Take wound swab for culture and sensitivity

Calculation and administration of IV fluid replacement

The objective is to maintain normal physiology as shown by urine output, vital signs and mental status.

The total volume of IV solution required in the first 24 hours of the burns is: 4mU x weight (kg) x % TBSA burned. **AND.**

The normal daily fluid requirement:

Give 50% of this the first 8 hours. 50% in the next 16 hours. The fluid input is balanced against the urine output.

The normal urine output is; Children (<30kg wt) 1 ml/kg/hr and adults 0.5ml/kg/hr (30-50mls /hr).

Note: The basis of fluid replacement is that fluid is lost from the circulation into the tissues surrounding the burns and some lost through the wounds. Fluid loss is excessive in 18-30 hours of burns. Low intravascular volume results in tissue circulatory insufficiency (shock) with results such as kidney failure and deepening of the burns.

Dietary management

- High protein and energy diet
- Vitamin C supplementation

Give ensure or paediasure, nutrient optimum, peptamen junior/adult

18.4 Sprains and strains

Description

Sprains are episodes of high impact or overstretching of the ligaments around a joint. Injury is to soft tissue causing inflammation.

Causes

- Sport injuries
- Motor vehicle accidents
- Slips and twists
- Overuse of muscles
- Abnormal posture

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

Diagnostic criteria and investigations

- Pain, especially on movement
- Tenderness on touch
- Limited movement
- History of trauma

Management

Community level	Health centre level	Hospital level
First Aid • Immobilise with firm bandage and/or temporary splinting e.g. triangular sling, back slab, etc. • Apply cold compressions	• Treat as CL **AND** • Paracetamol, oral, 15 mg/kg 4–6 hourly when required. Maximum of 4 doses per 24 hours	• Immobilise with firm bandage and/or temporary splinting e.g. triangular sling, back slab, etc. **Children over 12 years and adults:** • Ibuprofen 200–400mg (O) 8 hourly with or after a meal. **OR/AND** • Paracetamol, oral, 15mg/kg 4–6 hourly when required. Maximum of 4 doses per 24 hours. **In children less than 6 months:** Paracetamol 10mg/kg 8 hourly for 7 days. **Note:** Perform X-ray to rule out dislocations or sublaxations. **Refer if:** • Severe progressive pain. Do X-ray to exclude bone fractures or joint dislocation. • Progressive swelling • Extensive bruising • Deformity • Joint tenderness on bone • No response to treatment • Severe limitation of movement

18.5 Traumatic brain injuries

Description

It is any episode of trauma to the head. We will exclude maxillo-facial injuries and eye injuries from this discussion. Mortality is increased if hypotension or airway/breathing problem is not adequately solved.

Classification of head injuries

- Involving scalp only
- Traumatic brain injury

Diagnostic criteria and investigations

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

Illustration of traumatic brain injuries

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

Management

Community level	Health centre level	Hospital level
• Clean and dress any wound • If unconscious, ensure airway is patent • Keep patient warm • Put in coma position • Prevent spinal injury by stabilising the neck with collar • **Refer** immediately to health centre.	• Take full history from patient, relatives or whoever has brought patient where indicated • Ensure adequate oxygenation • Clean and suture wound as appropriate • Record and monitor vital signs including pupil size and symmetry • Inset IV line Normal saline or Ringer's lactate, avoid glucose containing fluids. • **Refer** if moderate or severe TBI, pupil asymmetry.	• Take full History as HC • Examine patient thoroughly, note the level of consciousness, pupils' asymmetry and any lateralising signs. • Phenytoin 100mg IV 8 hourly • Catheterise • Brain CT scan • Mannitol infusion 0.25g/kg over 30-60- only if BP is normal and there is clinical deterioration. • Admit to ICU if GCS score is 8 and below, or refer if required • Craniotomy is indicated for specialist cases e.g. intracranial hematomas, depressed skull • Fractures based on pupil asymmetry, lateralising signs and brain CT scan • **Refer** or consult the specialist if indicated especially moderate and severe traumatic brain injury and if pupil asymmetry is noted

Glasgow Coma Score

Score	Motor response	Score	Verbal	Score	Eye
6	Obeys verbal command	5	Oriented and converses	4	Eye open spontaneously command
5	Obeys verbal command	4	Disoriented and converses	3	Eye open to verbal command
4	Localises painful stimulus	3	In appropriate words	3	Eye open to pain
3	Abnormal flexion to painful stimulus	2	In appropriate sound	2	Eye open to pain
2	Extension to painful stimulus	1	No response	1	
1	No response				

Severe traumatic brain injury

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

Management

Community level	Health centre level	Hospital level
• **Refer** immediately to health centre.	• **Refer** to hospital immediately	• ICU admission • Craniotomy if indicated based on brain CT scan findings • Rehabilitation upon discharge from hospital **Traumatic brain injuries** • critical brain injury: give Ensure, or Paediasure, Nutrient Optimum, Peptamen Junior/Adult

chapter

19

Blood and Blood forming Organs Diseases

19.1 Anaemia

Description

Anaemia is a pathological condition arising as a result of low level of haemoglobin in the body. Reduction of haemoglobin impairs oxygen transport to the tissues – the basis of the clinical features of anaemia. Anaemia can be classified according to cause and mechanism of development. Anaemia affects all population groups but children aged below five years and pregnant women are the most vulnerable. Anaemia is not a diagnosis, it is a manifestation of underlying disorders

Signs and symptoms

- Pallor
- Jaundice (haemolysis)
- Splenomegaly
- Signs of micronutrient deficiency: skin and mucosal changes, including a smooth tongue, brittle nails, spooning of nails (koilonychia), and cheilosis. Dysphagia due to the formation of oesophageal webs (Plummer-Vinson syndrome) may occur in severe iron deficiency.
- Purpura
- Petechiae
- Fatigue
- Dizziness
- Shortness of breath
- Decreased mental alertness
- Bleeding

Causes

Four major groups are as follows:

- **Haemorrhagic anaemia:** develops due to various forms of bleeding (trauma, excessive menses, bleeding associated with pregnancy and birth giving, and parasitic infestations such as hookworms and schistosomiasis).
- **Haemolytic anaemia** – due to massive destruction of red blood cells as occurs in malaria and sickle cell disease.
- **Hypoplastic/Aplastic anaemia** – due to failure of bone marrow to produce sufficient red blood cells. Bone marrow depression can be caused by diseases (autoimmune, viral infection), radiation and chemotherapy and intake of some drugs (anti-inflammatory, antibiotics).
- **Nutritional anaemia** – due to deficiency of the nutrients needed for the synthesis of red blood cells: iron, folic acid and vitamin B12

Risk factors

1. Alcoholism
2. Medicines: e.g. hydroxyurea, zidovudine, methotrexate, phenytoin, carbamazepine
3. Chronic diseases: e.g HIV, TB, chronic kidney disease, haematological neoplasms, hypothyroidism, G6PD deficiency, sickle cell disease, thalassaemia

4. Environmental exposure: lead poisoning

Diagnostic criteria and investigations

- FBC and differential count

Detection of anaemia is by determining the concentration of Hb and the Cut-off points are as follows:

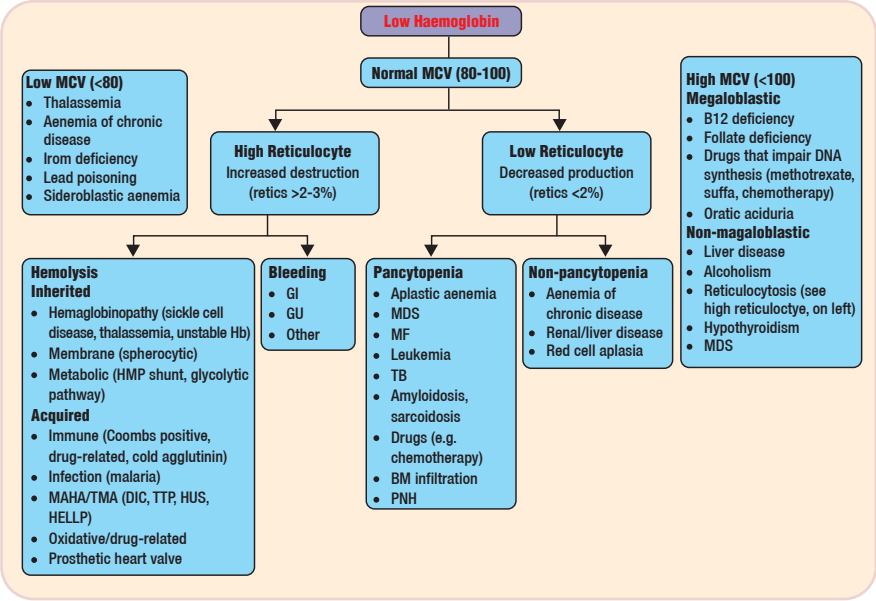
Population group	Hb levels indicating anaemia (g/dl)
Children 6 to 59 months	Below 11.0
Children 5 to 11 years	Below 11.5
Children 12 to 14 years	Below 12.0
Adult men (15+ years or above)	Below 13.0
Adult women (15+ years or above, non-pregnant)	Below 12.0
Pregnant women (regardless of age)	Below 11.0

Severity of anaemia:

- Hb 11.0 – 10.0 g/dl to the cut-off point = mild anaemia
- Hb = 10.0 – 7.0 g/dl = moderate anaemia
- Hb < 7.0 – 4.0 gdl = severe anaemia
- Hb < 4.0 g/dl = very severe anaemia

Further classification is needed to determine the type of anaemia based on the mean corpuscular volume (MCV), MCH (mean corpuscular haemoglobin), red blood count, reticulocytes count and MCHC (mean corpuscular haemoglobin concentration).

Approach to aenemia by NCV



Management

Community level	Health centre level	Hospital level
• Eat a diet containing iron foods liver, poultry, fish, seafood	• Eat a diet containing iron foods liver, poultry, fish, seafood • Iron and folic acid supplementation • Micronutrients fortified foods	• Treat as health centre

19.1.1. Iron deficiency

Description

The main function of iron is transport of oxygen at various sites in the body. Thus iron is a component of haemoglobin and myglobin (protein molecule in the muscle which carries oxygen for muscle metabolism). Iron is a component of cytochromes (involved in cell respiration); component of xanthine oxidase (involved in catabolism of purines which make nucleic acids). Iron is a component of aconitase (involved in the Krebb's Cycle) and many other enzymes such as peroxidase and catalase. While Hb concentration is used to define anaemia, it does not define the body's iron status.

Three stages are distinguished in the reduction of the body's iron status

- Depletion of iron stores: the body's storage pool (deposits in the liver, spleen and bone marrow) diminishes due to insufficient dietary intake. This has no effect on the Hb yet.
- Iron deficiency erythropoiesis: storage levels are substantially reduced, inadequate iron is available in the bone marrow for the synthesis of Hb. Still, no overt effect on the Hb level.
- Iron deficiency anaemia: last and most severe stage of iron deficiency – iron stores are insufficient to maintain Hb synthesis. Hb level decreases leading to anaemia.

Signs and symptoms of deficiency

- Pallor
- Glossitis
- Fatigue
- Dizziness
- Decreased mental alertness
- Anaemia (microcytic)

Management

Community level	Health centre level	Hospital level
• **Refer** to Health centre	• Eat a diet containing iron foods liver, poultry, fish, seafood • Ferrous Sulphate, oral, 170mg • Elemental iron, 65mg • Vitamin C **Refer the following if there is failure to respond to iron therapy:** • Continued blood loss, • Wrong diagnosis • Malabsorption • Mixed deficiency; concurrent folate or vitamin B deficiency.	• Ferrous sulphate 200mg **Children:** • Ferrous sulphate 5mg/kg **Red cell concentrate transfusion is indicated in patients with:** • Anaemia leading to cardiac failure or severe dyspnoea • Active, ongoing bleeding • Where correction of anaemia is required prior to performing an urgent invasive procedure or surgery.

19.1.2 Anaemia, megaloblastic

Description

Anaemia is caused by a deficiency of folate and/or vitamin B12.

Note: several medicines can cause macrocytic anaemia (e.g. hydroxyurea, stavudine and zidovudine) without deficiencies of folate and/or vitamin B12.

Diagnostic criteria and investigations

- Elevated MCV (mean corpuscular volume) and MCH (mean corpuscular haemoglobin)
- Pancytopenia in severe cases
- Full blood count smear: oval macrocytes, hyper-segmentation of neutrophils, thrombocytopenia with giant platelets
- Decreased serum vitamin B or red blood cell folate
- Intrinsic factor antibodies, and/ or anti-parietal cell antibodies are found in pernicious anaemia

Management

Community level	Health centre level	Hospital level
Refer to Health centre	**Refer** to hospital	• Dietary modifications to ensure adequate intake of folate and vitamin B12 • Identify and treat the underlying cause, e.g. antibiotics for intestinal overgrowth with bacteria. • After blood samples for RBC, folate and vitamin B12 levels have been taken, start with folic acid and vitamin B supplementation as follows: • Folic acid, oral, 5mg daily until haemoglobin returns to normal. Prolonged treatment may be required for malabsorption states. **AND** • Vitamin B12, IM, 1mg daily for 5 days, then weekly for a further 3 doses. Follow with 1 mg every second month for life in patients with pernicious anaemia. **Note the following:** • Give vitamin B12 and folic acid together until the test results are available as giving folic acid alone in patients with a B deficiency may precipitate a permanent neurological deficit. Adjust management according to results.

Community level	Health centre level	Hospital level
		• Response to treatment is associated with an increase in strength and improved sense of well-being. • Reticulocytosis begins 3–5 days after therapy and peaks at about day 7. • The anaemia normally corrects within 1–2 months. The white cell count and platelets normalise in 7–10 days. As there is an increase in red blood cell production, iron and folic acid supplementation is also recommended, until Hb has normalised. Check for hypokalaemia in the first few days of therapy. **Consider the following if there is failure to respond:** • Co-existing folate and/or iron deficiency, • Other causes of macrocytosis: myelodysplasia, hypothyroidism, • Chronic alcohol use, • Drug-induced, e.g. hydroxyurea, stavudine and zidovudine. • Prophylaxis • Vitamin B12, IM, 1mg every second month for life is indicated for patients after total gastrectomy or ileal resection. **Folic acid, oral, 5mg daily is indicated for the following:** • Chronic inherited haemolytic anaemias, e.g. sickle cell anaemia, thalassaemia. • Myeloproliferative disorders. • Exfoliative skin disorders. • Increased demands, e.g. pregnancy, chronic haemodialysis.

19.1.3 Anaemia, chronic disorder

Description

Anaemia due to chronic inflammation. This is characteristically a normochromic normocytic anaemia.

Causes

- Malignancy, e.g. haematological or solid tumours
- Autoimmune disorders, e.g. rheumatoid arthritis
- Chronic infections, e.g. HIV and TB
- Chronic kidney disease

Management

Community level	Health centre level	Hospital level
• **Refer** to hospital	• **Refer** to hospital	• Treat the underlying condition. • Blood transfusion is seldom necessary. **Note:** Do not treat with iron, folic acid or vitamin B unless there is a documented deficiency (note that diagnosing iron deficiency is difficult in chronic disorders as ferritin increases and serum iron decreases due to the acute phase response).

19.1.4 Anaemia, haemolytic

Description

Anaemia due to destruction of red blood cells. Destruction may be due to:

- Extracellular factors such as auto-immunity or mechanical factors, e.g. disseminated intravascular coagulation (DIC), hypersplenism, mechanical heart valves
- Abnormalities of the cell membrane, e.g. hereditary spherocytosis
- Enzymes, e.g. G6PD deficiency
- Haemoglobin abnormalities, e.g. sickle cell anaemia, thalassaemia

Diagnostic criteria and investigations

- Evidence of haemolysis: anaemia, reticulocytosis, decreased haptoglobin, increased lactate dehydrogenase (LDH) and unconjugated hyperbilirubinaemia.
- Full blood count smear: Spherocytes often reported
- Coombs' test (direct antiglobulin) is usually positive with autoimmune haemolysis.
- HIV status

Management

Community level	Health centre level	Hospital level
Refer to hospital	• Eat a diet containing iron foods liver, poultry, fish, seafood • Ferrous sulphate 200mg **Children:** • Ferrous sulphate 5mg/kg • Vitamin C **Refer the following if there is failure to respond to iron therapy:** • Continued blood loss, • Wrong diagnosis • Malabsorption • Mixed deficiency; concurrent folate or vitamin B deficiency	• Treat as HC • Treat the underlying cause. **All patients because of high red cell turnover, should be supplement with:** • Folic acid, oral, 5mg daily. **Do not transfuse prior to appropriate investigations, unless anaemia is severe.** **Red cell concentrate transfusion is indicated in patients with:** • Anaemia leading to cardiac failure or severe dyspnoea • Active, ongoing bleeding • Where correction of anaemia is required prior to performing an urgent invasive procedure or surgery. • Coombs-positive haemolytic anaemia may be technically difficult to cross match. • In G6PD deficiency, avoid drugs known to cause haemolysis, acetylsalicylic acid, sulphonamides (including cotrimoxazole), dapsone and prima • In patients with cold agglutinins all transfusions must be given blood warmed to avoid cold-induced haemolysis. **Autoimmune haemolytic anaemia:** Prednisone, oral. **Initial dose:** 1mg/kg daily, until Hb stable and >10 g/dL. Taper slowly and monitor Hb at least once weekly. **Note:** Prednisolone can be stopped when there is normalisation of haemoglobin and LDH. The patient should be monitored for recurrence following cessation of treatment. Treat under specialist supervision. **Referral if:** • If inadequate response: haemolysis remains severe for 3 weeks at prednisolone doses of 1mg/kg, if remission cannot be maintained on low doses of prednisone, patient has intolerable adverse effects or contraindicated glucocorticoids. • There is need for second-line treatment

19.1.5 Anaemia, aplastic (pancytopenia)

Description
Pancytopenia due to a hypoplastic bone marrow

Signs and symptoms
- Pallor
- Bleeding
- Frequent or severe infections

Management

Community level	Health centre level	Hospital level
Refer to hospital	• **Refer** to hospital	• Refer all cases of suspected aplastic anaemia with a specialist. • Stabilise patient, if necessary, with blood products before transport but after consultation with an expert.

19.1.6 Pancytopenia in HIV positive patients

Description
Full blood count (FBC) indicate different degrees of anaemia, thrombocytopaenia and leucopaenia.

Causes
- Direct effect of HIV
- Medication
- Secondary opportunistic infections
- Malignancies
- Nutritional deficiencies

Diagnostic criteria and investigations
- Full blood count smear
- Vitamin B12 and red cell folate
- Appropriate investigation to exclude opportunistic infections
- Bone marrow trephine and aspiration in selected patients

19.1.7 Anaemia, sickle cell

Description
Severe hereditary anaemia with sickle cell anaemia (HbSS), as a result of mutated haemoglobin which distort red cells.

Causes

- Recurrent acute vaso-occlusive episodes ("sickle crises") and chronic haemolytic anaemia.
- Adults develop hyposplenism, predisposing them to infection with encapsulated bacteria.

Signs and symptoms

- **Vaso-occlusive episodes**
  Vaso-occlusion can involve any part of the body, especially the skeleton. Episodes may be triggered by dehydration, infection, stress or menstruation.
  The most common presentation is with acute episodes of pain, varying in severity, in the affected areas.

Diagnostic criteria and investigations

- History
- Peripheral blood examination,
- Screening tests for sickling.
- Diagnosis is confirmed on haemoglobin electrophoresis.
- Homozygous individuals with sickle cell trait on the blood film have < 50% HbS and are generally asymptomatic. Milder sickle cell disease occurs in individuals with HbSC.

Management

Community level	Health centre level	Hospital level
Refer to hospital	• **Refer** to hospital	**Severe vaso-occlusive episodes:** • Keep well hydrated with intravenous fluids. • Transfusion is only indicated for severe episodes with severe anaemia – • Discuss with a specialist. • Pain must be controlled. **Severe vaso-occlusive episodes:** • Oxygen to maintain adequate saturation. **To prevent venous thromboembolism:** • Unfractionated heparin, SC, 5000 IU 12 hourly. **OR** • Low molecular weight heparin, enoxaparin, SC, 40mg daily. **AND** • Folic acid, oral, 5 mg daily. • Vaccination against infections due to pneumococci and haemophilus • Hydroxyurea (specialist-initiated) is the mainstay of therapy in severe disease. **Refer** if: • All patients, for chronic management in a specialised centre. • Vaso-occlusive episodes should be managed in consultation with a specialist.

19.2 Febrile neutropenia

Description

Febrile neutropenia is conventionally defined as an absolute neutrophil count of < 0.5 x 109/L with a temperature of greater than 38°C for > 1 hour or a single temperature of 38.3°C, but any neutropaenic patient showing clinical signs of sepsis should be investigated.

Signs and symptoms

1. Fever and chills
2. Fatigue
3. Infections by endogenous bacteria (e.g staphylococcus, gram negative bacteria). The most frequently occurring infections in patients with profound neutropenia are: cellulitis, liver abscesses, furunculosis, pneumonia, septicemia

Causes

- Decreased production: infections, drug induced (clozapine, antithyroid medications, sulfasalazine, methimazole, trimethoprim-sulfamethoxazole), nutritional deficiency, chemo-therapy, idiopathic
- Peripheral destruction/sequestration: spleen trapping, autoimmune disorders, methyldopa, antineutrophil antibodies
- Excessive margination: haemodialysis, idiopathic

Diagnostic criteria and investigations

Severity of neutropenia is classified into mild (1.0-1.5x109/L), moderate (0.5-1.0x109/L) and severe (<0.5x109/L). Clinical signs of sepsis with neutropenia confirms the diagnosis.

Management

Community level	Health centre level	Hospital level
Refer to hospital	• **Refer** to hospital	This is a medical emergency as these patients can rapidly develop features of severe sepsis (multi-organ failure and/or hypotension). • Treat the underlying cause of neutropenia, if applicable. • Withdraw any medication that may cause neutropenia. • Consider removing central IV line. **For patients with febrile neutropenia within 48 hours of admission:** • Ceftriaxone, IV, 1g daily. **AND** • Gentamicin, IV, 6mg/kg daily.

Community level	Health centre level	Hospital level
		If IV line, skin infection is suspected as the cause **ADD** meropenem, IV, 1g 8 hourly. **OR** • Imipenem, IV, 500mg 6 hourly. • Vancomycin, IV, 30mg/kg as a loading dose. Follow with 20mg/kg/dose 12 hourly. If fever develops after 48 hours of admission: **Note**: Ertapenem is not recommended because it is not effective for Pseudomonas species, which are important pathogens in this setting. **OR** • Piperacillin/tazobactam, IV, 4.5g 8 hourly **OR** • Cefepime, IV, 1g 12 hourly. If no response after 5–7 days: **ADD** • Amphotericin B, IV, 1 mg/kg daily in dextrose 5 % over 4 hours; ensure adequate hydration to minimise nephrotoxicity. **Duration of therapy:** • If neutrophil count increases to >0.5× 109/L, continue for 2 days after fever has settled. • If neutrophil count remains >0.5 × 109/L, continue for 7 days after fever has settled. **Refer the following:** All cases: consult with haematologist/oncologist.

19.3. Bleeding disorders

19.3.1 Haemophilia A and B

Description

Inherited bleeding disorders because of clotting factor deficiency VIII and IX which is X-linked and Haemophillia C and parahaemophillia as a result of deficiency of factor XI and V, respectively.

Other bleeding disorders include von Willebrand's disease, platelets disorders and factor

Signs and symptoms

- Haemorrhagic manifestation
  - Severe - Bleed spontaneously
  - Moderate - Bleed with minor trauma
  - Mild - Bleed with surgery or trauma

- Sites of bleeding
  - Joints - knees > ankles > elbows >shoulder > wrist > hips
  - Muscles - Psoas muscle, quadratus,
  - Mucous membranes - oral, nasal, GIT, GUT
- Other organ systems – CNS

- External features
  External bleeding may be from:
  - Mouth
  - Cut
  - Loosing teeth
  - Bite
  - Nose bleeding for no obvious reason
  - Heavy bleeding from minor cuts
  - Bleeding from cut that resume after stopping

- Internal Bleeds
  - Blood in urine
  - Blood in stools
  - Large bruises (bleeding into the muscles of the body)

- Haemathrosis
- Acute bleeds
- Pain, swelling and decreased range of motion

- Chronic bleeds
  - Muscle wasting
  - Axial deformity
  - Instability
  - Fixed Flexion deformity
  - Crepitation
- Traumatic bleeding

Differential diagnosis

- Septic arthritis
- Osteomyelitis
- Acute gouty attack

Classification

Type	Factor deficiency	Inheritance
Haemophillia A	Factor VIII	X-linked
Haemophillia B	Factor IX	X-linked
Haemophillia C	Factor X1	Autosomal recessive
Parahaemophillia	Factor V	Autosomal recessive

There are other acquired bleeding disorders e.g. malignancies

Haemophilia is classified as mild, moderate or severe according to the levels of circulating factors VIII or IX and indicates the expected frequency of bleeding.

Classification	Haemophilia A Factor VIII level	Haemophilia B Factor IX level	Clinical features
Severe	<2% of normal Less or equal 0.01 U/ml	Less or equal 1% of normal Less or equal 0.01U/ml	1. Spontaneous haemorrhage 2. Frequent spontaneous haemarthrosis factor is needed several times
Moderate	Moderate 2-5% of normal 0.01-0.05 U/ml		1. Haemorrhage secondary to trauma or surgery 2. Occasional spontaneous haemarthrosis
Mild	5-25% of normal	5-25% of normal	1. Haemorrhage post trauma or surgery 2. Rare spontaneous

19.3.2 Von Willebrand's disease

Description

Von Willebrand's disease is an inherited autosomal dominant bleeding disorder as a result of deficiency of Von Willerbrand factor which becomes the bridge between platelet adhesion and aggregation.

Classified in three types

Type 1 (mild), type 2 (moderate) and type 3 (severe)

Signs and symptoms

- Include a family history of the disorder
- Mucocutaneous bleeding (easy bruising, epistaxis, heavy menstrual bleeding, unexplained GI bleeding)

Diagnostic criteria and investigations

- Bleeding time
- Prolonged prothrombin time (PT)
- Prolonged partial thromboplastin time (PTT).
- FBC, platelets count and platelet aggregation test
- Factor deficiency assay (substitution test)
- D-dimer (fibrinogen degradation products)
- Lupus anticoagulant test (To help investigate the cause of a blood clot (thrombotic episode); to evaluate a prolonged partial thromboplastin time (PTT); to help determine the cause of recurrent miscarriages)
- Von Willebrand Factor
- Antiphospholipid antibodies
- Inhibitor screening for those on long term treatment

Level	Percentage of normal factor activity in blood	Number of international units (IU) per millilitre (ml) of whole blood
Normal range	• 50%–150%	• 0.50–1.5 IU
Mild haemophilia	• 5%–40%	• 0.05–0.40 IU
Moderate haemophilia	• 1%–5%	• 0.01⁻0.05 IU
Severe haemophilia	• Less than 1%	• Less than 0.01 IU

Management

Community level	Health centre level	Hospital level
Health education and outreach screening programmes with signs, symptoms with family pedigree tools	• Health education, • Sign, symptoms with family pedigree screening at VMMC, adolescent	Health education to include Patients and family: • Enrol on the haemophilia registry. • Alert bracelet. • Dental care (discuss management of tooth extraction with local haemophilia centre). • Avoid contact sport.

Community level	Health centre level	Hospital level
Health education and outreach screening programmes with signs, symptoms with family pedigree tools In (ECCD, Primary schools, initiation schools, head boys, military recruits and villagers), • Enroll on the haemophilia registry. • Alert bracelet.	• Health education, • Sign, symptoms with family pedigree screening at VMMC, adolescent corner, MCH, and men's clinic • Enrol on the haemophilia registry. • Alert bracelet.	**Treatment approaches are divided into two main categories:** • Prophylaxis for home self infusion On demand • For spontaneous bleeding Factor VIII or IX 50 to 100 IU/kg 12 hourly until clinical improvement • For prophylaxis: 70 to 100 IU per kg every other day. Adjust based on clinical response For surgeries: 50 to 100 IU per kg N/B: Not to exceed a single dose of 100 IU/kg and daily dose of 200unit/kg. Injection or infusion rate must not exceed 2 units/kg/minute • For haemophilias A and B Inhibitor FEIBA: For Prevention and Control of Bleeding episodes, peri-operative management and reduction of bleeding episodes in those who have developed inhibitors to factors VIII and IX. • HEMILIBRA: This could be considered when FEIBA fails **Maintenance dose:** 1.5mg/kg/week OR 3mg/kg/2 weeks OR 6mg/kg/month

19.3.3 Immune thrombocytopenia (ITP)

Description

A common bleeding disorder due to immune-mediated destruction of platelets.

Signs and symptoms

Pattern of bleeding: petechiae in the skin, purpura, multiple ecchymoses, mucosal bleeding and excessive bleeding after surgery

Causes

- Autoimmune B-cell directed production of antiplatelet antibodies
  Clinically apparent associated conditions, drugs (e.g. penicillins, cephalosporins, quinine, rifampicin and heparin), or other agents that may cause thrombocytopenia are NOT present. Patients with suspected ITP should be tested for SLE and for HIV infection.

Diagnostic criteria and investigations

- Thrombocytopenia with normal white cell count and red cell indices (however, anaemia may be present due to blood loss)
- Peripheral blood smear to exclude RBC fragments. Smear may show large platelets
- Do INR and aPTT, both of which should be normal in ITP
- If there is a poor response to treatment do a bone marrow aspirate and biopsy

Management

Community level	Health centre level	Hospital level
Refer to hospital	**Refer** to hospital	Health education on avoiding: • Medication that affects platelet function, e.g. NSAIDs and aspirin • platelet transfusions, unless there are life-threatening bleeds, • Dental procedures in acute phase, and • IM injections. • Reassure the patient that resolution usually occurs in acute ITP. • Medic alert bracelet. • Platelet transfusions may be given if surgery is required or in life-threatening bleeding, discuss with haematologist. Goal of treatment: reduce the risk of bleeding, not normalise the platelet count. Avoid unnecessary treatment of asymptomatic patients with mild to moderate thrombocytopenia (platelet count >30 x 109/L). **Medicine treatment** **Acute ITP** • Prednisone, oral, 1 mg/kg daily, until platelet count has normalised. • Taper slowly and monitor platelet count. (**Refer** to Appendix II for an example of a dose reduction regimen) • Although prednisone is also indicated for HIV-associated immune thrombocytopenia it is important that all these patients should be fast-tracked for ART.

Community level	Health centre level	Hospital level
		Second line therapy Patients with persistent thrombocytopenia not responding to treatment with glucocorticoids. Treatment with specialist supervision There are other multiple treatments available but are dependent on specialist opinion. **Refer if:** • All cases not responding to steroids and, in the case of HIV-infected patients, not responding to ART – discuss with haematologist. • Refer for second line treatment. **Acute active life-threatening bleeding and surgery** • Platelet transfusions. Platelet transfusions are only indicated in acute active bleeding uncontrolled by other means or before procedures. In an adult, 1 unit of platelets, preferably single donor, leucocyte depleted platelets, is usually sufficient to control the bleeding initially. Platelet transfusions have limited benefit in this condition as platelets are rapidly destroyed by the immune system. • Methylprednisolone acetate 1 g, IV, daily for 3 days. If the bleeding cannot be controlled, consult with a specialist.

19.3.4 Thrombotic thrombocytopenic purpura-haemolytic ureamic syndrome (TTP-HUS)

Description

This is a medical emergency.

Acute syndromes with abnormalities in multiple organ systems with evidence of micro-angiopathic haemolytic anaemia and thrombocytopenia.

Signs and symptoms

This condition presents with varying combinations of the following (only some of which may be present):

- Microangiopathic haemolytic anaemia thrombocytopenia, often with purpura but not usually severe bleeding
- Acute renal insufficiency
- Neurologic abnormalities, and
- Fever

Causes

- Diffuse platelet aggregation due to autoantibodies against a preventative enzyme; associated with endothelial injury and Escherichia coli O157:H7 infection
- TTP-HUS is often associated with HIV infection and all patients should be tested for HIV.

Diagnostic criteria and investigations

- The presence of fragments and low platelets is enough to consider the diagnosis.
- Microangiopathic haemolytic anaemia is defined as nonimmune haemolysis with prominent RBC fragmentation (schistocytes) observed on the peripheral blood smear along with thrombocytopaenia.
- TTP-HUS should be distinguished from disseminated intravascular coagulation (DIC) and severe pre-eclampsia where, in the latter, the coagulation profile (PT/PTT) is also deranged.

Management

Community level	Health centre level	Hospital level
Refer to hospital	**Refer** to hospital	• In HIV-associated thrombotic thrombocytopenia, start combination antiretroviral therapy urgently. • Lyophilised plasma, IV infusion, 30mL/kg/day in 3–4 divided doses. **OR** FFP, IV infusion, 30mL/kg/day in 3–4 divided doses. Use of platelet transfusions should be discussed with aspecialist. **Refer:** All patients – discuss with a haematologist urgently.

19.4 Venous thrombo-embolism

Description

Venous thromboembolism (VTE) should be seen as a spectrum from calf deep venous thrombosis (DVT) to pulmonary thrombo-embolism. All patients should be seen as potentially high risk.

Signs and symptoms

- PE: Tachypnea, tachycardia, low-grade fever, neck vein distention, and a loud P2 on cardiac examination, hypotension and cyanosis suggest massive PE.
- DVT: mild calf tenderness, marked thigh swelling and inguinal tenderness with massive DVT, phlegmasia alba dolens (white appearance) and phlegmasia cerula dolens (acute pain and oedema) with massive thrombosis

Causes

Virchow's Triad

- Endothelial damage: exposure of procoagulant proteins on dysfunctional endothelium, changes to vessel wall integrity
- Venous stasis: immobilisation (e.g. Post-MI, CHF, stroke, and postoperative)
- Hypercoagulability: inherited, acquired, age (risk increases with age), surgery (especially orthopaedic, thoracic, GI, and GU), trauma (especially fractures of spine, pelvis, femur, or tibia, and spinal cord injury), neoplasms (especially pancreas, stomach, lung, lymphoma, bladder, testicular, colorectal, and gynaecologic, blood dyscrasias, PNH, hyperviscosity, polycythemia, leukemia, and SCD), haemolytic anaemias, prolonged immobilisation (e.g. CHF, stroke, MI, and leg injury), hormone related (combined COC, hormone replacement therapy, and selective estrogen receptor modulators), pregnancy, AntiPhospholipid Syndrome, heart failure
- Idiopathic (10-20% are later found to have cancer)

Differential diagnosis includes

• Cellulitis • Superficial thrombophlebitis • Lymphoedema • Chronic venous insufficiency	• Ruptured popliteal (Baker's) cyst • Calf muscle pull or tear • Internal derangement of the knee

Diagnostic criteria and investigations

Diagnosis is primarily clinical (Wells' score to predict probability of DVT) and confirmed with imaging studies, e.g. Duplex Doppler.

Well'score criteria	Score	Total score interpretation
Paralysis, paresis, or recent orthopaedic casting of lower extremity	1	3-8: High probability
Recently bedridden (>3 days) or major surgery within past 4 weeks	1	1-2: Moderate
probability,		
Localised tenderness in deep vein system	1	-2-0: Low probability
Swelling of entire leg	1	
Calf swelling >3 cm compared to the other leg (measured 10 cm below the tibial tuberosity	1	
Pitting oedema greater in the symptomatic	1	
Collateral non-varicose superficial veins	1	
Active cancer or cancer treated within 6 months	1	
Alternative diagnosis more likely than DVT (e.g. Baker's cyst, cellulitis, muscle damage, superficial venous thrombosis Prothrombin blood test (PT) • Patial prothrombin time (PTTK) • International normalised ratio (INR) • D-Dimer blood test	-2	

Community level	Health centre level	Hospital level
		Treat a HC **AND** **Acute management** Thrombolytic therapy may be indicated in patients with confirmed early pulmonary embolism where haemodynamic stability cannot be achieved. Discuss with a specialist. **MEDICINE TREATMENT** **PROPHYLAXIS** • Risk assessement Risk assessment is essential, and treatment needs to be individualised. • Prophylactic treatment Prophylaxis is indicated for medical patients with moderate to high risk of VTE (see table above), with restricted mobility during acute illness/ surgical patients. Low molecular weight heparin, e.g.: • Enoxaparin, SC, 40 mg daily. • In morbid obesity dosing of LMWH should be individualised, in discussion with a specialist. In renal failure (eGFR <30 mL/minute), the recommended dose of LMWH is 1 mg/kg daily. **OR** • Unfractionated heparin, SC, 5 000 units 12 hourly. • Although the risk of bleeding is small, in the following patients prophylaxis should only be used under exceptional circumstances: • Active bleeding • Intraocular, intracranial or spinal surgery • Lumbar puncture or spinal/epidural anaesthesia within 12 hours after prophylactic dose or 24 hours of full therapeutic dose, [Timing of anticoagulants for patients receiving anaesthesia] • Renal insufficiency • Coagulopathy • Uncontrolled hypertension

Community level	Health centre level	Hospital level
		ACUTE TREATMENT • Unfractionated or low molecular weight heparin started simultaneously with warfarin. After 5 days, heparin may be stopped if a therapeutic INR level has been reached and maintained for at least 24 hours. **Note:** Heparin and warfarin therapy should overlap for at least 5 days. For proximal deep venous thrombosis and/or pulmonary embolism: Low molecular weight heparin, e.g.: • Enoxaparin, SC, 1.5mg/kg daily, **OR** 1mg/kg 12 hourly. In morbid obesity dosing of LMWH should be individualised, in discussion with a specialist. In renal failure (eGFR <30mL/minute), the recommended dose of LMWH is 1mg/kg daily. **OR** • Unfractionated heparin, SC, 333 units/kg as an initial dose. • Follow 12 hours later by 250 units/kg/dose 12 hourly. Evidence indicates that PTT monitoring is not necessary with weight based dosing of unfractionated heparin. However, in patients with morbid obesity and renal failure (eGFR <30mL/minute unfractionated heparin should be used with PTT monitoring to maintain the PTT at 1.5 to 2.5 times the control. PTT should be taken 4 hours after SC dose. Follow with: • Warfarin, oral, 5mg daily. • INR should be done after 48 hours, then every 1 to 2 days until within the therapeutic range of 2 to 3 • Adjust dose to keep INR within therapeutic range • Continue warfarin for 3 months with regular INR monitoring if there was a precipitating cause that has resolved.

Community level	Health centre level	Hospital level
		• In patients with a first unprovoked DVT, discuss duration of therapy with a specialist. • Contraindications for warfarin: first trimester and the last month of pregnancy. In these instances, replace with heparin. • For all major elective surgery and other elective procedures with asignificant bleeding risk, such as neuraxial anaesthesia and lumbar punctures, the INR should be <1.5. **Heparin induced thrombocytopenia** A severe immune-mediated drug reaction occurring in 1–5% of patients receiving heparin (more common with unfractionated heparin, but may also occur with low molecular weight heparin) therapy. It presents with thrombocytopenia and thrombosis. Diagnosis needs a high index of suspicion and should be considered if a patient has a 50% drop in platelet count within 5–10 days after initiating heparin therapy. Confirmation is done by positive antibody testing. Stop heparin and discuss all patients with a specialist. Refer if: • Heparin-induced thrombocytopenia.

19.5 Disseminated intravascular coagulation (DIC)

Description

DIC is a complication of an underlying condition and is characterised by widespread activation of clotting cascade leading to consumption of clotting factors and platelets with generalised bleeding.

Signs and symptoms

Appropriate history of precipitating condition; uncontrolled bleeding from wounds and surgical sites, hematemesis, dyspnea; jaundice, digital cyanosis, hypotension, tachycardia, possible neurologic or renal insufficiency signs, possible shock

Causes

- Sepsis
- Severe trauma
- Neoplasm, obstetric complications: placenta abruption, amniotic fluid embolism, HEELP syndrome

Diagnostic criteria and investigations

No single diagnostic test, but the combination of a prolonged INR and PTT, thrombocytopenia, decreased fibrinogen and increased D-dimer is highly suggestive of the diagnosis.

Management

Community level	Health centre level	Hospital level
• **Refer** to hospital	• **Refer** to hospital	• Identify and treat the underlying cause. • If the patient is bleeding, replace haemostatic factors with cryoprecipitate or FFP/lyophilised plasma. • If the patient is not actively bleeding and platelet count >20 x 109/L, then platelet transfusion is not necessary. • Replacement therapy for thrombocytopenia should consist of 1 apheresis single donor unit or 1 pooled random donor unit. In chronic DIC, or in the absence of bleeding, platelet transfusions should not be given merely to correct the thrombocytopenia. **For hypofibrinogenaemia:** • Cryoprecipitate, IV, 1 unit/10kg. **For depletion of other coagulation factors:** • Lyophilised plasma, IV, 15mL/kg as initial dose. • Volume: ±200mL/unit. **OR** • FFP, IV, 15mL/kg as initial dose. • Volume: ±280mL/unit. • Repeat replacement therapy 8 hourly or less frequently, with adjustment according to the clinical picture and laboratory parameters. • Monitor response with frequent estimation of the platelet count and coagulation screening tests

19.6. Hypersensitivity disorders

Description

Allergen-induced immunologic response by body involving cellular or humoral mechanisms

Signs and symptoms

Symptoms and signs typically occur within 30 minutes of initial exposure but may appear up to several hours later. These include (in order of frequency):

(1) Skin manifestations, typically urticaria but also flushing, blotchy rashes, and pruritus;
(2) Respiratory distress, including wheezing, stridor, bronchospasm, and airway angioedema;
(3) Gastrointestinal symptoms, including cramping, emesis, and diarrhoea (especially in food allergy); and
(4) Hypotension, often manifested as lightheadedness, dizziness, or syncope. The condition is potentially fatal, especially if untreated, and can affect both nonatopic and atopic persons.

Causes and types

Gell and Coombs types of hypersensitivity			
Type	**Mediated By**	**Mechanism**	**Examples**
I (Anaphylactic)	IgE antibodies attached to mast cells	Antigens react with antibody to cause **mast cell degranulation** and histamine release	Allergic rhinitis, asthma, **anaphylaxis**
II (Complement-mediated)	IgM and IgG antibodies	Cellular antigens react with antibodies to initiate **complement cascade** and cell death	**Drug-induced or immune haemolytic anaemia,** hemolytic disease of the newborn
III (Immune complex-mediated)	IgM and IgG immune complexes	Antibodies bind to soluble antigens to form **immune complexes,** which are then deposited in tissue and initiate complement cascade	Arthus reaction, serum sickness, glomerulonephritis

Gell and Coombs types of hypersensitivity			
Type	**Mediated by**	**Mechanism**	**Examples**
IV (Delayed)	T cells and macrophages	T cells present antigens to macrophages and secrete lymphokines that induce macrophages to destroy surrounding tissue	Transplant rejection, **allergic contact dermatitis**, PPD testing
Ig= Immunoglobulin PPD, purified protein derivative			

Diagnostic criteria and investigations

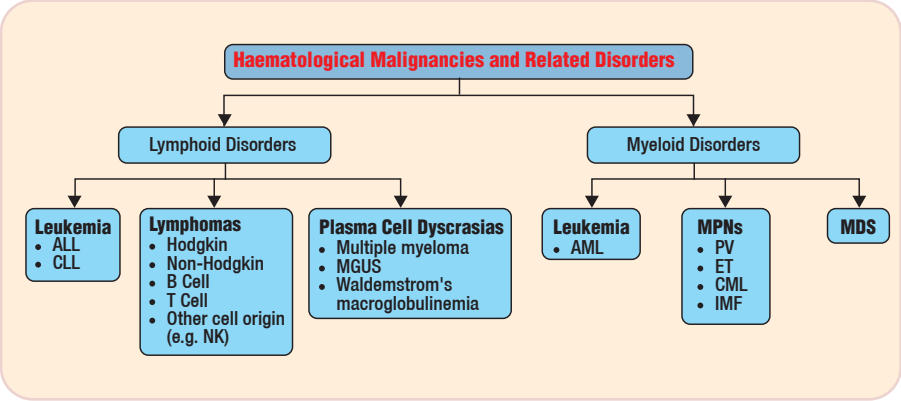
- Based on clinical presentation
- FBC and IgE levels
- Skin allergen testing or radioallergosorbent test (RAST) may be useful indetermining specific allergies

Community level	Health centre level	Hospital level
Health education on: • Contact prevention and avoidance of offending agents is important	Treat as CL **AND/OR** **Type I:** antihistamines, bronchodilators, and corticosteroids may improve symptoms after reaction; desensitisation may be considered to avoid recurrent reactions; if anaphylaxis is a concern, epinephrine injections should be kept readily available (see Anaphylactic shock management) **Type II:** anti-inflammatories or immunosuppressive agents, possibly plasmapheresis **Type III:** anti-inflammatories **Type IV:** corticosteroids or immunosuppressive agents **Medicine treatments** • For mild skin presentations (urticaria see chapter on skin conditions) • Adrenaline injection 0.5mg IM stat adults, 0.3mg IM stat children (see anaphylactic shock) • Chlorpheniramine 4mg 8 hourly or loratadine 10mg 24 hourly or cetirizine 10mg 24 hourly for 5 days • Prednisolone 20mg 12 hourly for 5 days or dexamethasone 4mg 12 hourly or Hydrocortisone injection 100mg 12 hourly for 24 to 48 hours • Hydrocortisone cream or mepyramine cream • Salbutamol nebulisation for bronchoconstriction (stridor and wheezing) **Refer if:** • Treatment failure • Recurrence • For change of regimen in case of chronic treatment	Treat as HC

19.7 Haematological malignancies

Description

Haematological malignancies are classified according to the cells affected in two main groups as described in the table below.



Signs and symptoms

- Fatigue
- Weight loss
- Signs of platelet deficiency: easy bruising, purpura, mucosal bleeding
- Signs of anaemia: pallor, dyspnea on excession
- Signs of neutropenia: fever, frequent infections
- Signs of other ogarns infiltration: lymphadenopathy, bone and joint pain hepatosplenomegaly, pathologic fractures

Causes and risk factors

- Exposure to ionising radiation or chemicals e.g. benzene
- Prior treatment with certain antineoplastic drugs
- Infection with a virus e.g. HIV, EBV (Epstein-Barr Virus), herpes virus 8

Diagnostic criteria and investigations

- FBC
- Blood smear
- Bone marrow biopsy
- Histochemical studies
- Cytogenetics
- Serum and urine protein electrophoresis
- Lymph node biopsy

Community level	Health centre level	Hospital level
Refer to hospital	• **Refer** to hospital	**Severe anaemia:** • Transfusion • Antimicrobial drugs for confirmed infections • Hydration and urine alkalinisation • Psychological support • Pain management (see chapter on pain management) **Refer:** all cases to specialist

chapter

20

Pain Management

Description

Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage. Pain is the commonest reason why people seek help and care, yet many individuals suffer with unrelieved or undertreated pain.

20.1 Types of pain

It is important to understand the pathophysiology of pain – i.e. nociceptive or neuropathic, because of therapeutic implications.

1. Nociceptive pain is produced by stimulation of specific sensory receptors in the viscera and somatic structures through intact nerves.
   - It is either somatic (presenting as sharp well localised pain or dull localised pain from joints, etc) or visceral (presenting as dull poorly localised pain).

2. Neuropathic pain presents as a result of damage to central and/or peripheral nerves and it presents as burning or shooting.

Concept of total pain

Physical pain does not occur in isolation. A patient's mood, sense of well being financially, socially and spiritually can all influence the pain experienced and thus how it affects their life. When assessing a patient's pain it is essential to incorporate the concept of total pain, thereby ensuring that a holistic assessment is undertaken.

Diagnostic criteria and investigations

Pain Assessment

Precise and systematic pain assessment is required to make the correct diagnosis and determine the most efficacious treatment plan for patients presenting with pain.

Technique

Pain must be assessed using a multidimensional approach, with determination of the following:

- Chronicity
- Severity
- Quality
- Contributing/associated factors
- Location/distribution or etiology of pain, if identifiable
- Mechanism of injury, if applicable
- Barriers to pain assessment

All patients should be evaluated for pain at every visit- supporting the claim that pain should be considered the fifth vital sign.

Pain severity is best assessed by the patient self-reporting. Pain severity assessment maybe aided by:

- Visual analogue scales
- Numerical rating scales, and
- Faces scale

Pain is subjective and therefore a patient should be encouraged to report about their own pain. A thorough assessment of a client's pain is essential to establish the most likely cause, evaluate any contributing factors and decide appropriate intervention.

Whole patient pain assessment

Physical	What is the likely cause of this pain in this patient at this time? What structural or functional abnormality would cause this pain pattern?
Psychological	How is the patient coping with the pain? How much anxiety or depression is present? What are the patient's ideas, concerns or expectations about pain and its management in this situation? What information do they need?
Social	How is the pain affecting the family? How much family anxiety is present? What are the family's ideas, concerns and expectations? (These may differ from the patient's) How have family dynamics been affected by this illness? How is the pain limiting the usual role(s)?
Spiritual	How much distress or suffering is this patient experiencing? What does the pain mean to them? What does the illness mean to them? What sustains them in difficult times?

The PQRST pain assessment

Meaning		Example
P	Palliative, Provocative	What makes the pain better? What makes the pain worse?
Q	Quality	What are the properties &characteristics of the pain? How would you describe the pain?
R	Radiation	Where does the pain start and travel to ?
S	Severity	Rate the pain ;on a scale of 0-5 ,how bad is your pain ?
T	Temporal	What are the patterns of the pain? Is it constant, or does is come and go

Pain assessment in the elderly

Pain assessment can be particularly difficult in elderly patients for the following reasons:

- Underreporting of discomfort because the patient does not want to complain
- Use of pain to mask other newly developing physical or cognitive disabilities
- Decreases in hearing and visual acuity, so that pain assessment tools that require extensive explanation or visualisation to perform will be more difficult and possibly less reliable The verbal descriptor scale may be the easiest tool for the elderly to use. It allows patients to use common words to describe what they are feeling

Pain assessment in infants

The following tools use a combination of behavioural and physiologic measurements to assess pain in infants:

- CRIES - Uses 5 variables (ie, crying, requires oxygen, increased vital signs, expression, sleeplessness) on a scale of 0-2 points to assess neonatal postoperative pain
- Modified Behavioural Pain Scale - Uses 3 factors (facial expression, cry, movements); has been validated for children aged 2-6 months

Pain assessment in young children

Limited cognitive or language skills may influence pain measures, as may the positive or negative consequences of a child's behaviours associated with pain.

In children older than 3-4 years, self-report measures may be used. However, children may underreport their pain to avoid future injections or other procedures aimed at alleviating the pain.

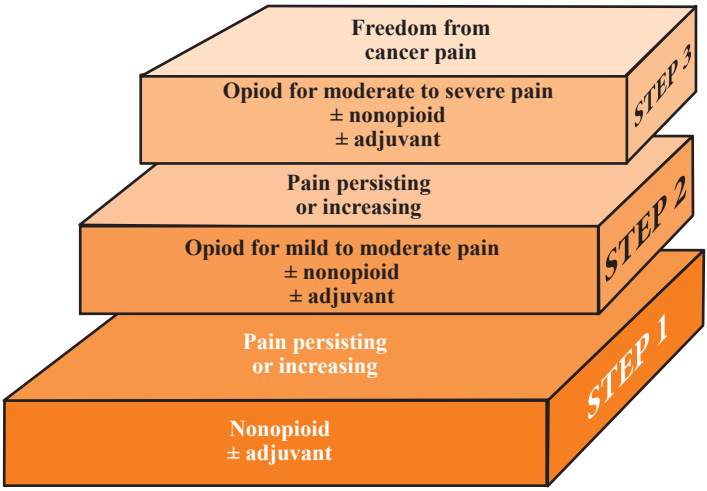
Children may not report pain for several reasons, including their being:

- Frightened of talking to doctors
- Frightened of finding out they are sick
- Unwilling to disappoint or bother their carers
- Unwilling to receive an injection
- Unwilling to return to or delay discharge from hospital
- Unwilling the side effects of medication for pain.
- Question the child and their parents
- Use a pain rating scale
- Evaluate behaviour and physiological changes

Note: a sleeping child, a very quiet child, even a child that is playing is not necessarily pain free. Movement might be painful, or the child might be too sick or too tired to move.

Community level	Health centre level	Hospital level
Health education on: • Lifestyle changes • Ginger • Raw vegetarian diet • Reassure the patient and the family that pain can be relieved. • Explain that pain relief is not instantaneous. • Explain that unpleasant side effects will wear off after 3 days. • Paracetamol 500-1g STAT • **Refer** to health centre	• Treat as above **AND/OR** • Use WHO Stepped Care approach • Paracetamol 500-1g TDS **OR** • Aspirin 300mg TDS • Ibuprofen 400mg TDS **AND OR** • Codeine phosphate 30-60mg TDS • **Refer** to the hospital.	• Treat as above **AND/OR** • Use WHO Stepped Care approach • Tramadol P.O. 50-100mg TDS • Morphine SL P.O. BD • Morphine oral solution 2.5-20mg every 4 hours (Give prophylactic laxative to prevent constipation bisacodyl 5-20mg • Note * Adjuvant therapy - medications that can help to enhance the effects of non-opioid and opioid analgesics • Neuropathic pain • Amitriptyline 25-75mg nocte **OR** • Clonazepam 0.5-2mg OD **OR** • Carbamazepine 100mg BD, can be increased 800mg **OR** • Sodium valproate 200mg BD **Anxiety pain** • Diazepam 5mg BD **Bone pain, neuropathic pain, headache related to increase intracranial pressure** • Prednisolone 30mg daily in the morning • Dexamethasone 2-4mg OD

WHO stepped care approach for pain management



20.2 Pain management in children

General principles to be followed:

- Treat the underlying cause without increasing pain
- Use nonmedicinal support, such as:
  - Emotional support
  - Physical methods such as touching, stroking, massage, and applying ice or heat
  - Cognitive methods such as preparation for procedures, distraction with music or
  - Imagery, play
  - Non-harmful traditional practices
  - Use medicines specific to the type of pain
  - Address psychosocial issues
  - Continue to assess the pain

chapter

21

Palliative Care

21.1 The Goals of Palliative Care

- Relief of pain
- Relief of suffering
- Improvement of quality of life

Description

Palliative care is a holistic impeccable care of people with life limiting illnesses embracing their mind, body and soul needs to improve the quality of life of patients and their families who are faced with chronic and life-threatening illness (cancer; AHD; stroke; cerebral palsy, diabetes mellitus, etc.) through prevention and relief of suffering

Signs and symptoms

General physical symptoms such as:

- Pain
- Delirium
- Nutrition and dehydration
- Breathlessness

Diagnostic criteria and investigations

This is achieved through early identification, impeccable assessment and treatment of pain and other physical, psychosocial and spiritual problems

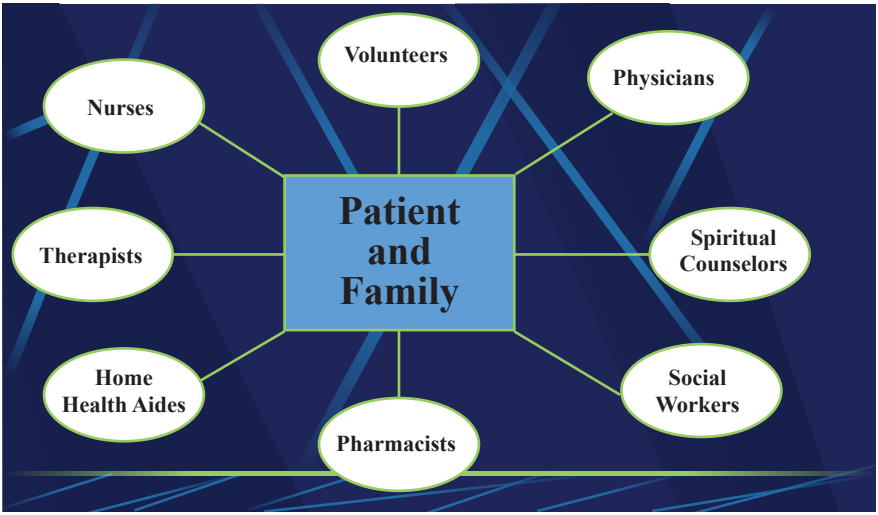
Observe and assess the following:

- Changes in behaviour
- Facial expressions and grimaces
- Vocalisations
- Crying
- Breathing patterns
- Body language

Non-pharmacological management of pain

Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage. Pain is the commonest reason why people seek help and care, yet many individuals suffer with unrelieved or undertreated pain.

Multi-team assessment



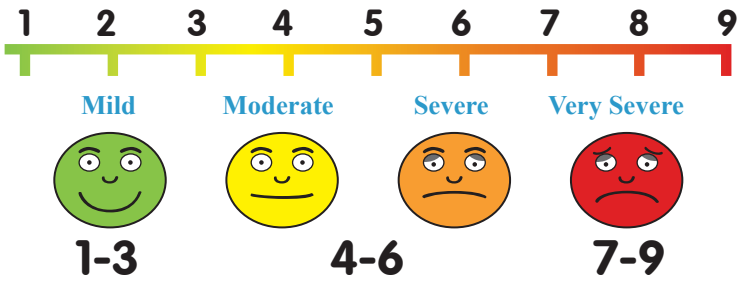
Physical pain does not occur in isolation. A patient's mood, sense of well-being financially, socially and spiritually can all influence the pain experienced and thus how it affects their life.

When assessing a patient's pain, it is essential to incorporate the concept of total pain, thereby ensuring that a holistic assessment is undertaken.

21.2 Pain assessment

Precise and systematic pain assessment is required to make the correct diagnosis and determine the most efficacious treatment plan for patients presenting with pain.

Universal Pain assessment tool is as follows:



Aspects requiring evaluation

- **Check CARES Score**
  - **Comfort** (basic needs, pain, symptoms other than pain, compliance with current treatment)
  - **Access** (transport, healthcare)
  - **Resources** (primary caregiver, financial resources)
  - **Emotional Needs** (child (the patient), caregiver)
  - **Safety** (abuse/neglect, environment)

Symptom control – contributing factors to distress

- **Key principles in symptom control**
  - Irrespective of what the symptom is, there are certain key principles that can be applied to the management of any distressing symptom. These are:
    - Determine and treat the underlying cause of the symptom including non-physical causes
    - Relieve the symptom without creating new symptoms or unwanted side effects
    - Consider different types of interventions; drug and non-drug interventions

Consider whether the treatment is of benefit to the individual patient (weigh advantages and disadvantages of therapy)

Concept of total pain

Whole Patient Pain Assessment

Physical	What is the likely cause of this pain in this patient at this time? What structural or functional abnormality would cause this pain pattern?
Psychological	How is the patient coping with the pain? How much anxiety or depression is present? What are the patient's ideas, concerns or expectations about pain and its management in this situation? What information do they need?
Social	How is the pain affecting the family? How much family anxiety is present? What are the family's ideas, concerns and expectations? (These may differ from the patient's) How have family dynamics been affected by this illness? How is the pain limiting the usual role(s)?
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The PQRST pain assessment

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R	Radiation	Where does the pain start and travel to ?
S	Severity	Rate the pain; on a scale of 0-5, how bad is your pain ?
T	Temporal	What are the patterns of the pain? Is it constant, or does it come and go

Technique

Pain must be assessed using a multidimensional approach, with determination of the following:

- Chronicity
- Severity
- Quality
- Contributing/associated factors
- Location/distribution or aetiology of pain, if identifiable
- Mechanism of injury, if applicable
- Barriers to pain assessment

All patients should be evaluated for pain at every visit- supporting the claim that pain should be considered the fifth vital sign.

Pain severity is best assessed by the patient self-reporting. Pain severity assessment maybe aided by:

- Visual analogue scales
- Numerical rating scales, and
- Faces scale

Pain is subjective and therefore a patient should be encouraged to report about their own pain. A thorough assessment of a client's pain is essential to establish the most likely cause, evaluate any contributing factors and decide appropriate intervention.

Pain assessment in the elderly

Pain assessment can be particularly difficult in elderly patients for the following reasons:

- Underreporting of discomfort because the patient does not want to complain
- Use of pain to mask other newly developing physical or cognitive disabilities
- Decreases in hearing and visual acuity, so that pain assessment tools that require extensive explanation or visualisation to perform will be more difficult and possibly less reliable The verbal descriptor scale may be the easiest tool for the elderly to use. It allows patients to use common words to describe what they are feeling.

Pain assessment in infants

The following tools use a combination of behavioural and physiologic measurements to assess pain in infants:

- CRIES - Uses 5 variables (ie, crying, requires oxygen, increased vital signs, expression, sleeplessness) on a scale of 0-2 points to assess neonatal postoperative pain
- Modified Behavioural Pain Scale - Uses 3 factors (facial expression, cry, movements); has been validated for children aged 2-6 months

Pain assessment in young children

Limited cognitive or language skills may influence pain measures, as may the positive or negative consequences of a child's behaviours associated with pain.

In children older than 3-4 years, self-report measures may be used. However, children may underreport their pain to avoid future injections or other procedures aimed at alleviating the pain.

Children may not report pain for several reasons, including their being:

- Frightened of talking to doctors
- Frightened of finding out they are sick
- Unwilling to disappoint or bother their carers
- Unwilling to receive an injection
- Unwilling to return to or delay discharge from hospital
- Unwilling to experience the side effects of medication for pain
- Question the child and their parents
- Use a pain rating scale
- Evaluate behaviour and physiological changes.

Health education

- Reassure the patient and the family that pain can be relieved
- Explain that pain relief is not instantaneous
- Explain that unpleasant side effects will wear off after 3 days
- The goal of pain management is to ensure that the patient is
  - Pain-free at rest
  - Pain-free at night
  - Pain-free while active

Use step-by-step approach to pain relief according to the WHO analgesic ladder.

- The principles governing use of analgesics are that they should be given
- By mouth
- By the clock
- By the ladder
- By the patient

Reassure the patient of regular visits and reassessment by health care professional.

Note: a sleeping child, a very quiet child, even a child that is playing is not necessarily pain free. Movement might be painful, or the child might be too sick or too tired to move.

Classification of Pain

It is important to understand the pathophysiology of pain - i.e. Nociceptive or neuropathic, because of therapeutic implications.

	Nociceptive	Neuropathic	Sympathetic	Psychogenic
Cause	Stimulation of sensory receptors by trauma	Damage of the nerve (Neuropathic)	Damage of sympathetic nerve (Sympathetic)	Psychopathology (Neuropathic nerve damage)
Charact -eristics	Somatic superficial pain Deep and visceral	Burning pain - shooting pain, aching sensation and allodynia	Burning pain - increased sensitivity - localised vasomotor instability and trophic changes	Headache muscle, spasms back and abdominal pain
Treatment	Non-Opioids + Opioids	Adjuvants analgesics	Regional sympathetic block	Psychotherapy, antidepressants, non-narcotic pain killers, music therapy

Pharmacological management of pain

- Determine the aim of treatment.
- Decide on which analgesics to use first
- Determine any adjuvants (i.e., co-analgesics) that may be needed to counteract side effects of the analgesics
- Alternative techniques in managing spiritual, emotional, and social problems may require referral to social worker or other people (medical or nonmedical)

Community level	Health centre level	Hospital level
• Health education on: • Lifestyle changes • Ginger • Raw Vegetarian diet • **Refer** to health centre	• Treat as above **AND/OR** • Paracetamol 1g orally every 6-8 hourly for 5 days • **Refer** to the hospital.	• Treat as above **AND/OR** • Add Opioid for moderate pain - Paracetamol/Codeine 500mg/8mg orally every 6 - 8 hourly • Amitriptyline 10mg orally nocte • **Note:** Consider stronger opioid if pain not controlled by the above combinations. • Morphine 5-10mg 6 hourly titrate to pain

The WHO Pain Ladder

The WHO Pain Ladder was developed in 1986 as a conceptual model to guide the management of cancer pain. There is now a worldwide consensus promoting its use for the medical management of all pain associated with serious illness, including pain from wounds.

Non-narcotic – "around the clock"

- Paracetamol 1g orally every 6-8 hourly for 5 days **OR**
- Acetylsalicylic Acid 150mg orally 8 hourly for 5 days **OR**
- Ibuprofen 400mg orally every 6-8 hours for 5 days

Note* Adjuvant therapy - medications that can help to enhance the effects of non- opioid and opioid analgesics

(1) NSAIDs (non-steroidal anti-inflammatories) - can be used as co-analgesics and are useful in reducing inflammation

(2) Tricyclic anti-depressants - Amitriptyline is an option although it can cause confusion in the elderly. Studies have confirmed its effectiveness in treating diabetic neuropathy and neuropathic pain from other sources

- Anticonvulsant medications – carbamazepine can relieve the shooting, electrical pains of peripheral nerve dysfunction

Notes: if pain persists, use short acting preparation of same medication increasing for breakthrough pain. Consider lower dose in opioid naïve and elderly patients. Refer to hospital if pain persisting

• + Adjuvants*

The WHO Three –Step Analgesic Ladder

Step 1 – Non- opioid (e.g. paracetamol, aspirin) + adjuvant (antidepressant) if pain is not controlled by step 1 analgesics, move to step 2 by adding a weak opioid.

Step 2 – Opioid for mild to moderate pain (e.g. codeine) + non –opioid + adjuvant. If an opioid for mild to moderate pain has been used to a maximum dose and the patient still has pain, then move to step 3 by changing to a stronger opioid.

Step 3 – Strong opioid (e.g. morphine) + non –opioid + adjuvant

21.3 Pain management in adults

Tables outline pain management for adults, including medications, dosages, side effects, and management of side effects.

Pain Management in Adults

Step	Analgesic	Dosing
1. Non-opioid	Paracetamol	1gm every 4 hours. Do not exceed 4gm in 24 hours
	Aspirin	600mg every 4 hours. Do not exceed 4gm per day
	OR; Ibuprofen	400mg 3 times per day. Do not exceed 1,200mg per day
2. Mild to moderate pain. Opioid	Tramadol HCL (capsules)	50 to 100 mg not more often than every 4 hours
	Codeine phosphate	In addition to NSAIDs; 30mg - 80mg every 4-6 hours. Give a laxative to prevent constipation.
3. Moderate to severe pain. Opioid	Oral morphine	2.5 to 5.0mg every 4 hours (dose can be increased by 50% or doubled after 24 hours if pain persists.

Neuropathic pain,

- Amitriptyline; 10-75mg at night. Start with a low dose and increase as needed or
- Clonazepam; 0.5 mg to 2mg once a day **OR**
- Carbamazepine; Start at 100mg orally 12 hourly; can be increased to 800mg orally 12 hourly. **OR**
- Sodium valproate; 200mg 12 hourly

Muscle spasm (colicky abdominal pain); Hyoscine butyl bromide; 10mg per day. Can be increased to 40mg 8 hourly.

Anxiety related pain;

- Diazepam; 5mg orally 8 hourly. Bone pain, neuropathic pain, headache related to increase in intracranial pressure; Dexamethasone; 2-4mg per day.

21.4 Pain management in children

- **QUESTT Principles to assess pain in children**
  - Q – Question the child and parent/caregiver
  - U – Use pain rating scales
  - E – Evaluate behaviour, physical findings, and physiologic changes
  - S – Secure the parent's/caregiver's involvement
  - T – Take the cause of the pain into account
  - T – Take action and evaluate results
- **Revised Faces Pain Scale**
- **Pain related behaviours and physical findings**
- **Determining the underlying cause** – Pain is a total experience. It is not just physical, it has Psychological, Social, Spiritual and Cultural components.

General principles to be followed -

- Treat the underlying cause without increasing pain
  - Use non-medicinal support, such as -
  - Emotional support
  - Physical methods such as touching, stroking, massage, and applying ice or heat
- Cognitive methods such as preparation for procedures, distraction with music or
  - Imagery, play
  - Non-harmful traditional practices
- Use medicines specific to the type of pain
- Address psychosocial issues
- Continue to assess the pain

NOTE: Many doctors are over-cautious in using strong opioids in children; however, the WHO 3-step analgesic ladder approach should still be used, with preference for oral medications and regular administration.

Respiratory depression with strong morphine is not a problem in children over 1 year old if treatment is started in standard doses and thereafter increased or reduced according to needs. In younger children starting doses should be reduced.

Opioids

Itching with opioids in the first few days is common and responds to antihistamines if necessary. Many children are sleepy initially and parents should be warned of this and reassured.

Dosages of analgesic medicines in children

Paracetamol 20mg/kg orally every 4 hours. Maximum dose 90mg/kg over 24 hours

Ibuprofen 5 to 10mg/kg orally every 6 to 8 hours

Ibuprofen not recommended in children below 7kg

Child 1 – 2 years: 50mg 8 hourly
3 – 7 years: 100mg 8 hourly
8 – 12 years 200mg 8 hourly

Morphine, standard starting dose, 0.15 to 0.3mg/kg orally every 4 hours neonates< 1 month; 1/3 of the above dose over 6 months: 0.2 - 0.5mg/kg/dose every 4 hours children 1- 5 years: 2.5 - 5mg every 4 hours children 6 – 12 years: 5 – 10mg every 4 hours

Adjuvant therapy for pain in children

If analgesics are inadequate, the adjuvant therapies are recommended.

- Neuropathic pain: amitriptyline 0.2 - 0.5mg/kg at bed time. Increase dose by 25% every 2-3 days as needed.
  Itching: chlorpheniramine 0.1mg/kg every 8 hours.
- Muscle spasms: diazepam 0.2 - 0.5mg/ kg every 24 hours in 3 to 4 divided doses.

Community level	Health centre level	Hospital level
• Patients are provided with palliative care in their homes and are not exposed to practices not familiar to them. • Care is provided by their own people • **Refer** to health centre	• Treat as above **AND/OR** • **Refer** to the hospital.	• Treat as above

The palliative care plan and activities: what to assess

Plan and Activities	What to assess
Palliative care plan	• Endorsement of the plan and scope (geographical area and conditions included) • Whether or not part of a comprehensive cancer control plan • Timeliness (updated/outdated) • Accessibility to the written plan • Stakeholders' involvement in plan development • Inclusion of critical sections of the plan (assessments, goals and objectives, strategies, timetable, responsible persons, reources, monitoring and evaluation • Comprehensiveness and prioritism (objectives related to pain relief and control of other symptoms) • Integration with other related activities • Utility of the plan (used to guide programme implementation)
Ongoing palliative care activities	• Number and types of palliative care activities and related services offered • Coverage of ongoing palliative care activities • Quality of ongoing palliative care activities • Evaluation of structure, outcomes, outputs and process indicators and trends
Resorces of ongoing palliative care activities	• Information systems (registries, surveillence of palliative care services) • Protocols, guidelines, standards, manuals, educational materials, etc. • Physical resources (infrastructure, technologies, list of essential drugs for palliative care) • Human resources (leaders, councils, committees, healthcare networks, healthcare providers, partners, volunteers, traditional healers) • Financial resources • Regulations and legislation (insurance schemes, opioid analgesics)
Context of the palliative care plan and activities	• SWOT analysis: strenghts, weaknesses, opportunities and threats concerning the performance of the palliative care programme for cancer

Criteria for palliative care

Community level

Patients are provided with palliative care in their homes and are not exposed to practices not familiar to them. Care is provided by their own people.

chapter

22

Anaesthesiology and Intensive Care

22.1 Anaesthesia

Anaesthetic and sedative medication may only be administered by medical practitioners trained and experienced in their use.

Sound theoretical and practical training followed by several years of supervised experience in the administration of anaesthetics is essential to develop the skills of the anaesthetist. Even within the recommended dosage range, anaesthetic agents can cause death when inappropriately used and only as a last resort should they be administered by non-specialised personnel.

Medicines and equipment for resuscitation should be functional and immediately available whenever general anaesthesia, regional anaesthesia or sedation is administered.

The following is a list of medicines required for anaesthesia that should be available at district and regional hospitals.

The doses of the medicines given are those recommended for healthy adults. Patients who are acutely or chronically sick, and or elderly, may require substantial reductions in the doses given otherwise life-threatening adverse effects may ensue.

22.1.1 Pre-medication

Lorazepam, 1–2mg, oral, the night before surgery and 1–2 hours preoperatively

- Use half the dose in the elderly.
- Duration of action (10–20 hours)
- Unsuitable for day case surgery.
- Midazolam, 5–7.5mg, oral, one hour preoperatively
- Use only in healthy adults

22.1.2 Anaesthesia, general

22.1.3 Intravenous induction (and/or maintenance) agents)

Inject intravenous induction agents over 30 seconds (>60 seconds in the elderly). Titrate the dose to effect.

Respiratory depression occurs following induction of anaesthesia and ventilation should be supported as required. Administer at appropriate doses, after consideration of patient factors, surgical factors and contraindications:

- Propofol is the most widely used IV induction agent but can produce hypotension.
- Etomidate or ketamine is preferred in haemodynamically unstable patients.
- Propofol, IV, 1.5–2.5mg/kg. 6–12mg/kg/hour IV infusion for maintenance, if volatile agent use contraindicated.

- Etomidate, IV, 0.3mg/kg (0.2–0.6mg/kg)
- Ketamine, IV, 1–2mg/kg.

22.1.4 Inhalation agents

22.1.5 Induction

In adults, intravenous induction is preferable. Inhalational induction is reserved for patients with difficult airways or severe needle phobia. Use only halothane or sevoflurane (isoflurane is too irritant). Halothane can cause hepatitis after repeated exposure within 3 months. Halothane sensitises the heart to catecholamines and may cause cardiac dysrhythmias, particularly if anaesthesia is too light or the patient hypercarbic. Sevoflurane is not associated with these problems, has a faster onset and emergence time.

- Halothane, titrated to effect **OR**
- Sevoflurane, titrated to effect

22.1.6 Maintenance

In spontaneously breathing patients, the dose of a volatile agent is titrated to clinical effect. If a neuromuscular blocking agent has been used, the dose of the volatile agents must be adequate to prevent awareness. This is about 1 minimum alveolar concentration (MAC), but must be titrated according to clinical signs of awareness (e.g. tachycardia, hypertension, sweating, lacrimation).

- Isoflurane (MAC = 1.2%).

22.1.7 Muscle relaxants

Used to facilitate intubation and to provide intraoperative muscle relaxation for surgery. It must not be used if difficult intubation anticipated.

22.1.7.1 Depolarising muscle relaxants

- Suxamethonium, IV, 1–1.5 mg/kg.
  - Onset 30–60 seconds
  - Duration 5 minutes
  - Repeated doses associated with bradycardia and prolonged neuromuscular block.
  - Contraindicated in patients at risk for developing suxamethonium induced hyperkalaemia, e.g. upper or lower motor neuron defect, prolonged chemical denervation (ICU >3 days), direct muscle trauma, tumour or inflammation, burns, disuse atrophy, severe infection, preexisting hyperkalaemia.

2.1.7.2 Non-Depolarising Muscle Relaxants (NDMR)

Use a nerve stimulator to monitor effect and determine when subsequent doses (about a fifth of the intubating dose) are required. Higher doses result in shorter onset times but longer duration of action.

Intermediate-acting neuromuscular blocking agents, e.g.:

- Cisatracurium:
  - Intubation dose 0.1–0.15mg/kg.
  - Onset 3–5 minutes.
  - Duration of action 45–55 minutes.
  - Eliminated by Hoffman degradation, therefore can be used in renal or liver impairment.
- Rocuronium:
  - Intubation dose 0.6–1.2mg/kg.
  - Intubate after 2 minutes
  - Duration 20–30 minutes
- Atracurium
  Dose: 0.4mg/kg
  Intubate after 3 minutes
  Elimination Hoffman degradation and breakdown by non-specific plasma esterases
  NB: Avoid in asthma (it releases histamine)

22.1.7.3 Muscle relaxation for rapid sequence intubation

Patients at risk of aspiration (e.g. emergency surgery, incomplete gastric emptying) require a rapid sequence intubation. An IV induction agent is given through an IV line with fast running fluids, immediately followed by a rapidly acting muscle relaxant. Cricoid pressure is applied and then intubation proceeds. The rapid onset of action enables the time to intubation to be short enough to avoid mask ventilation, as this can result in gastric insufflation and aspiration of gastric contents.

- Suxamethonium, 1–1.5mg/kg, IV.
  - Preferred agent as, in the event of a failed intubation, it wears off quickly enabling spontaneous respiration to resume.
  - Contraindications to suxamethonium - Congenital and acquired medical conditions associated with severe, potentially lethal suxamethonium-induced hyperkalaemia.
    - Malignant hyperthermia. If suxamethonium is contra-indicated, consider:
- Rocuronium, 0.9-1.2mg/kg, IV.
  - Duration +/- 60 minutes. Sub-optimal conditions for intubating and prolonged effect can be problematic in the event of a difficult or failed intubation and if the procedure is short.

22.1.8 Medicines to reverse muscle relaxation

Only administer when the clinical signs of NDMR are wearing off or at least 2 twitches occur using train-of-four on nerve stimulator. Neostigmine has profound cholinergic effects and, to counteract resultant profound bradycardia, is administered mixed with an anticholinergic agent, atropine or glycopyrrolate. Whilst atropine is effective and can be used for this purpose in otherwise healthy patients, the onset of neostigmine and duration of action more closely matches that of glycopyrrolate, so this is the preferred combination agent for patients who poorly tolerate tachycardia or bradycardia

Neostigmine, IV, 50mcg/kg

WITH EITHER:

- Atropine, IV, 20mcg/kg (maximum 1.2mg)

  OR
- Glycopyrrolate, IV, 10mcg/kg

22.1.9 Perioperative analgesia

The perioperative period includes the pre-operative, intra-operative and post-operative stages of surgery.

- Perioperative analgesia should be multi-modal, i.e. use analgesics, where possible, from different classes to reduce side effects from high doses of a single agent (e.g. paracetamol, NSAID and a weak/strong opioid) with either a regional block or wound infiltration with local anaesthetic.
- Patients with pain before surgery should be given analgesia preoperatively.
- Paracetamol may be given orally with premedication to prophylactically reduce perioperative pain.
- Intraoperatively, analgesics are given intravenously and/or a central neuraxial or regional local anaesthetic block may be used. The analgesic effect of these may extend into the early postoperative period.
- Postoperatively analgesics are given IV, IM and/or rectally, until the patient is able to take oral medication. Patients with a functioning block may not require analgesia until the block wears off but analgesics should be prescribed in anticipation of this.
- Pain severity should be assessed frequently post-operatively (see Section 12.5.3: Postoperative analgesia ward prescriptions).

Oral analgesics

- Paracetamol, oral, 1g 4–6 hourly when required
  - Maximum dose: 15mg/kg/dose
  - Maximum daily dose: 4g in 24 hours

AND

- Tramadol, oral, 50–100mg 4–6 hourly
  - Avoid in head injury and epilepsy
  - Improved effect when given with paracetamol

AND

NSAID, e.g.:

- Ibuprofen, oral, 400mg 8 hourly with meals. Note: Do not administer NSAIDs to patients at risk of hypovolaemia, renal impairment or gastrointestinal bleeding. Avoid in patients with asthma who experience bronchospasm with NSAIDs.

Tilidine in children: 1mg/kg sublingual (1ml/kg 1 drop/ 2.5kg)

22.1.10 Intravenous analgesics

- Fentanyl, IV, 1–2mcg/kg o Onset ± 3 minutes, duration of action 30–60 minutes. Higher doses last longer.

- Morphine, IV/IM, 3–5mg as a single dose then further boluses at intervals of 5–10 minutes and monitor all vitals closely.
  - Dilute 10 mg up to 10 mL with sodium chloride 0.9%.
  - Total maximum dose: 10 mg.
  - Repeat after 4 hours if necessary
  - Monitor response to pain and effects on respiration and BP
  - Onset 5-10 minutes. Duration of action ± 3 hours
  - Histamine release may cause intraoperative hypotension
- Ketamine, IV, 0.1–0.3 mg/kg – a sub-anaesthetic dose given pre-incision may reduce persistent post-surgical pain.
- Paracetamol IV 15mg/kg Q8h for Adults and patients over 10kg
- 7.5mg/kg for patients less than 10kg/Neonates

Intravenous fluids

The following IV fluids should be available for peri-operative fluid replacement and maintenance therapy.

Crystalloids

Most commonly used crystalloid for perioperative fluid maintenance:

- Sodium chloride 0.9%, IV

Higher sodium content than indicated if there is a perioperative risk of hyponatraemia e.g. transurethral resection of prostate. Balanced solutions may be appropriate in some patients (i.e. presentation with hyponatraemia, previous renal placement therapy):

• Balanced solution, e.g.: • Ringer's lactate, IV.

COLLOIDS may be used however they can cause coagulopathy/anaphylaxis and are expensive (Voluven, gelofusine and haemacel)

22.2 Medicines to treat complications of anaesthesia

Malignant hyperthermia

Dantrolene IV, 2.5 mg/kg as a single dose (preferably through large bore cannula).

- Reconstitute with 60 mL water for injection. For a 70 kg patient, 175 mg (9 vials) is required.
- Administer subsequent doses to clinical effect (cardiac and respiratory symptoms stabilise, muscle tone and body temperature reduced).
- Doses higher than 10 mg/kg is uncommon and the clinician should question the diagnosis.
- Although, high doses of 10 mg/kg may be required in muscular males.

Local anaesthetic toxicity

Airway Management

- Ventilate with 100% oxygen. Seizure suppression:
- Diazepam, IV, 10 mg. Cardiopulmonary resuscitation may be required:
- Reduce individual adrenaline (epinephrine) doses to less than 1 mcg/kg.

- Lipid emulsion (20%), IV, 1.5mL/kg over 1 minute, then continuous infusion 0.25mL/kg/minute.
  - Repeat bolus 1–2 times for persistent cardiovascular collapse
  - Double infusion rate to 0.5mL/kg/minute if BP remains low
  - Continue infusion for at least 10 minutes after cardiovascular stability attained.
  - Recommended upper limit: approximately 10mL/kg lipid emulsion over the first 30 minutes

Anaesthetic-related acute hypotension

Treat the cause of hypotension. Ensure appropriate fluids are given to correct hypovolaemia. The medicines given below all require significant dilution before administration.

- Adrenergic and dopaminergic agents, e.g.:
- Ephedrine IV, 3–5 mg as a single dose and then further boluses as required to a maximum of 30 mg.
  - Increases heart rate and contractility, and vasoconstrictor.
  - Repeated administration can result in tolerance and tachyphylaxis.
  - Alternative vasopressor infusion (e.g. adrenaline (epinephrine)) may be needed to mitigate unresponsiveness to treatment.

OR

Phenylephrine IV, 50–100mcg as a single dose and then infuse at 60– 180mcg/minute.

- Vasoconstrictor.
- High doses may cause significant reflex. bradycardia: treat this by discontinuing the phenylephrine only.

Anaesthetic-related acute hypertension

To obtund the hypertensive response to intubation e.g. pre-eclampsia:

- Alfentanil, IV, 7.5mcg/kg (with magnesium sulfate, IV 30mg/kg). During anaesthesia or post-operatively, establish the cause (e.g. light anaesthesia or inadequate pain relief) and treat as appropriate.
- Labetalol IV, 5–10mg IV over 2 minutes.
- Repeated at intervals of at least 5 minutes to maximum 200mg.
- Duration of action 50 minutes.
- Vasodilates and slows heart rate.

Other options:

Nitric oxide forming agents:
Nitroglycerine
Hydralazine

22.3 Postoperative nausea and vomiting (PONV)

Prevention of PONV

Patients identified preoperatively as medium or high risk for PONV should be considered for prophylactic antiemetics. Prophylactic antiemetics also required if postoperative vomiting is potentially dangerous, e.g. after jaws wired, open eye surgery, oesophageal surgery.

High risk patients should receive anti-emetics from ≥ 1 class. Adequate IV hydration associated with less PONV.

Risk factors for PONV

Risk factors for PONV	Points
Female Gender	1
Non-Smoker	1
History of PONV and/or motion sickness	1
Postoperative opioids	1
Sum	0–4

Risk factors for PONV

Points	Risk for PONV (%)	Risk category
0	10	Low
1	20	Low
2	40	Medium
3	60	High
4	80	High

Management of PONV

Class	Anti-emetic	Prophylactic Dose and timing	Notes
Corticosteroid (glucorticoids)	e.g.: Dexamethasone	4-8mg, IV, on induction.	Increases blood glucose in diabetics. Only used for prophylaxis, not established PONV.
5-HT3 receptor antagonist	e.g.: Ondansetron	4-8mg, slow IV/ IM, on induction.	Prolongs QTc interval

Treatment of PONV

Ensure adequate hydration and correct hypotension if present. Give an emetic from a different class than the prophylactic agent given (except dexamethasone, which is only used for prophylaxis).

- Metoclopramide, IM/IV: If less than 60kg: 5mg IM or IV (over 2 minutes).
  If more than 60kg: 10mg IM or IV (over 2 minutes).
- Repeat 8 hourly if required.

- Note: Metoclopramide can cause extrapyramidal side effects.

Treat acute dystonic reactions with:

Anticholinergic agent, e.g.:
- Biperiden, IM/IV, 2mg.
  - Repeat as necessary. If an anticholinergic agent is not available:
- Promethazine, deep IM, 25–50mg.
  - In the elderly 25mg. If an anticholinergic agent or promethazine is not available:
- Diazepam, IV, 5–10mg for symptom relief.

Acid aspiration prophylaxis

The use of a non-particulate, non-effervescent antacid reduces the risk of pneumonitis if gastric fluid is aspirated. Give to patients at risk of aspiration, e.g. pregnant women before Caesarean delivery.
- Sodium citrate, 0.3M, oral, 30mL.
  - Not more than 30 minutes pre-induction of anaesthesia.

22.4 Anaesthesia, spinal (intrathecal)

Only preservative free medicines may be used. Larger doses cause block to spread higher, with risks of respiratory depression, hypotension and loss of consciousness.
- Bupivacaine 0.5% (Spinal use)
  - Give up 3 mL according to desired level of block.
  - Becomes hypobaric (light) within CSF so block may spread higher than anticipated.

- Bupivacaine 0.5% with dextrose (Spinal use)
  - Give up to 3mL according to desired level of block.
  - Hyperbaric (heavy) so block spreads according to patient position. To increase duration of analgesia:

ADD
- Fentanyl, 10–25mcg (i.e. small amounts).

Caesarean deliveries Lower doses are required due to physiologic changes of pregnancy:
- Bupivacaine 0,5% with dextrose, 1.8mL (9mg).

AND
- Fentanyl, 10mcg (0.2mL).

22.5 Anticoagulants and spinal or epidural blocks

Patients on anticoagulants are at risk of developing a spinal haematoma with subsequent paralysis after a spinal or epidural block. These anticoagulants should be stopped before the spinal or epidural is performed according to the guidelines given below. In order to encourage safe and quality care

of patients, please consult a specialist prior to attempting blocks on patients on anticoagulants. There are a range of oral anticoagulation, with each having specific recommendations with regard to neuraxial blocks

Timing of anticoagulants in patients receiving neuraxial anaesthesia

Anticoagulant	Before Neuraxial block	After Neuraxial block
Warfarin, oral	Consult with specialist to stop warfarin.	Restart after neuraxial block performed (do not delay) and epidural catheter removed. Monitor INR daily with indwelling catheter.
Unfractionated Heparin, SC	Neuraxial techniques may be performed if total daily dose is	
Unfractionated Heparin, IV	Stop heparin 4-6 hours and check PTT<40	Wait 1 hour before next bolus/infusion restarted
Prophylactic LMWH, SC	12 hours after last dose	4 hours after neuraxial block performed and epidural catheter removed
Therapeutic LMWH, SC	24 hours after last dose	>24 hours and consult a specialist (bleeding risk of surgery should be assessed).

Note: After neuraxial block or epidural catheter removal, patients should be observed closely for new or progressive neurological symptoms. A spinal haematoma can result in permanent paralysis unless decompressive surgery is performed within 8 hours of paralysis onset. Clopidogrel and platelet GPIIb/IIIa inhibitors have variable durations of effects on clotting after stopping these medications. Specialist advice should be sought before performing neuraxial blocks on patients receiving these medications. For patients on warfarin the use of bridging anticoagulation (giving heparin after warfarin is stopped in preparation for surgery or invasive procedures) remains unsettled. Practitioners should exercise careful judgment of competing risks in individual patients. Heparin may increase the risk of bleeding. Whatever practice is adopted the most important consideration is to ensure that adequate anticoagulation with warfarin is re-instituted once the risk of bleeding is past.

22.6 Anaesthesia, epidural

Only preservative free medicines may be used. Local anaesthetics are administered through a catheter inserted into the epidural space at a spinal level appropriate for the surgery. Aspiration and a test dose (2–3 mL) of local anaesthetic should be given to confirm catheter not intravascular or intrathecal. Subsequent doses should be fractionated (3–5 mL boluses).

- Bupivacaine 0.5%.

- Onset ±10 minutes. o Duration ±4 hours. Motor block is less with lower concentrations.
- Maximum dose 2mg/kg.

22.7 Peripheral nerve block or wound infiltration

Only preservative free medicines may be used for nerve blocks. Lidocaine has a faster onset of action than bupivacaine, but a shorter duration of action.

- Lidocaine 1% or 2%.
  - Higher concentrations cause more pain on injection.
  - Maximum dose: 3mg/kg.
- Lidocaine 2% plus adrenaline.
  - Not to be used in areas supplied by an end-artery e.g. finger, ear, penis.
  - Maximum dose: 7mg/kg.
- Bupivacaine 0.5%
  - Not be used in mucosal areas as risk of systemic toxicity.
  - Maximum dose: 2mg/kg.

22.8 Anaesthesia, topical

- Lidocaine jelly, topical, 2g/100mL.
  - For urethral catheterisation: female 5–7 mL, male 10–15 mL.
- Lidocaine topical spray, 4%. Maximum dose 160mg.
  - To assist with awake intubation or reduce haemodynamic response to intubation. For venepuncture analgesia in adults or oncology patients requiring repeated invasive procedures (e.g. lumbar punctures, venepuncture):
- Lidocaine/prilocaine, topical cream, 2.5/2.5%.
  - Apply at least 1 hour before and cover with occlusive dressing.

22.9 Sedation

Description

Sedation aims to reduce some combination of anxiety, agitation and pain while the patient retains control of airway, breathing and blood pressure.

Procedural sedation and analgesia

Procedural sedation and analgesia is a technique that uses medications to allow patients to tolerate unpleasant medical, interventional or diagnostic procedures. It is a brief intervention, unlike sedation in intensive or palliative care. It is commonly used in emergency units, dentistry and for certain endoscopic and gynaecological procedures. The information described does not apply to:

- Patients receiving inhaled anaesthetics.
- Patients receiving analgesia for pain without sedation.
- Patients receiving sedation to manage behavioural emergencies.
- Patients who are intubated

General measures

Procedural sedation is a continuum: ranging from minimal sedation (anxiolysis), moderate sedation/analgesia, deep sedation/analgesia, to general anaesthesia. Deep sedation/analgesia includes the dissociative state caused by medicines like ketamine. It is often difficult to predict levels of sedation and therefore clinicians undertaking procedural sedation should be adequately trained in this technique. The clinician should have a detailed understanding of the risks and benefits of all the medicines used. Further the clinician should be competent in resuscitation, airway management and assisted ventilation. Procedural sedation should only be performed in an area with adequate light, space and fully functional and adequate observation, monitoring and resuscitation equipment. Besides the clinician performing the procedure, there must be one other trained health care provider present responsible for observing the patient, assisting with resuscitation if necessary and monitoring the patient. The trained health care provider should observe the patient until the patient is ready for discharge. Patient monitoring and details of the types and amounts of all medicines used must be recorded for each procedure. After the procedure the patient's fitness to leave the observation area should be formally assessed and recorded.

Sedation level

Sedation				
Depth	**Minimal**	**Moderate**	**Deep**	**General anaesthesia**
Other aims	Anxiolysis	Analgesia		
Examples	Nitrous oxide **OR** benzodiazepine	Opioid **AND** benzodiazepine	Opioid **AND** benzodiazepine **OR** propofol **OR** etomidate	
Response to stimuli	Verbal	Purposefully to verbal or tactile	Purposefully only after	Unrousable
Airway intervention	Not required	Not usually needed	May be needed	Requires assistance
Breathing	Normal	Usually normal (spontaneous ventilation adequate)	May need assistance	Requires assistance /positive pressure ventilation
BP/Pulse	Normal	Usually normal/ maintained		May need support
Monitoring	Intermittent review of vital signs	Continuous pulse oximetry and heart rate, intermittent BP and respiratory rate. Continuous ECG if CVS disease or sedation with more than one agent		As for any general anaesthetic
Cognitive Function or level of conscious	Impaired	Depressed		Loss of consciousness

Ketamine

Ketamine administration leads to a dissociative state (patients may not be able to speak coherently or respond purposefully to verbal commands) and provides both sedation and analgesia. Used on its own, it rarely requires airway intervention or affects breathing, but may cause hypertension and tachycardia because of sympathetic stimulation.

Medicine treatment

Patient characteristics and required depth and/or duration of sedation lead to differences in dosing requirements; the doses listed serve only as a guide, and incremental further dosing may be required depending on clinical response. Minimal sedation and anxiolysis (no analgesic effect required) Oral sedation may be appropriate for certain procedures. Initial dose (further dose increments may be necessary – consult full prescribing information for each agent to determine maximum safe dosages, and reduce doses in the frail and elderly):

Diazepam, IV, 0.1mg/kg. (In a 60kg patient, give boluses of 2mg every minute; may require up to 10mg).

OR

Midazolam, IV, 0.05 mg/kg. (In a 60kg patient, give boluses of 1mg every minute; may require up to 3mg).

OR

Nitrous oxide, inhaled 20 to 50%, in oxygen (will also provide some analgesia).

Benzodiazepines may cause respiratory depression; monitor accordingly.

Moderate sedation and analgesia If analgesia is required, one of the above is usually combined with an opioid. However, ketamine has analgesic activity and can be used on its own, or combined with a benzodiazepine. The opioids may cause respiratory depression; monitor accordingly.

Initial doses:

- Fentanyl, IV, 0.25 mcg/kg.
  - Titrate to effect and repeat dose every five minutes until desired level of analgesia has been achieved. OR Morphine, IV, 0.1 mg/kg, in increments of 2 mg every 5 minutes.

  OR

  Ketamine, IV, 0.5 mg/kg (the addition of a benzodiazepine is often recommended to reduce the incidence/severity of phenomena such as hallucinations and dreaming, but the benefit of this is unclear).
  - Repeat doses of 0.5 mg/kg as required, every 5 to 10 minutes.

  OR

  Nitrous oxide, 20–50% inhaled, in oxygen.

Other agents for moderate sedation. Propofol on its own provides moderate sedation for short procedures (e.g. endoscopy), but without analgesia:

- Propofol, IV, 0.5mg/kg, repeated as 0.25mg/kg boluses every 5 minutes as required.

Specialist consultation. Etomidate is a short-acting agent like propofol, but is more likely to cause myoclonus. It has minimal haemodynamic effects and a reliable onset of action, but no analgesic effect and is more commonly used for emergency unit procedures, rather than endoscopies.

- Etomidate, IV, 0.1mg/kg.
- Repeat doses of 0.05 mg/kg every 5 minutes, as required.

Deep sedation and analgesia

This is usually achieved with either higher doses of medications used for moderate sedation, or by combining an opioid, a benzodiazepine, and either propofol or etomidate. When agents are combined, lower doses may be adequate. Always have another health care provider monitoring the patient and resuscitation equipment present. Supplemental analgesia. Simple analgesics can be given before or after the procedure as appropriate:

- Paracetamol, oral, 1g 4–6 hourly when required.
  - Maximum dose: 15mg/kg/dose
  - Maximum daily dose: 4g in 24 hours.

  AND/OR NSAID, e.g.:
- Ibuprofen, oral, 400mg 8 hourly with meals after the procedure. Other routes (e.g. rectal or intramuscular) may be appropriate for certain indications and medications.

Reversal Agents must be available as medicine doses for sedation/analgesia are highly variable as are patient's age, concurrent medication and medical conditions. Supportive management is aimed at maintaining cardiorespiratory function.

For opioid toxicity:

- Naloxone, IV, 0.08 mg immediately.
  - Repeat doses as required at 2 minute intervals.
  - Maximum total dose is 10 mg.

Sedation in intensive care

Indications for sedation in intensive care need to be defined for each patient, and may include one or more of: anxiolysis, analgesia, agitation control, or to help patients tolerate uncomfortable situations or procedures (e.g. intubation and ventilation). Sedation requirements fluctuate rapidly and warrant regular review. Individualised sedation objectives should be clearly defined, and level of sedation regularly recorded. Sedation protocols that recognise the need for dose minimisation, weaning and sedation interruptions probably improve outcomes. Adequate pain control is often more efficacious than sedatives for reducing agitation. Delirium should be considered, and managed appropriately. The doses listed apply to ventilated patients in whom short term respiratory depression is not a concern.

Short term sedation (less than 24 hours)

- Midazolam, IV infusion, 0.05–0.2 mg/kg/hour.
  OR
  Propofol, IV infusion, 0.5mg/kg/hour.

Note: Propofol does have cardiovascular effects; benzodiazepines are preferred. Longer term sedation (expected 72 hours or more)

- Lorazepam, IV, 0.1mg/kg/hour.
  OR
  Midazolam, IV, 0.2mg/kg/hour.

Note: Lorazepam (0.1mg/kg/hour) is as effective (and as easy to wean) as midazolam 0.2mg/kg/hour) but is more difficult to titrate. Due to high fat solubility, midazolam also becomes 'long acting' after infusions of more than 24 hours.

Supplemental analgesia: Analgesia can be added to any of the above regimens:

- Morphine, IV infusion, 0.1–0.2 mg/kg/hour.
  OR
- Fentanyl, IV infusion, 1mcg/kg/hour (also becomes long acting after prolonged infusion due to fat solubility.)

22.10 Nutritional support

Establish a multidisciplinary nutrition support team to assess and address the nutritional requirements of patients. This team should include a dietician. Nutrition support should be considered in patients at risk, defined as those who have a poor absorptive capacity and/or high nutrient losses and/or increased nutritional needs from causes such as catabolism.

Oral feeding, if feasible, is preferred. Enteral tube feeding is the next best option. Total parenteral nutrition (TPN) is indicated in exceptional circumstances. For short-term care (≤ two weeks), the current standard formulas in multi-chamber bags that have a long shelf-life are considered to provide adequate nutritional support. Clinicians should be aware of the possibility of clinically important hypo-vitaminosis in individual patients, and replace selected vitamins where appropriate.

In selecting the treatment modality, the team should consider:

- The likely duration of nutrition support.
- Patient activity levels and the underlying clinical condition, e.g. catabolism.
- Gastrointestinal tolerance, potential metabolic instability and risks of refeeding.

Potential complications harms of nutritional support include:

- Re-feeding syndrome:

Hypophosphataemia occurs when patients are re-fed too quickly with high carbohydrate feeds. The syndrome usually begins within 4 days of re-feeding. A multitude of life-threatening complications involving multiple organs may occur, causing: respiratory failure, cardiac failure, cardiac dysrhythmias, rhabdomyolysis, seizures, coma, red cell and leukocyte dysfunction.

The most effective way to prevent re-feeding syndrome is that feeds should be started slowly with aggressive supplementation of magnesium, phosphate and potassium.

- Diarrhoea.
- Lactose intolerance. Regularly review the need for ongoing therapeutic nutritional support. Vitamin and mineral supplementation should be considered on a case-by-case basis.

Enteral tube feeding

Enteral tube feeding should be used in patients who cannot swallow or who are at risk of aspiration. Patients should be fed via a nasogastric tube unless this is contra-indicated. Patients with upper gastro-intestinal dysfunction (or an inaccessible upper gastrointestinal tract) should receive post-pyloric (duodenal or jejunal) feeding. Percutaneous endoscopic gastrostomy feeding should be used in patients likely to need long-term (≥4 weeks) enteral tube feeding.

Parenteral feeding

The team should consider parenteral nutrition in patients who are malnourished or at risk of malnutrition and fit the following criteria:

- inadequate or unsafe oral and enteral tube nutritional intake, or
- a non-functional, inaccessible or perforated (leaking) gastrointestinal tract.

Note: For short-term care, the current standard formulas in multi-chamber bags that have a long shelf-life are considered to provide adequate nutritional support.

The addition of glutamine does not confer any clear clinical benefits and is thus not recommended.

Parenteral nutrition can be withdrawn once adequate oral or enteral nutrition is tolerated and nutritional status is stable.

Withdrawal should be planned and done in a stepwise way with a daily review of the patient's progress.

chapter

23

Oncology

Description

Cancer is a large group of diseases that can start in almost any organ or tissue of the body when abnormal cells grow uncontrollably, go beyond their usual boundaries to invade adjoining parts of the body and/or spread to other organs. The latter process is called metastasising and is a major cause of death from cancer. A neoplasm and malignant tumour are other common names for cancer.

General approach to management of a cancer patient before referral to a specialist is as follows:

1. History taking and examination
2. Work up
   - Baseline blood tests (FBC, urea, creatinine, LFTs)
   - Imaging (Chest X-ray, Ultra sound scan for abdomen &/ pelvis where available
3. Biopsy proven diagnosis
4. Immediate wound and pain care (Refer to pain management ladder in the chapter for pain management)
5. Definitive management of cancer patient is of multidisciplinary approach.

23.1 Head, neck and central nervous system malignancies

Description

Neoplastic proliferation of cells in the head and neck

In adults, these cancers arise from the oral cavity, pharynx, larynx, nasopharynx and the sinuses. They are classified as cancers of the head and neck region

Signs and symptoms of neck mass

- Painful/difficulty swallowing
- Weight loss
- Local site bleeding
- General body weakness
- Local site swelling pain
- Loss of organ function
- Non-healing ulcer

Risk factors

- Fungal infections – Pneumocystis Carinni Pneumonia, Candida Species
- Viral Infections – HPV, Cytomegalovirus and Humanpolioma Virus, Herpes simplex,
- Bacterial Infections – Staphylococcus Infection, Beta-haemolytic Strep, Norcadia, Hemophyllus Species
- Hardening/Fibrosis - Tobacco and alcohol use

Diagnosis and investigations

- Oropharynx: oral cavity inspection with Base of tongue palpation, "stick out your tongue," LN exam, CN exam.
- Oral Cavity: oral cavity inspection w/ palpation of tongue and FOM;
- Examine tongue mobility (CN XII), sensation (V), and taste (VII, IX);
- LN exam, CN exam.
- Larynx: palpate larynx (mass at thyroid notch = pre-epiglottis space invasion), gently move (loss of laryngeal click = post cricoid area invasion), palpate tongue, and BOT, LN exam
- "Fixed" = when you move the mass, the patient moves with it. Implies ECE/attachment to soft tissue or musculature.
- Labs tests: as for general cancer patient; HPV for OPX; EBV for Nasopharyngeal cancer
- Imaging: CT neck with contrast, MRI, PET-CT (where available)
- Referrals ("SANDS"): speech/swallow, audiometry, nutrition, dental, smoking cessation programmes
- ENT for biopsy/surgery
- Biopsy
  - Fine Needle aspiration (FNA) preferred
  - Open biopsy: Alters lymphatics; Seeding or dissemination of tumor and wound necrosis
- Full Blood Count
- Kidney function tests – creatine test for smoking risk
- Washings and Fine Needle aspiration; Tissue biopsy and Immunohistochemistry tests where necessary
- Provide anatomical location of malignancy, site and size of check for lymph node involvement and presence of metastasis.

May be classified as

- Squamous Cell Carcinoma
- Adenocarcinoma – Serious or mucinous
- Pleomorphic

Management

- Cancer treatment is dependent on biopsy proven histopathology report

Common treatment involves

- Surgery
- Chemotherapy
- Radiation
- Hormonal therapy
- Immunotherapy

Note: The involvement of multidisciplinary team in the initial development and ongoing evaluation of treatment plan and management of sequelae associated with treatment is recommended.

Community level	Health centre level	Hospital level
• Health education • Lifestyle modification • Stop tobacco and alcohol abuse • Counselling • Ask about voice changes (hoarseness), swallowing, aspiration, **Refer** to health centre	• Treat as CL • **Refer** to the hospital.	• Treat as HC AND/ OR • Follow the common approach for management of cancer patients indicated above • **Refer** to an oncology specialist

Note: **The following treatment for initiation by the oncology specialist are used for treatment of cancer at different organs and/or tissues of the body (refer to Oncology programme Guidelines):**	
Bortezomib 3.5mg SC injection	Mitomycin 40mg injection
Carboplatin 150mg injection	Oxaliplatin 100mg injection
Cyclophosphamide 500mg injection	Paclitaxel 300mg injection
Darcabazine 200mg injection	Trastizumab 440mg injection
Docetaxel 80mg injection	Rituximab 100mg injection
Doxorubicin 50mg injection	Rituximab 500mg injection
Gozerellin 3.5mg injection	Zolendronic acid 4mg injection
Leucovorin 50mg injection	Filgrastine 0.3mg SC injection
Methotrexate 100mg injection	Filgrastine 0.48mg SC injection
Methotrexate 50mg injection	Hydroxyurea 500mg capsules
Vincristine	Imatinib 400mg tablets
Etoposide 100mg injection	Lenalidomide 25mg tablets
5 Fluorouracil 500mg injection	Oxybutanin 5mg tablets
Vinblastine 10mg injection	Thalidomide 50mg tablets
	Bleomycin 15iu injection
	Cisplatin 50mg injection

23.1.2 Salivary glands tumours

Description

Tumors originating from three types of glands; Parotid, maxillary and sublingual glands

Classification of salivary tumors

- By site – parotid, maxillary and sublingual glands
- Cell type – mucinous, serous, mixed mesordermal

Risk factors

- Fungal infections – Pneumocystis Carinni Pneumonia, Candida Species
- Viral Infections – HPV, Cytomegalovirus, Humanpolyoma virus, Herpes simplex
- Bacterial Infections – Staphylococcus Infection, Beta-haemolytic Strep, Norcadia, Hemophyllus Species
- Hardening/Fibrosis – Tobacco and alcohol use

Diagnostic criteria and investigations

- Fine Needle Aspiration for Cytology: benign vs malignant
- Ultrasound
- Guides FNAC, assess location and lymph nodes
- CT or MRI: anatomical location, staging for metastasis
- Open Biopsy: can cause tumour seeding

23.1.3 Oral cancer

Description

Mouth cancer refers to cancer that develops in any of the parts that make up the mouth (oral cavity). Mouth cancer can occur on the:

- Lips
- Gums
- Tongue
- Inner lining of the cheeks
- Roof of the mouth
- Floor of the mouth (under the tongue)

Signs and symptoms of mouth cancer may include

- A lip or mouth sore that doesn't heal
- A white or reddish patch on the inside of your mouth
- Loose teeth
- A growth or lump inside your mouth
- Mouth pain
- Ear pain
- Difficult or painful swallowing

Management

- Managed as above under the section for the common approach in managing cancer patients
- For pain management of all the cancers refer to Palliative Care and Pain Management section

23.1. 4 Oropharyngeal carcinoma

Description

Oropharyngeal cancer is a type of head and neck cancer in which cancer cells are found within an area of the throat called the oropharynx.

Signs and symptoms

- A sore throat that does not heal
- Pain or difficulty with swallowing
- Trouble opening up your mouth fully or moving your tongue
- Unexplained weight loss
- Voice changes that do not go away
- Ear pain that does not heal
- A lump in the back of your throat or mouth
- A lump in your neck
- Coughing up blood
- White patch on your tongue or lining of your mouth that does not heal

Management

- Managed as above under the section for the common approach in managing cancer patients
- For pain management of all the cancers refer to Palliative Care and Pain Management sections

23.1.5 Tonsil carcinoma

Description

Tonsil cancer occurs when abnormal cells in the tonsils grow out of control, forming tumors or lesions. Tonsil cancer is the most common form of oropharyngeal cancer.

Signs and symptoms

- Lump in the neck
- A sore or ulcer in the back of the mouth that does not heal
- Blood in saliva
- Mouth pain
- One tonsil that's larger than the other
- A sore throat that does not heal
- Ear pain
- Difficulty swallowing, speaking or chewing
- Bad breath (halitosis)

Management

- Managed as above under the section for the common approach in managing cancer patients
- For pain management of all the cancers refer to Palliative Care and Pain Management sections

23.1. 6 Thyroid cancer

Description

Cancer that affects the endocrine gland call the thyroid which is found in both sides of the throat and neck area

Risk factors

- Viruses – Cytomegalovirus, humanpolioma virus
- Tobacco and alcohol abuse
- Iodine deficiency
- Endocrine disorders
- Tropic tumors
- Genetic factors
- Types of malignancy; myoepiphelial carcinoma, ademoid cystic carcinoma, basal cell carcinoma, Acinic cell carcinoma, oncolytic carcinoma

Management

- Managed as above under the section for the common approach in managing cancer patients
- For pain management of all the cancers refer to Palliative Care and Pain Management sections

23.2 Respiratory carcinomas

Description

Tumors that develop from tracheal parenchyma, bronchi, bronchioles or lung parenchyma.

Signs and symptoms

- Cough
- Dyspnoea
- Fatigue
- Chest, shoulder, arm or back pain
- Recurrent pneumonia or bronchitis
- Haemoptysis
- Hoarseness
- Wheezing
- Swelling in face or neck

Risk factors

- Alcohol and tobacco
- Silicosis
- Asbestosis
- Cytomegalovirus
- Human polioma virus
- Mycosis – PCP, Candida species, speculums species
- PTB
- Nocardia

Diagnosis and investigations

- Sputum cytology – to include asbestos bodies, silicone bodies and carbon ladine macrophages presence
- Bronchial brushings and washings
- Blood creatine
- CT directed FNA cytology

Management

- Managed as above under the section for the common approach in managing cancer patients
- For pain management of all the cancers refer to Palliative Care and Pain Management sections

23.2.1 Mesothelioma

Description

- Cancer of the plural cavity lining of the mesothelial

Risk factors

- Silicosis
- Asbestoses
- Smoking and alcohol
- Metastatic cancers

Diagnostic criteria and investigations

- Plural cytology
- FNA biopsy

23.3 Breast cancer

Description

Neoplastic proliferation of cells from the breast in both male and female but it is far more common in females.

Risk factors

- High oestrogen exposure
- Obesity
- Alcohol and smoking
- Diabetics
- Hypertension
- Early menarche, nulliparity, older age at first birth (>30 years), lack of breast feeding, late menopause (>55 years), hormone replacement therapy).
- Family history: other cancers
- Genetics (5%–10% hereditary): mainly comorbidities of genetic nature.
- Personal history of breast disease: Prior breast cancer, DCIS, LCIS, atypical ductal hyperplasia, dense breast tissue, history of radiation treatment during youth

Signs and symptoms

- Early Breast cancer
  - Lump in the breast
  - Discharge or bleeding from nipple
- Locally Advanced Breast cancer
  - Axillary lymph node enlargement
  - Nipple retraction
  - Ulceration and tender
- Metastatic Breast Cancer
  - Symptoms depend on the site of metastasis
  - Bone – back pain is a danger sign
  - Lung/Pleura – cough, shortness of breath, chest pain
  - Liver – right upper quadrant pain, poor appetite, weigh loss
  - Brain – headache, focal neurologic deficiency

Diagnostic criteria and investigations

- Fine needle aspiration (FNA) and/or Preferably Biopsy of the breast lump or FNA from axillary lymph node + IHCs (immunohistochemistry) – O/P Receptor status of the breast cancer lesion
- CA15. 5
- Ki 67- Marker of cell proliferation

Imaging (Mammogram to rule out bilateral breast carcinoma /DCIS, Breast sonar as needed, Abdominal sonar, Bone scan CXR, Heart sonar or MUGA or cardiac echo)

Management

- Managed as above under the section for the common approach in managing cancer patients
- For pain management of all the cancers refer to Palliative Care and Pain Management sections

23.4 Gynaecological malignancies

23.4.1 Cervical cancer

Description

Neoplastic proliferation of cells from the endocervix and endocervical canal

Risk factors

- High risk HPV infection
- STIs – HPV, HIV, Herpes,
- Multiparity
- Alchohol and smoking
- HIV status/CD4/Viral load
- HPV related risk factor

Classification of cervical neoplasia

- Cervical Intraepithelial Neoplasia (CIN) lesions- premalignant lesions
- Invasive cervical squamous carcinoma
- Adeno carcinomas
- Metastatic carcinomas

Diagnostic criteria and investigations

- Visual inspection of the cervix with acetic acid (VIA)
- Magnified visual inspection after application of acetic acid (VIAM)
- Pap smear
- Cytology
- DNA-HPV
- HIV +/- viral loads if not done
- Full blood count
- Liver function tests
- Kidney function tests
- Histopathology: report confirming malignancy
- Imaging
- Chest X-ray + abdominal USS at District hospital level
- CT scan chest/abdomen/pelvis

Management

- Managed as above under the section for the common approach in managing cancer patients
- For pain management of all the cancers refer to palliative Care and Pain Management sections

23.4.2 Endometrium cancer

Description

Neoplastic proliferation of cells from the endometrium- fundus of cervix

Risk factors

- High oestrogen exposure
- PID
- HIV status +/-CD4 count and viral load
- exposure to estrogen
- Alchohol and smoking
- Obesity
- Diabetics
- Hypertension

Diagnostic criteria and investigations

- Laboratory investigations
- HIV +/- viral loads if not done
- Full blood count
- Liver function tests
- Kidney function tests
- Where endocervical cancer is suspected a panel of markers including at least estrogen receptor,
- vimentin,
- Carcinoembryonic antigen and p16 (as surrogate for HPV) by IHC Histopathology: subtype, grade, myometrial invasion, LVSI, lymph nodes
- Imaging
- Chest X-ray + abdominal + pelvic USS at District hospital level if available
- CT scan chest/abdomen/pelvis

Management

- Managed as above under the section for the common approach in managing cancer patients
- For pain management of all the cancers refer to palliative Care and Pain Management sections

23.4.3 Ovarian cancer

Description
Neoplastic proliferation of cells from the ovary

Risk factors
- Pelvic Inflammatory Disease (PID)
- Pseudomaxoma peritonii
- Pituitary hormonal imbalance
- Drugs e.g. Diethylstilbesterol (DES)
- Co morbidities
- HIV status +/-CD4 count and viral load

Classification
- Adenoserous carcinoma
- Adenomucous carcinoma
- Stroma
- Folicular Carcinoma

Diagnostic criteria and investigations
- Laboratory investigations
- HIV +/- viral loads if not done o Full blood count
- Liver function tests
- Kidney function tests
- Tumour markers: CA 125, CEA, and LDH, B-HCG, AFP for germ cell tumours and inhibin levels for sex cord stromal tumours
- Histopathology:
  - Epithelial
  - Germ cell
- Imaging
  • CT scan chest abdomen and pelvis
- Peritoneal washings before manipulation of the tumour
- Ovarian cancer is a surgically staged cancer

Management
- Managed as above under the section for the common approach in managing cancer patients
- For pain management of all the cancers refer to Palliative Care and Pain Management sections

23.4.4 Vulva cancer

Description
Neoplastic proliferation of the Vulva

Risk factors

- Low risk HPV
- STI
- Smoking and Alcohol
- Multi-parity
- Multi-sexual partners

Diagnostic criteria and investigations

- Vulvar per examination
- Vulval swab culture
- Vulval smear cytology
- FBC and CD4 Count
- Biopsy
- HIV +/- CD4 counts, viral loads if not done
- Full blood count + Liver function tests + Kidney function tests
- Imaging (CT scan chest, abdomen and pelvis)

Management

- Managed as above under the section for the common approach in managing cancer patients
- For pain management of all the cancers refer to Palliative Care and Pain Management sections

23.4.5 Choriocarcinoma

Description

Gestational trophoblastic disease that has a range of pathologies

- Pre-malignant forms: Complete Hydatidiform Moles (CHM) and Partial Hydatidiform Moles (PHM)
- Malignant forms (GTN): Choriocarcinoma, Placental Site Trophoblastic Tumour, Epithelioid Trophoblastic tumour

Signs and symptoms

- Abnormal or irregular vaginal bleeding in a woman who recently had a hydatidiform mole or pregnancy.

Other symptoms may include:

- Irregular vaginal bleeding
- Pain, which may be associated with the bleeding, or due to enlargement of the ovaries that often occurs with a choriocarcinoma.

Diagnostic criteria and investigations

- β- hCG
- HIV +/-, CD4 count, viral loads if not done
- Full blood count
- Liver function tests
- Kidney function tests

23.5 Prostate cancer

Description

Prostate cancer is cancer that occurs in the prostate. The prostate is a small walnut-shaped gland in males that produces the seminal fluid that nourishes and transports sperm.

Signs and symptoms

- Prostate cancer may cause no signs or symptoms in its early stages.
- Prostate cancer that's more advanced may cause Signs and symptoms such as:
  - Trouble urinating
  - Decreased force in the stream of urine
  - Blood in the urine
  - Blood in the semen
  - Bone pain
  - Losing weight without trying
  - Erectile dysfunction

Risk factors

- Tobacco/alcohol use
- Family history of malignancies

Disgnostic criteria and investigations

- Full blood count and diff
- Liver function tests: LDH, ALP
- Kidney function tests
- HIV +/- viral loads if not done
- Tumour markers: PSA
- Review of Histopathology: Adenocarcinoma of prostate or other histology types
- Imaging (CT scan chest abdomen and pelvis; MRI pelvis if available, Bone scan)

Management

- Managed as above under the section for the common approach in managing cancer patients
- For pain management of all the cancers refer to Palliative Care and Pain Management sections

23.6 Gastrointestinal cancers

23.6.1 Stomach cancer

Description

Stomach cancer, which is also called gastric cancer, is a growth of cells that starts in the stomach. The stomach is in the upper middle part of the belly, just below the ribs. Stomach cancer can happen in any part of the stomach.

Signs and symptoms

- Trouble swallowing
- Belly pain
- Feeling bloated after eating
- Feeling full after eating small amounts of food
- Not feeling hungry when you would expect to be hungry
- Heartburn
- Indigestion
- Nausea
- Vomiting
- Losing weight without trying
- Feeling very tired
- Stools that look black

Management

- Managed as above under the section for the common approach in managing cancer patients
- For pain management of all the cancers refer to Palliative Care and Pain Management sections

23.7 Skin cancer

Description

Skin cancer is the abnormal growth of skin cells that most often develops on skin exposed to the sun. But this form of cancer can also occur on areas of the skin not ordinarily exposed to sunlight.

Three major types of skin cancer:

- Basal cell carcinoma usually occurs in sun-exposed areas of your body, such as your neck or face.
- Melanoma can develop anywhere on the body, in otherwise normal skin or in an existing mole that becomes cancerous. Melanoma most often appears on the face or the trunk of affected men. In women, this type of cancer most often develops on the lower legs. In both men and women, melanoma can occur on skin that has not been exposed to the sun. Melanoma can affect people of any skin tone. In people with darker skin tones, melanoma tends to occur on the palms or soles, or under the fingernails or toenails.

Nonmelanoma skin cancer

- Squamous cell carcinoma of the skin: most often, squamous cell carcinoma occurs on sun-exposed areas of the body, such as the face, ears and hands. People with darker skin are more likely to develop squamous cell carcinoma on areas that are not often exposed to the sun.

Signs and symptoms

Basal cell carcinoma signs and symptoms

- A pearly or waxy bump
- A flat, flesh-colored or brown scar-like lesion
- A bleeding or scabbing sore that heals and returns

Squamous cell carcinoma signs and symptoms

Squamous cell carcinoma may appear as:

- A firm, red nodule
- A flat lesion with a scaly, crusted surface

Melanoma signs and symptoms

- A large brownish spot with darker speckles
- A mole that changes in color, size or feel or that bleeds
- A small lesion with an irregular border and portions that appear red, pink, white, blue or blue-black
- A painful lesion that itches or burns
- Dark lesions on your palms, soles, fingertips or toes, or on mucous membranes lining your mouth, nose, vagina or anus

Signs and symptoms of less common skin cancers

Other, less common types of skin cancer include:

- Kaposi sarcoma. This rare form of skin cancer develops in the skin's blood vessels and causes red or purple patches on the skin or mucous membranes. Kaposi sarcoma mainly occurs in people with weakened immune systems, such as people with HIV/AIDS, and in people taking medications that suppress their natural immunity, such as people who've undergone organ transplants.
- Merkel cell carcinoma causes firm, shiny nodules that occur on or just beneath the skin and in hair follicles. Merkel cell carcinoma is most often found on the head, neck and trunk.
- Sebaceous gland carcinoma. This uncommon and aggressive cancer originates in the oil glands in the skin. Sebaceous gland carcinomas which usually appear as hard, painless nodules that can develop anywhere, but most occur on the eyelid, where they are frequently mistaken for other eyelid problems.

Management

- Managed as above under the section for the common approach in managing cancer patients
- For pain management of all the cancers refer to palliative Care and Pain Management sections

23.8 Haematological cancers

Description

Haematological Cancers are also called blood cancer. These are cancers that begin in blood-forming tissue, such as the bone marrow, or in the cells of the immune system. The three main types of blood and bone marrow cancer are leukemia, lymphoma and myeloma:

- Leukemia is a blood cancer that originates in the blood and bone marrow. It occurs when the body creates too many abnormal white blood cells and interferes with the bone marrow's ability to make red blood cells and platelets.
- Non-Hodgkin lymphoma is a blood cancer that develops in the lymphatic system from cells called lymphocytes, a type of white blood cell that helps the body fight infections.
- Hodgkin lymphoma is a blood cancer that develops in the lymphatic system from cells called lymphocytes. Hodgkin lymphoma is characterised by the presence of an abnormal lymphocyte called the Reed-Sternberg cell.
- Multiple myeloma is a blood cancer that begins in the blood's plasma cells, a type of white blood cell made in the bone marrow. Also, learn about the stages of multiple myeloma.

There are also less common forms of blood and bone marrow cancers, or associated disorders, including:

- Myelodysplastic syndromes (MDS): These are rare conditions that may result from damage to blood-forming cells in the bone marrow.
- Myeloproliferative neoplasms (MPNs): These rare blood cancers occur when the body overproduces white blood cells, red blood cells or platelets. The three main subcategories are essential thrombocythemia (ET), myelofibrosis (MF) and polycythemia vera (PV).
- Amyloidosis: This rare disorder, characterised by the buildup of an abnormal protein called amyloid, is not a form of cancer. But it is closely associated with multiple myeloma.
- Waldenstrom macroglobulinemia: This is a rare type of non-Hodgkin lymphoma that starts in B cells.
- Aplastic Anaemia: This rare condition occurs when key stem cells are damaged and can only be treated with a bone marrow transplant.

Signs and symptoms

- Fever, chills
- Persistent fatigue, weakness
- Loss of appetite, nausea
- Unexplained weight loss
- Night sweats
- Bone/joint pain
- Abdominal discomfort
- Headaches
- Shortness of breath
- Frequent infections
- Itchy skin or skin rash
- Swollen lymph nodes in the neck, underarms or groin

Management

- Managed as above under the section for the common approach in managing cancer patients
- For pain management of all the cancers refer to Palliative Care and Pain Management sections

23.9 Special cases in cancer

1. Cancer in Pregnancy
   Patients has to be managed in consultation with a gynaecologist and oncologist. No imaging should be done except Ultra Sound scan.
2. Multiple pathologies - is a patient with different or more that one primaries. Managed as above under the section for the common approach in managing cancer patients. For pain management of all the cancers refer to Palliative Care and Pain Management sections

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