Government of Sierra Leone

MINISTRY OF HEALTH AND SANITATION

STANDARD TREATMENT GUIDELINES

2021

World Health Organization
Sierra Leone

Revised Standard Treatment Guidelines 2021

Published by: Ministry of Health and Sanitation
4th Floor Youyi Building
Brookfields
Freetown
Sierra Leone

Table of Contents

FOREWORD

Standard Treatment Guidelines are an essential strategy in antimicrobial stewardship; the aim of the STG is to improve patient outcomes and reduce adverse consequences associated with drug use, including antimicrobial resistance, toxicity, and unnecessary costs. These Standard Treatment Guidelines have been prepared to assist and guide prescribers in tertiary and secondary 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 have been finalized to ensure that the opinion of the intended users was considered and incorporated. Their development has included input from a multi-disciplinary and multi-specialty team of individuals. These guidelines are equally applicable in the private healthcare sectors. They are intended to support practitioners to make wise decisions about when to prescribe these medicines.

It is my pleasure to bring to you the third edition of the Standard Treatment Guidelines (STGs). Health for all is vital, and the movement toward Universal Health Coverage (UHC) is now one of the most prominent global health priorities. To achieve UHC, emphasis is placed on the role of primary healthcare (PHC), integrated into the broader framework for delivering comprehensive care in a patient-centered, efficient, and equitable way. Furthermore, there must be a focus on disease prevention and health promotion, supported by the use of appropriate technology and cost-effective use of available resources. During the unprecedented times that the country is experiencing through the COVID-19 pandemic, access to safe, effective, and affordable medicines has become more important than ever. The National Medicines Committee (NMC) together with a wide variety of specialists has worked tirelessly to contribute to making sure that the highest standard of quality healthcare based on available resources is provided to all citizens. The third edition of the STG brings updates based on the latest scientific evidence and other new and updated practice guidelines. The National STGs accessed by healthcare professionals in both the public and private health sectors in Sierra Leone and across the globe are important tools to support the rational use of medicines. The evidence-based medicine recommendations included in the STGs are reviewed through the transparent critical appraisal of global evidence, using a systematic evidence-to-decision framework. These Standard Treatment Guidelines have been prepared to assist and guide prescribers (including doctors, medical assistants, and midwives), pharmacists, dispensers, and other healthcare staff who prescribe at primary 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 guidelines are comprehensive, concise, and seek to summarize treatment plans for patients with priority diseases. It is assumed that the patient has been fully evaluated and all co-morbidities identified. Under each clinical condition, the treatment plan has been suggested that can be applied to the average patients with the common presentation. However, there may be great variations in patient presentation, family history, treatment preferences, and tolerance for different side effects. Therefore, these guidelines can be viewed as expert consultation and weighed with respect to other information. Moreover, the recommendations do not replace clinical judgment nor encroach on clinical flexibility, which must be tailored to the particular needs of each clinical situation. As the country continues to move towards National Health Insurance, the STGs will continue to provide a strong foundation on which health service benefits will be structured, assisting with the provision of equitable access to safe, effective affordable healthcare for all. I urge all healthcare professionals to use this important resource in the provision of quality health care to the people we serve.

Ministry of Health and Sanitation
4th Floor, Youyi Building

ACKNOWLEDGEMENTS

The development of the third edition of Standard Treatment Guidelines by the Ministry of Health and Sanitation could not have been successfully completed without the collective inputs of many health professionals, development partners, and individuals within and outside the ministry.

An attempt to list individuals will stand the risk of leaving some of the contributors. Notwithstanding, however, the Ministry is greatly indebted to W.H.O. (World Health Organization) for the funding and technical support, WACI Health, the Editorial Committee and the National Medicines Committee of the Ministry and Sanitation.

Dr. Sattie M. Kenneh
Chief Medical Officer

Dr Donald Bash Taqi	Deputy Chief Medical Officer (Clinical)
Pharm. Michael Jack Lansana	Chief Pharmacist
Mr. Musa M. Sesay	Community Health Officer
Dr Dennis T. Thomas	Clinical Pharmacist
Dr Manal Ghazzawi	Clinical Pharmacist
Rosaline Dissa Bangura	Community Health Officer
Dr Alren O. N. Vandy	National ART Coordinator
Dr Sheku S. Mansaray	Clinical Pharmacist
Dr David Kamara	Specialist Dentist
Prof. Sahr M. Ngevao	Specialist Haematologist
Dr Ibrahim Kemoh Kamara	Medical Officer
Pharm. Halimatu Kamara	Pharmacist, Directorate of Drugs and Medical Supplies
Pharm. Yusuf Marah	Pharmacist, Directorate of Drugs and Medical Supplies
Dr Karim A. Kabineh	Specialist Ear, Nose and Throat
Dr Sulaiman Lakoh	Specialist Physician (Infectious Diseases)
Pharm. Jennet Buck	Head of Rational Use of Medicine Unit, Directorate of Drugs and Medical Supplies
Prof. Durodami R. Lisk	Specialist Neurologist
Ms Sia Manyeh	Specialist Nutritionist
Dr Kisito S. Daoh	Specialist Obstetrician/Gynaecologist
Pharm. Zainab Mullah	Pharmacist, Directorate of Drugs and Medical Supplies
Dr Isaac O. Smalle	Specialist Oncologist
Dr Jalikatu Mustapha	Specialist Ophthalmologist
Dr Abu Bakarr Bah	Specialist Paediatrician
Dr Fawzi Thomas	Clinical Pharmacist
Dr James B. W. Russell	Specialist Physician (Cardiologist)
Dr Gibrilla Fadlu Deen	Specialist Physician
Dr Abdul P. Jalloh	Specialist Psychiatrist
Pharm. Samuel H. Serry	Pharmacist, Directorate of Drugs and Medical Supplies
Pharm. Ebun Cole	Pharmacist, Directorate of Drugs and Medical Supplies

Dr Mohamed M. Bah	Specialist Surgeon
Dr Thaim Buya Kamara	Specialist Urologist
Dr Joy Lasite	Clinical Pharmacist
Dr Muhamed D. Mansaray	Clinical Pharmacist
Sis. Mabinty Tarawallie	IMNCI Program Coordinator
Pharm. Joyce Kallon	Program Pharmacist – Child Health/EPI
Dr Brian Thompson	Clinical Pharmacist, College of Medicine and Allied Health Sciences
Pharm. Petula Wright	Rokurpa Government Hospital
Pharm. Tracey E. C. Jones	Princess Christian Maternal Hospital
Pharm. Angella Kaiakai	Princess Christian Maternal Hospital
Pharm. Susanne Thomas	Kings College
Pharm. Rebecca Sellu	Tuberculosis/Leprosy Programme
Pharm. Foday Usman Munu	Lumley Hospital
Pharm. Albert Davies	Connaught Hospital
Pharm. Malik Dawood Kamara	Connaught Hospital
Pharm. Junior Lamin Kamara	Connaught Hospital
Pharm. John Smith	Ola During Children's Hospital
Pharm. Brima Lahai	King Harman Road Hospital
Pharm. Paul Kamara	Ola During Children's Hospital,
Pharm. Dauda Sesay	China Friendship Hospital
Pharm. Abubakarr Sesay	Psychiatric Hospital
Pharm. Francis Lahai	Bo Government Hospital
Dr Sorie Conteh	Connaught Hospital
Pharm. Daniel Bangura	Kingharman Road Hospital
Pharm. Hannah Conteh-Kali	Lumley Government Hospital
Dr Mustapha Jalloh	Rokupa Government Hospital
Pharm. Salimatu Sesay	Ola During Children's Hospital
Dr Ayeshatu Mustapha	Ola During Children's Hospital
Pharm. Alusine Kamara	Kingharman Road Hospital
Dr Valerie J. Cole	Princess Christian Maternal Hospital
Dr Francis Moses	Reproductive Health Program
Richard Kaimbay	Community Health Officer
Elizabeth Musa	Community Health Officer
Dr Charles Senessie	College of Medicine and Allied Health Sciences
Pharm. Brenda Stafford	National Malaria Control Program
Dr Joshua Coker	Connaught Hospital
Dr David Saio Turay	Neglected tropical diseases
Pharm. Samuel Bundu	Neglected tropical diseases
Dr Edries Tejan	Connaught Hospital
Dr Augustine Brima	National Medical Supply Agency
Dr Rowland E. Williamson-Taylor	Specialist Obstetrician/Gynaecologist

Programs

Dr Mariama Murray	Program Manager – National AIDS Control Program
Pharm. Veronica L. Deen	Pharmacist – National HIV/AIDS Secretariat
Dr Francis Moses	Program Manager – Family Planning /Reproductive Health
Dr Lynda Foray	Program Manager – TB Leprosy Control Program
Dr Alhaji S. Turay	Programme Manager- National Malaria Control Program
Dr Ibrahim Kargbo-Labour	Programme Manager – Neglected Tropical Diseases

Partners, donors and other stakeholders

Dr Selassie D'Almeida	World Health Organization, Sierra Leone
Dr James Bunn	World Health Organization, Sierra Leone
Fabrice Mbikayi	Crown Agents
Pharm. Ibrahim Gassama	Partners in Health
Marie I. Kholipha-Kamara	Chemonics/President's Malaria Initiative
Prof. Obehi A. Akoria	Professor of Medicine, University of Benin & Honorary Consultant Geriatrician & Clinical Pharmacologist, University of Benin Teaching Hospital, Nigeria
Dr Stephen Ayinbuomwan	Senior. Lecturer, Department of Clinical Pharmacology, University of Benin and Honorary Consultant Clinical Pharmacologist, University of Benin Teaching Hospital, Nigeria
Dr Martha Gyansa-Lutterodt	Consultant, World Health Organization, Sierra Leone
Dr Brian Adu Asare	Consultant, World Health Organization, Sierra Leone
Dr Ogori Taylor	Consultant, World Health Organization, Sierra Leone

Members of the Editorial Committee

	NAMES	DESIGNATION
1.	Dr. Thaim B. Kamara	Chairman
2.	Prof. Duradomi L. Lisk	Member
3.	Dr. James B. W. Russell	Member
4.	Dr. Karim A. Kabineh	Member
5.	Dr. Gibrilla Faddlu Deen	Member
6.	Prof. Sahr M. Gevao	Member
7.	Pharm. Michael Jack Lansana	Secretary
8.	Pharm. Alhaji Murtada M. Sesay	Member
9.	Dr. James Bunn	Member
10.	Dr. Muhamed D. Mansaray	Member
11.	Dr. Valerie John-Cole	Member
12.	Dr. Abu Bakarr Bah	Member
13.	Dr. Charles Senessie	Member
14.	CHO Richard Kaimbay	Member
15.	Dr. Mannal Ghazzawi	Member
16.	Dr. Sheku S. Mansaray	Member
17.	Pharm. Susanne Thomas	Member

Introduction

The Ministry of health and Sanitation in 2020, revised the National Medicines Policy with one of the objectives being to ensure the availability and accessibility of safe, efficacious, and good quality medicines that are rationally used. The objective of the guidelines is to optimize therapeutic benefit to the patient and reduce wastage or losses through irrational prescribing and dispensing practices. The Ministry of Health and Sanitation subsequently adopted a National Essential Medicines List for Sierra Leone, which defines the range of medicines that are available to the public sector in Sierra Leone. The list also categorizes the medicines by level of use based on the three-tier system of health delivery in the country.

The development of these guidelines is a further step aimed at standardizing and simplifying medicine prescription, promoting rational and cost-effective use of medicines as well as rationalizing medicine supply to the public sector in the country.

The Ministry of Health and Sanitation has several guidelines for specific disease control programmes and all such guidelines are incorporated into the STG. It is important to note that these guidelines do not give extensive information on the disease states covered, and additional information should be sought in other literature. e.g. Ministry of Health and Sanitation manuals, medical text books and journals. The guidelines cover the most common disease conditions in Sierra Leone.

The guidelines are to be used to guide health care workers to make treatment choices for most of the common disease conditions in the country, and are meant to be used at hospital levels of the public health care delivery system. The private sector is encouraged to use the guidelines.

The guidelines have been developed on the principle of evidence-based medicine where current medical and pharmaceutical literature has demonstrated that treatment choices are efficacious and cost effective for a particular disease condition. The cost of the medicine and ease of administration have also been considered in coming up with treatment choices.

These guidelines will be comprehensively reviewed every four years by the National Medicines Committee. However, different sections will be promptly reviewed whenever the need arises. Any changes to the recommended guidelines will be based on sound scientific evidence clearly demonstrating that the newly recommended medicine has distinct advantages over the one in current use.

Guide to good prescribing

WHO has described a six-step model of therapeutic reasoning which will lead to rational prescribing:

Step 1: Define the patient's problem
Step 2: Specify the therapeutic objective
Step 3a: Choose your standard treatment (P-drug)
Step 3b: Verify the suitability of your treatment (P-drug)
Step 4: Start treatment
Step 5: Give information, instructions, and warnings
Step 6: Monitor (and stop?) treatment

The first step is to define the patient's problem which will lead the prescriber to delineate a clear indication for treatment. The prescriber reviews the signs, symptoms, results of investigations, patient characteristics and history (e.g. allergy, concomitant medication, co-morbidity, pregnancy) to define the problem.

Secondly, the prescriber defines the therapeutic objectives. This step is critical in determining the right treatment for the condition as well as defining the expected outcomes of treatment. Clear definition of therapeutic objectives helps in adequate monitoring of patients and instituting further interventions where the objective has not been satisfactorily achieved.

Thirdly, the prescriber chooses the treatment needed to achieve the defined therapeutic objective. WHO recommends each prescriber should define their own Personal Medicines known as P-Medicines drawn from the national EML. The P-Medicines, which is the prescriber's personal formulary, should compose of those medicines that are familiar to the prescriber.

The medicine selected for the patient should have evidence of efficacy, safety, suitability and affordability. Suitability entails that the medicine(s) would concord with the patient's history, demography, social and occupational situations. In addition, the prescriber checks for contraindications, interactions, comorbidities, allergies, liver or kidney functions etc. before making the final choice for the patient.

Fourthly, the prescriber writes the prescription. Fifthly, the prescriber provides instructions, warnings, and expected outcomes. Lastly, the prescriber monitors the effect of treatment in order to decide whether to continue, adjust, or stop the treatment.

Medical Histories

The ability to obtain an accurate medical history and carefully perform a physical examination is fundamental to making the right diagnosis and subsequently the right treatment. The following are critical elements of a comprehensive medical history.

- Name, dosage, formulation, duration of all medicines the patient is currently taking
- Medications that have been recently commenced or discontinued
- Over-the-counter, traditional and complementary medicines, dietary supplements which patient is currently taking
- Medications which patients have been advised never to take and reasons (e.g. in Glucose-6-phosphate dehydrogenase deficiency (G6PDD); hypersensitive reactions etc.)
- Known allergies

Prescription writing

A prescription is a written order by a physician or medical doctor or a clinical pharmacist in the form of medication instructions for an individual patient. It can also be defined as an order to take certain medications. A prescription has legal implications; this means the prescriber must assume responsibility for the clinical care of the patient and should be written after a diagnosis or a health problem has been identified.
When prescribing, it is therefore important to adhere to the following:

- All prescriptions should be written using generic names
- Do not prescribe too many medicines where avoidable. Prescribe the most important and leave out the extras as these might reduce patient compliance for the essential items.
- Avoid using non-standard or unknown abbreviations for medicine names as this can lead to confusion during dispensing.
- State the dose in terms of strength (e.g. 150mg) and not number of tablets/capsules as the strength of the available formulation might be different depending on the supplier.
- Also for drugs that are prescribed base on weight, the dose should be calculated and specified in milligram Uncalculated doses should not be prescribed for individual patients.
- Avoid using unit of measures like teaspoonful or tablespoonful as volumes vary from spoon to spoon. Use millilitres.
- Avoid using decimal places as the wrong strength might end up being dispensed and this can have disastrous consequences. For example, instead of 0.25mg the strength should be stated as 250 mcg or 250 micrograms.
- Give stat doses where possible. This will improve compliance.
- If necessary, reduce the number of medication times. Doses are likely not to be missed in those cases where the medicine is taken once or twice a day compared to four times a day.
- Patients should at most times take their different medicines at the same frequency per day to reduce the need to remember when and what to be taken. This is especially important in the elderly.

Common abbreviations used in prescriptions

The following abbreviation are commonly used in prescriptions

Patient safety

The objective of patient safety is to prevent and reduce risk, errors and harm that occur during provision of health care or during treatment.
Medication-related harm is described as any harm associated with medication use or its omission. It includes adverse reactions and medication errors.

Adverse Drug Reactions (ADR)

A response to a medicinal product which is noxious and unintended and which occurs at doses normally use in man for prophylaxis, diagnosis or therapy of diseases or for the modification of physiologic function. Pharmacovigilance is the science relating to the collection, detection, assessment, monitoring, and prevention of adverse effects or any other drug related problem.

Pharmacovigilance promotes patient safety through the following activities:

- Early detection of unknown safety problems
- Detection of increases in frequency of side effects
- Identification of risk factors
- Quantifying risks
- Preventing patients from being affected unnecessarily

ADRs can be categorized as follows:

- Unavoidable due to genetic, idiosyncratic, or other factors
- Avoidable caused by medication error, accidental misuse and non-adherence to therapy

Adverse reactions could be serious or benign. Serious ADRs can result in:

- Death
- Life-threatening situations
- Hospitalization or prolonged hospitalization for in-patients
- Disability which can significantly affect quality of life
- Congenital abnormality

Vulnerable populations

The following patients could be vulnerable to adverse effects and therefore, particular care should be exercised when they are being treated.

- Pregnant and lactating mothers

- Children
- Elderly persons
- Persons with multi-morbidities
- Persons taking several medications (polypharmacy)
- Persons with impaired hepatic or renal function
- Persons with disabilities such as poor vision, poor dexterity
- Persons with communication difficulties such as language difficulties, cognitive impairment, under CNS medication
- Destitute persons who cannot afford medications

Elderly people present special therapeutic challenges due to potential decline in renal and hepatic functions, which are responsible for elimination and metabolism respectively. Special attention should be paid to elderly patients taking the following class of medicines when they cannot be avoided:
- Cardiovascular medicines which cause orthostatic hypotension
- Oral hypoglycaemic
- Benzodiazepines
- Psychoactive medicines
- Anticoagulants
- Non-steroidal anti-inflammatory analgesics
- Opioid analgesics
- Anticholinergics

Preventing adverse drug reactions.

Adverse drug reactions can be prevented through the following:
- Do not use a medicine unless there is a good indication.
- Avoid use of medicines during pregnancy unless benefits outweigh risk to the foetus
- Allergy and idiosyncrasies are important causes of ADRs, (ask patient if they have had previous reactions).
- During history taking, ask for any other medicines the patient is taking including non-prescription medicines as interactions may occur.
- Ask for any existing diseases as this might affect metabolism or excretion of the medicine e.g. hepatic or kidney disease.
- Use a familiar medicine where possible. Look out for adverse reactions or unexpected effects with all new medicines.
- Take extra care when you prescribe drugs known to exhibit a large variety of interactions and adverse reactions (anticoagulants, hypoglycaemics, and centrally acting medicines). Carefully monitor patients for such reactions.
- Review all medicines used by patients regularly, taking special notice of those bought without prescription e.g. Over-the-counter, herbal preparations cosmetics etc.
- Be particularly careful when prescribing for children, the elderly, pregnant and nursing women, the seriously ill and patients with hepatic and renal diseases. Careful continuous monitoring is essential in these patients.
- Beware, of the interaction of drugs, with certain foods, alcohol and house hold chemicals.
- Warn patients of any serious adverse reactions that may occur.
- Use reference materials or the Drug Information Centre to elicit information on reactions and interactions.
- If you suspect an adverse reaction, consider stopping the drug or reduce the dosage as soon as possible. Immediately notify the Drug Information and Pharmacovigilance Unit, Pharmacy Board of Sierra Leone using the ADR reporting form included in the annex or the ADR reporting software through the PBSL website: pharmacyboard.gov.sl

Medication Errors

Medication error is defined as the accidental failure to perform an action as intended (prescribing the wrong drug) or accidentally perform incorrectly an action (for example, writing the wrong dose of an appropriate medicine).

Steps to avoiding medication errors

- Always use generic names
- Individualize prescribing for each patient
- Practice taking and documenting thorough medication histories
- Use appropriate reference sources when needed
- Communicate clearly
- Develop safe checking practices
- Encourage patients to be actively involved in the medication process
- Report and learn from their own and others' errors
- Identify high-risk situations in their own area of practice and take action to reduce these risks
- Use special labels for blind or poorly sighted patients

Dispensing of Medicines

The dispensary is usually the last place of call for the patient and it is crucial that information passed to the patient is clear and concise. This information is crucial in ensuring that the patient takes their medication as prescribed.
Dispensing should only be carried out when;
- A proper prescription is presented at the Pharmacy
- The prescription is dated and has the patient's details (name, age weight etc.)
- The medicine name and other details about the medicine are clear to the dispenser. When in doubt, the dispenser should liaise with the prescriber before the prescription is processed.

Labelling of medicines

Spoken instructions given to the patient should be adequately supported by written instruction, as it might be difficult to remember the different instructions for several medicines. Clearly written instructions will help, as some patients who are uninformed might seek help from neighbours in reading the instructions.
Pictorial labels should be used for uninformed patients.

Information required on the label

The following information should be on the label to promote patient safety and compliance:

- Medicine name (use generic name)
- Strength (usually in mg)
- Quantity dispensed
- Clear instructions for use in a familiar language or pictorially
- Cautionary label where necessary (e.g. for topical use only)
- Name of patient
- Name of health facility
- Date of dispensing

Common medicine interactions

The interactions listed in table are not comprehensive. Please consult the British National Formulary, the WHO Model Formulary, Sierra Leone's National Formulary, or any other current literature for more information.

Medicine or medicine group	*Effect and comments*	*Medicine causing effect*
ACE inhibitors	Enhanced Hypotensive effect	Alcohol, diuretics, anaesthetics, beta blockers, nitrates
	Severe postural hypotension	Antipsychotics especially chlorpromazine
	Reduced absorption	Antacids
	Increase the risk of hyperkalaemia	NSAIDs, Corticosteroids
	Risk of hypotensive effect	Heparin, potassium sparing diuretics (amiloride), potassium salts
Aminoglycosides	Increased risk of nephrotoxicity	Amphotericin
	Increased risk of ototoxicity	Loop diuretics (frusemide)
Anticoagulants	Increase risk of bleeding	Aspirin
	Reduced anticoagulant effect (warfarin)	Carbamazepine, phenobarbitone
	Effect enhanced Increased risk of CNS toxicity	Fluconazole, ketoconazole, miconazole, macrolides and metronidazole Tramadol
Antidiabetics	Enhanced effect plasma levels of sulphonyureas increased	Fluconazole, miconazole, chloramphenicol
Antiepileptics carbamazepine	Convulsive threshold lowered	Antidepressants, chloroquine
	Anticonvulsant effect antagonized	Mefloquine antipsychotics
	Effect enhanced	Erythromycin, cimetidine, isoniazid
Phenytoin	Increased plasma concentrations	Aspirin, chloramphenicol, isoniazid Metronidazole, fluconazole, miconazole, nifedipine, cimetidine
	Reduced absorption	Antacids
	Convulsive threshold lowered	Antidepressants, antipsychotics
Antifungals (Imidazole)	Reduced absorption (itraconazole ketoconazole)	Antacids, cimetidine, ranitidine
	Reduced plasma concentration increased metabolism (fluconazole, ketoconazole)	Rifampicin
	Reduced plasma concentrations (itraconazole ketoconazole)	Phenytoin
Antivirals	increased plasma concentration (indinavir)	ketoconazole
Antivirals	Plasma Concentration reduced	Carbamazepine, phenobarbitone and phenytoin
Beta blockers	Enhanced hypotensive effect	Alcohol anaesthetics, diuretics
	increased risk of bradycardia and AV block, severe hypotension and heart failure	Diltiazem, digoxin Verapamil, antidiabetics including insulin
Calcium Channel blockers	Enhanced hypotensive effect	Anaesthetics
	Reduced effect	Rifampicin, phenobarbitone, phenytoin
Digoxin	Increased toxicity	Chloroquine, quinine, frusemide, clarithromycin,
Doxycycline	Reduced absorption	Antacids, iron salts

Medicine or medicine group	*Effect and comments*	*Medicine causing effect*
	Reduced plasma concentration	Carbamazepine, phenobarbitone, phenytoin
Lithium	Increased plasma concentration	ACE inhibitors, diuretics, ibuprofen, indomethacin
	Increased toxicity without increase in plasma levels	Carbamazepine, phenytoin, verapamil, diltiazem, methyldopa
	Increased toxicity	Metronidazole
Oral Contraceptives	Effect reduced	Rifampicin, broad spectrum antibiotics, carbamazepine, phenobarbitone, phenytoin

Prescribing in renal impairment/renal failure

Use of certain medicines in patients with renal impairment may give rise to problems:
- Failure to excrete the medicine or its metabolites may result in toxicity
- Some medicines cease to be effective when there is reduced renal function.
- Sensitivity due to reduced elimination of medicines

General prescribing principles:
- Drugs eliminated via the kidney must be avoided or in some cases the dose can be modified based on patient state.
- The drugs listed below should be avoided in patients with renal impairment. This list is not exhaustive and additional information can be obtained from current literature sources.

Medicines to be avoided or used within caution in renal impairment

Category	*Medicine*	*Comments*
Analgesics	NSAIDs/NSAIMs (aspirin, indomethacin, diclofenac)	Avoid; may lead to sodium and water retention and deterioration of renal function).
	Opioids (codeine, morphine, pethidine)	If unavoidable, use a reduced dose formulation. Use paracetamol.
Anti – TB	Ethambutol	Reduce dose if creatinine clearance is <30 mL/minute
	Isoniazid	Avoid Maximum dose 200 mg daily
Antibiotics	Penicillins and Cephalosporins	Reduce dose in advance renal failure
	Aminoglycosides	Use with extreme caution where they cannot be avoided; monitor serum concentrations.
	Nalidixic acid	Use half normal dose.
	Cotrimoxazole	Reduce dose as required.
	Sulphadiazine	Avoid
	Doxycycline	Avoid
	Erythromycin	Can be used. Avoid excessive doses Maximum 1.5 g daily
Anticoagulants (Oral)	To be filled	Avoid. Impairment can be severe
Cardiovascular	Atenolol	Reduce dose (propranolol safer except in very severe cases. Start with low dose)
	ACE inhibitors	Use with caution and monitor response. Monitor potassium level Initial doses: captopril 12.5mg and Enalapril 2.5mg daily. Reduce the dose and frequency
	Hydralazine	Reduce dose as required.
	Digoxin	Toxicity increased by electrolyte disturbances. Adjust dose.
Diuretics	Amiloride and spironolactone	Monitor serum electrolyte levels in mild cases and avoid in moderate and severe cases
Thiazide diuretics	Bendrofluazide & Hydrochlorothiazide	Avoid (ineffective)
Glucose lowering agents	Insulins	May need dose reduction Insulin requirements reduce Compensatory response to hypoglycaemia is impaired
	Chlorpropamide	Avoid
	Glibenclamide	Avoid in severe cases
	Metformin	Avoid
	Tolbutamide	Reduce dose in mild to moderate cases. Avoid in severe cases

Treatment of Common Symptoms

Cough

Cough is the forceful expulsion of air from the lungs that helps clear secretions, foreign bodies, and irritants from the airway.

Acute cough (less than 3 weeks)

Non-life threatening	***Life threatening***
- Upper respiratory tract infections (URIs) - Acute bronchitis - Laryngo-tracheo-bronchitis ("croup") in children	- Acute heart failure - Acute pulmonary embolism - Severe Pneumonia - Acute exacerbation of bronchial asthma - Acute exacerbation of COPD - Acute inhalation injury

Subacute cough (3-8 weeks)

- Post-infectious cough
- Bacterial sinusitis
- Pneumonia
- Acute exacerbation of chronic bronchitis
- Bronchial asthma

Chronic cough >8 weeks in adults and >4 weeks in children

- Bronchial asthma/cough variant asthma
- Gastroesophageal reflux disease (GERD)
- Upper airway cough syndrome previously known as postnasal drip syndrome
- Allergic fungal sinusitis
- Allergic rhinitis
- Non-allergic rhinitis (due to medicines, post-infection, chemical or physical irritants)
- ACE-inhibitor induced cough
- Pertussis

Productive (phlegm or mucous)	***Non productive***	***Nocturnal cough***	***Seasonal***	***Red flag symptoms (indicate further investigations)***
- Pneumonia - Bronchitis - Tuberculosis	- Bronchial asthma - Viral pneumonia	- Bronchial asthma - GERD - Heart failure	- Bronchial asthma - Allergic rhinitis - Allergic sinusitis	- Fever - Haemoptysis - Weight loss - Severe respiratory distress

Investigations

- History taking and physical examination are sufficient to diagnose the cause of an acute cough
- Blood culture for suspected pneumonia
- Tuberculin skin test for patients with suspected TB
- Chest radiograph for suspected pulmonary infection
- Sputum examination for acid-fast bacilli for suspected TB
- Sputum culture for suspected TB or bacterial pneumonia
- Complete blood count for patients with chronic cough and red-flag symptoms
    - Neutrophilic leucocytosis in suspected TB or allergy
    - Eosinophilia in suspected bronchial asthma
    - Gene xpert

Non-pharmacologic treatment

Non-life-threatening acute cough:

- Honey
- Menthol
- Hydration
- Lozenges
- Humidifiers

Chronic cough

- Stop precipitating factors
- Stop or substitute ACE inhibitors

Pharmacologic treatment

- Analgesics for fever, head and body aches
- Antibiotics are usually not recommended for non-life-threatening acute cough.
- Give antibiotics only to persons suspected to have bacterial infections
- Treat the underlying cause (*see sections on congestive heart failure, bronchial asthma, COPD, croup, pertussis,* etc.)
- GERD (PPIs for 8-12 weeks)
- Empirical cough management

Cough

Productive Cough (Expectorants)

Diphenhydramine oral
25-50 mg every 4 hours when necessary (syrup preferred); not to exceed 150 mg/day

Non-productive cough

Cough suppressant

Antitussives

Useful for dry, irritating cough or cough that serves no useful purpose such as clearing excessive sputum production or secretions

Dextromethorphan (abuse potential less than codeine) oral
Liquid and syrup: 10-20 mg every 4 hours or 30 mg every 6-8 hours
Gel: 30 mg every 6-8 hours; not to exceed 120 mg/24 hours

Codeine oral
7.5-30 mg every 4-6 hours when necessary

Post-infectious cough

- No treatment may be required, as it often resolves spontaneously
- If cough is interfering with sleep, give antitussives, oral or inhaled corticosteroids or bronchodilators according to aetiology.

Dehydration

Dehydration is a state of decreased total body water. Dehydration secondary to diarrhoeal illness is the leading cause of infant and child mortality worldwide.

Causes

- Diarrhoea
- Vomiting
- Burns
- Sweating
- Fever
- Insufficient fluid intake especially in critically ill patients and the elderly

Signs and symptoms

- Thirst
- Dry skin and mucous membranes
- Headache, dizziness, disorientation
- Weakness, fatigue, lethargy
- Restlessness
- Sunken eyes
- Dark circles around the eyes and frequent blinking (reduced tear fluid quantity)
- Decreased blood pressure
- Decreased pulse volume; sometimes thready pulse
- Increased heart rate (tachycardia)
- Increased respiratory rate (tachypnoea)
- Decreased urine output (oliguria)
- Children: no tears when crying
- Infants: sunken fontanelle, restlessness/lethargy

Complications

- Hypovolemic shock
- Acute kidney injury
- Risk of urinary tract infection
- Thrombosis
- Dehydration can trigger diabetic ketoacidosis in diabetic patients

Investigations

Degree of dehydration for children under 5 years (WHO Guidelines)

Severe dehydration	*Some dehydration*	*No dehydration*
At least two of the following signs	**Two or more of the following signs**	**Not enough signs**
- Lethargy/unconsciousness - Sunken eyes - Unable to drink or drinks poorly - Skin pinch goes back very slowly (≥2 seconds)	- Restlessness - Irritability - Sunken eyes - Drinks eagerly - Thirsty	

Older Children and Adults (at least 2 signs must be present)

Mild dehydration	*Moderate dehydration*	*Severe dehydration*
- Thirsty - Alert - Normal pulse - Normal respiration rate - Normal systolic blood pressure - Skin pinch quickly goes back to normal - Eyes are normal - Tears are present - Normal mucous membranes - Normal urine output	- Thirsty - Alert - Rapid pulse - Rapid respiration rate - Normal systolic blood pressure - Skin pinch slowly goes back to normal - Eyes are sunken - Tears are absent - Dry mucous membranes - Reduced urine output	- Lethargy/unconsciousness - Restlessness - Cold extremities - Absent or thready pulse - Low systolic blood pressure - Skin pinch returns slowly to normal (more than 2 secs.) - Eyes are very sunken - Tears are absent - Very dry mucous membranes - No urine output (empty bladder)

Treatment objectives

- Correct fluid imbalance
- Correct electrolyte imbalance

Pharmacological treatment

No dehydration, administer fluids as follows:

- ORS solution
- Salted drinks (e.g. salted rice water or a salted yoghurt drink)
- Vegetable or chicken soup with salt.
- Give supplemental zinc (10 - 20 mg) to children, daily for 10 to 14 days.

Moderate dehydration

Give ORS

- If the child's weight is known, this should be used to determine the approximate amount of solution needed.
- The amount may also be estimated by multiplying the child's weight in kg by 75ml

If the child's weight is not known, select the approximate amount according to the child's age.

Approximate amount of ORS solutions to give in the first 4 hours include

Age	**<4 months**	**4-11 months**	**12-23 months**	**2-4 years**	**5-14 years**	**15 years or older**
Weight	< 5 kg	5-7.9 kg	8-10.9 kg	11-15.9 kg	16-29.9 kg	30 kg or more
Volume of ORS	200-400	400-600	600-800	800-1200	1200-2200	2200-4000

Note:
- The exact amount of solution required will depend on the child's dehydration status
- If the patient needs more ORS than shown, give more (check for signs of over hydration)

Monitoring the progress of oral rehydration therapy
- If there are signs of severe dehydration, intravenous (IV) therapy should be started following initial treatment.
- Continue oral rehydration therapy until there are no more signs of dehydration.

Features of adequate hydration:

- *Normal skin turgor*
- Subsiding thirst
- Adequate urine volumes
- The child becomes quiet, is no longer irritable and often falls asleep
- Ensure patient's fluid intake meets normal daily fluid requirements
- For breastfeeding infants - continue to breastfeed as often and as long as the infant wants, even during oral rehydration therapy.
- For non-breastfed infants under 6 months of age, after completing rehydration, resume full strength milk (or formula) feeds. Give water and other fluids usually taken by the infant.
- Older children and adults: encourage liberal oral fluid intake, in addition to ORS solution.

Severe dehydration
Rapid intravenous rehydration is the preferred treatment in this group of patients.

(N.B: Nutritional status for children should be taken into account and other underlined conditions)

- If the patient can drink, give ORS by mouth while setting up an intravenous access.
- Start 100 mL/kg of **Ringer's lactate solution** (if not available **0.9% saline** may be used) divided as follows:

Infants under 12 months:
First give 30 mL/kg in 1 hour (repeat once if radial pulse is still very weak or not detectable),
Then give 70 mL/kg in 5 hours

Older children
First give 30 mL/kg in 30 minutes (repeat once if radial pulse is still very weak or not detectable)
Then give 70 mL/kg in 2½ hours

Monitoring the progress of intravenous rehydration
- Assess patients every 15-30 minutes until a strong radial pulse is present and at least every hour thereafter to confirm that hydration is improving. If the hydration is not improving, give the IV infusion more rapidly
- Once the planned amount of IV fluid has been given (after 3 hours for older patients, or 6 hours for infants), the hydration status should be reassessed fully according to the WHO scale for dehydration.

    - If signs of severe dehydration are still present, repeat the IV fluid infusion as outlined above
    - If the child is improving (able to drink) but still shows signs of dehydration, discontinue the IV infusion and give ORS solution for four hours as mentioned in treatment for moderate dehydration
    - If there are no more signs of dehydration, follow treatment for no dehydration

Referral
- Patients who do not respond to treatment should immediately be referred for specialist care.

Febrile convulsions (seizures)

Febrile seizures are one of the most common paediatric emergencies which occur with high fever in children between 6 months and 5 years of age.

Febrile seizures are classified as; simple febrile seizure and complex febrile seizure, and occur in 75% and 25% of cases, respectively.

Causes
- Genetic predisposition
- High fever (> 40°C)
- Viral infection (e.g. Human Herpes virus 6, influenza)

- Recent immunization (especially MMR and tetanus, diphtheria, and pertussis)
- Fever from:
  - Malaria
  - Respiratory tract infections
  - Urinary tract infections
  - Other febrile conditions

Simple febrile seizure	*Complex febrile seizure*
- Duration is less than 15 minutes - Does not recur within 24 hours - Occurs in children 6 months to 5 years - Generalized, usually tonic-clonic seizures - Symmetrical - No other apparent neurologic disorders - Occurs during a febrile episode - Does not involve an acute disease of the nervous system - No neurologic deficits in the child - No postnatal brain damage - Child has normal psychomotor development - Child has no previous afebrile seizures	- Duration is more than 15 minutes - Recurs more than once in 24 hour - More commonly outside the typical range of 6 months to 5 years - Focal onset - Pronounced on one side of the body - Transient hemiparesis and speech impairment - May occur in children with previous neurologic deficits

Differential diagnosis
- Syncope during febrile states
- Abnormal motor manifestations: shuddering, dystonic seizures
- Meningitis

Investigations
- Simple febrile seizures do not require any specific investigations, but identifying the cause of fever (malaria, meningitis, respiratory infection etc.)
- Complex febrile seizures always require specific investigative tests such as EEG

Treatment objectives
- Abort seizures
- Treat precipitating factors

Treatment

Treatment of a prolonged seizure in a hospital setting
- Manage airway obstruction
- Prepare a venous access
- Monitor vital parameters (heart rate, breath frequency(respiratory rate), blood pressure, SaO2)
- Administer oxygen, if necessary (SaO2 <90%)SPO2
- Administer intravenous **diazepam** at a dose of 0.5 mg/kg, at a maximum rate of 5 mg/minute, and suspend it when the seizure stops; the dose may be repeated, if necessary, after an interval of 10 minutes
- If seizures do not stop, **refer** to specialist

For patients prone to recurrence:

The risk factors for recurrence are similar for simple and complex febrile seizure and are:
- Early age of onset (<15 months)
- Epilepsy in first-degree relatives
- Febrile seizures in first-degree relatives
- Frequent febrile illness
- Low temperature at the onset of the febrile seizure

Administer at the onset of fever to prevent recurrences

Diazepam oral
0.4–0.5 mg/kg
Repeat after 8 hours if fever persists.

Prevention
- Early treatment of high temperature

Education for parents
- Remain calm and do not panic
- Loosen the child's clothing, especially around the neck
- If the child is unconscious, place the child in the lateral decubitus position, to avoid inhalation of saliva or vomitus
- Do not force opening of the mouth
- Observe the type and duration of the seizure
- Do not give any drugs or fluids orally
- Take the child to the health facility as soon as possible

Referral
- Refer all complex febrile seizure to specialist for further investigation
- If the seizure does not stop refer to specialist

Shock

Shock is the state of insufficient blood flow to the tissues of the body as a result of problems with the circulatory system. It is a life-threatening medical emergency, and is associated with a high mortality rate.

Causes
Shock due to massive blood or fluid loss e.g.
- Blood loss
    - Blunt trauma
    - External haemorrhage
    - Internal haemorrhage
    - Post-partum haemorrhage + APH
    - Fracture of the pelvis
    - Upper GI bleeding
- Fluid loss
    - GI loss diarrhoea, vomiting, surgical drainage
    - Increased loss such as burns, Steven-Johnson's syndrome
    - Polyuria

- **Cardiogenic shock** due to inability of the heart to circulate blood e.g.

- Myocardial infarction
- Dysrhythmias
- Cardiomyopathy/myocarditis
- Heart failure with systolic dysfunction
- Valvular heart disease

Obstructive shock due to blockage of **blood flow to or from the heart**
- Cardiac tamponade
- Constrictive pericarditis
- Tension pneumothorax
- Pulmonary embolism
- Aortic stenosis
- Hypertrophic sub-aortic stenosis

Distributive (anaphylactic, septic or neurogenic) shock due to a disturbance in the fluid distribution in the body
- Sepsis
- Anaphylaxis
- Spinal cord injury
- Overdose of some medicines

Signs and symptoms

Shock
- Weak and thready pulse
- Tachycardia
- Rapid and shallow breathing
- Hypotension
- Hypothermia
- Melaena
- Haematemesis
- Vomiting
- Diarrhoea
- Increased thirst
- Dry mouth

The severity of shock can be graded on a 1–4 scale based on physical signs

Physical sign	Grade of shock			
	I Mild	**II Progressing**	**III Severe**	**IV End stage**
Blood loss	< 15%	15-30%	30-40%	> 40%
Heart rate	< 100	100-120	120-140	> 140
Systolic blood pressure	Normal	Normal	<90/60mmHg	<<90/60mmHg
Capillary refill	Normal	Within 2-3 sec	4 and above	Absent
Pulse	Normal or 100	>100	>>100	>>>100
Respiratory rate	14-20	20-30	30-40	> 35 or <13*
Urine output	> 30 mL/hr	20-30 mL/hr	5-15 mL/hr	Absent
Mental status	Alert	Anxious	Confused	Confused/lethargic /unconscious

- ***In cases of bradypnia***

Cardiogenic shock
- Distended jugular veins
- Thready or absent pulse
- Abnormal heart rhythms, often a fast heart rate
- Reduced blood pressure
- Cold, clammy extremities

Obstructive shock
- Abnormal heart rhythms
- Cardiac tamponade
- Reduced blood pressure
- Cold and clammy extremities
- Decreased urine output

Distributive shock

Septic shock
- Abnormal heart rate, character and rhythms, often a fast heart rate
- Reduced blood pressure
- Oliguria due to decreased blood flow to kidneys
- Altered mental status due to decreased blood flow to the brain

Anaphylactic shock
- Skin changes, such as hives, itching, flushing and swelling.
- Wheezing and shortness of breath.
- Abdominal pain, diarrhoea, and vomiting.
- Light-headedness, confusion, headaches, loss of consciousness.

Investigations
- Immediate investigations should include:
  - haematological
  - microbiological
  - Radiological tests as soon as possible.
  - Blood lactate level

Note

Haemoglobin concentration is useful for initial assessment and monitoring, but should be interpreted with informed caution.

Treatment objectives

- Reverse the underlying cause of the shock
- Stabilize the haemodynamic status of the patient

Treatment

- Start adequate intravenous antibiotics as early as possible.
- Resuscitate the patient with septic shock by using supportive measures to correct hypoxia, hypotension, and impaired tissue oxygenation (hypoperfusion)
- Identify the source of infection and treat with antimicrobial therapy, surgery, or both.
- If haemorrhage is suspected, perform blood grouping and cross-matching and have packed RBC concentrates at hand for transfusion

Septic shock

- Fluid resuscitation
- Vasopressors
    - First-line: **noradrenaline**
    - Second-line: **adrenaline**
- Early initiation of broad-spectrum empirical antibiotic therapy in cases resulting from bacterial Infection.
- Surgical therapy may be required in some cases (e.g., peritonitis, necrotizing fasciitis)

Cardiogenic shock

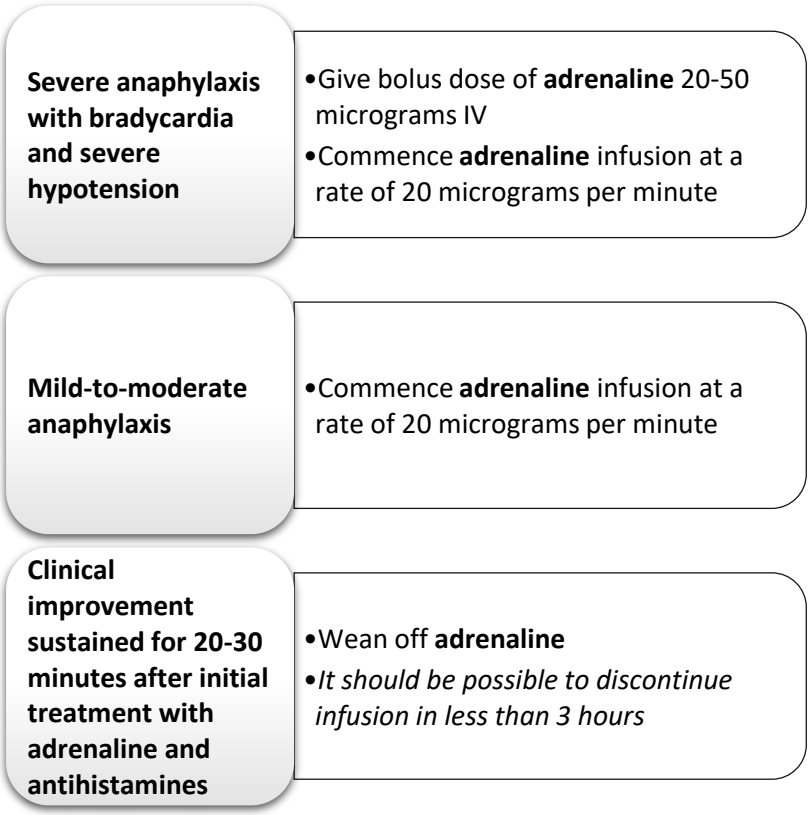
- Cardiopulmonary resuscitation if necessary
- Myocardial infarction:
    - SBP < 70 mmHg: **noradrenaline**
    - SBP 70-100 mmHg: **dopamine**
    - Reperfusion therapy (PTCA, thrombolysis)
    - If there is pulmonary congestion: diuretics
    - Vasodilators todecrease afterload (e.g., hydralazine, isosorbide dinitrate)
- Cardiac tamponade: pericardiocentesis
- Pulmonary embolus: thrombolysis
- Tension pneumothorax: needle decompression (***Second Intercoastal space Mid Clavicular Line***) followed by chest tube insertion

Anaphylactic shock

- Secure the airway
- Place patient in recumbent position with feet elevated (if this can be tolerated)

Adrenaline
This should be given intravenously in all patients with IV access (see figure below).

- The IM route may however be lifesaving in patients who do not have immediate IV access:
- I mg/mL preparation: give 0.3-0.5 mL IM on the outer lateral aspect of the thigh immediately. Repeat after 5-15 minutes if symptoms persist, while preparing for IV injection/infusion:



Antihistamines

Chlorphenamine by slow intravenous injection or IM
>12 years and adults: 10 mg
>6 – 12 years: 5 mg
>6 months – 6 years: 2.5 mg
<6 months: 250 micrograms/kg

OR

Diphenhydramine 1 mg/kg (maximum 40 mg IV, over 5 minutes)

Glucocorticoids

Hydrocortisone by slow IV injection or IM:
>12 years and adults: 200 mg
>6 – 12 years: 100 mg
>6 months – 6 years: 50 mg
<6 months: 25 mg

Supportive care

IV fluids:

Give 0.9% **saline infusion** at 20 mL/kg body weight. Re-evaluate and repeat fluid boluses (20 mL/kg), as needed

Supplemental **oxygen** at 8-10 L/minute

Hypovolaemic shock

- Insert the largest bore cannula in the largest vein visible. You may insert 2 cannulae at separate sites for rapid IV infusion
- Catheterize the bladder
- Raise drip stand or squeeze bag to increase infusion rate

Give **colloids** (e.g. **Dextran 70**). If not available give **crystalloids** e.g. **0.**9% sodium chloride.

Adult: 70 mL/kg body weight
Child: 30 mL/kg body weight.

- In haemorrhagic states, cross–matched blood is preferred but time-consuming, so commence initial resuscitation with above
- Fluid should be given quickly and slowed only when BP rises and urine flow is adequate.

Give **Oxygen** 4-6 L/min via nasal prongs or facial mask
- Continue to monitor BP, pulse and urine output

Pain

Pain is an unpleasant sensory and emotional experience that arises from actual or potential tissue damage and described in terms of such damage.. Pain is the most common symptom of a disease.

Classification of pain

Based on duration:

- ***Acute pain*** is usually associated with trauma, surgery, and acute illness; short duration (few seconds to days)
- ***Chronic pain:*** lasts beyond the normal tissue healing time (6 months)

Based on mechanism and origin:

Nociceptive pain	*Neuropathic pain*
Triggered by chemical, mechanical, or thermal stimuli	Caused by abnormal neural activity that arises secondary to injury, disease, or dysfunction of the nervous system
Somatic (Musculoskeletal pain) - Localized - Sharp - Variable in duration and quality ***Visceral pain*** - Dull, deep, diffuse pain	***Central pain***: caused by CNS dysfunction e.g. ischaemic stroke, phantom limb ***Peripheral pain***: caused by damage to peripheral nerves e.g. diabetic neuropathy ***Sympathetically-***mediated pain: caused by damage to autonomic nerves

Referred pain

Pain that is felt at a site different from the organ of origin is referred pain.
Examples:

Organ of origin of pain	*Projection/Referred to*
Diaphragm	Shoulders
Heart	Left chest
0esophagus	Retrosternal
Stomach	Epigastrium
Liver, gallbladder	Right upper quadrant of abdomen
Small bowel	Periumbilical
Colon	Lower abdomen
Bladder	Suprapubic
Kidneys, testicles	Groin

Investigating pain

- Duration of pain
- Severity: assess using the numerical rating scale, where the patient grades his/her pain on a scale of 0 = no pain to 5 (or 10) = worst pain ever experienced
- Site and radiation
- Nature (e.g., stabbing, throbbing, crushing, cramp-like)
- Periodicity (constant or intermittent)
- Relieving or aggravating factors
- Accompanying symptoms
- Ask the patient for a detailed history for each pain experienced, as there may be more than one type of pain and area causing pain
- Targeted physical examination

Treatment Principles

- Follow the WHO Pain Ladder to institute treatment
- Analgesics should be preferably administered orally
- Administer analgesics regularly at fixed times and doses rather than on demand
- On demand administration should be given only with short-acting analgesics for peaks in pain.
- If necessary dosing is required more than 3 times a day, review treatment regimen
- Also follow the WHO Pain Ladder to modify treatment
- Administer concurrent treatment with adjuvant medicines to potentiate the analgesic effects or manage side effects of analgesics.

WHO Pain Ladder

Step 1	*Step 2*	*Step 3*
Non-opioid analgesic	**Weak opioid analgesic**	**Strong opioid analgesic**
PLUS/MINUS	**PLUS/MINUS**	**PLUS/MINUS**
Adjuvant analgesic	Non-opioid analgesic	Non-opioid analgesic
	PLUS/MINUS	**PLUS/MINUS**
	Adjuvant analgesic	Adjuvant analgesic

Step 1: Mild Pain

Adults

Paracetamol 1 g every 8 hours (500 mg in elderly)
AND/OR
Ibuprofen 400 mg every 6-8 hours (maximum 2,400 mg/day)
OR
Diclofenac 50 mg every 8 hours
OR
Other NSAIM

Child

Paracetamol 10-15 mg/kg every 6 hours
AND/OR
Ibuprofen 5-10 mg/ kg every 6-8 hours (use only in children >3 months)

Step 2: Moderate Pain

Adult:

Morphine 2.5-5 mg every 4 hours during day, double dose at night
OR
Codeine 30-60 mg every 6 hours (maximum 240 mg)
OR
Tramadol 50-100 mg every 6 hours (maximum 400 mg)

Child:

Morphine every 4 hours
1-6 months: 100 micrograms/kg

6-12 months: 200 micrograms/kg
1-2 years: 200-400 micrograms/kg
2-12 years: 200-500 micrograms/kg (maximum 10 mg)

Step 3: Moderate to Severe Pain *(discontinue step 2 analgesics when starting step 3*)
- **Morphine** 7.5-10 mg every 4 hours during day and double dose at night
- Increase dose by 30-50% as required to control the pain
- Give additional dose for breakthrough pain or 30 minutes before an activity causing pain (e.g. wound dressing)

Adjuvant medicines (co-analgesics)

Potentiation of analgesic effects
- Tricyclic antidepressants (e.g. amitriptyline, fluoxetine for neuropathic pain)
- Anticonvulsants (e.g. carbamazepine) for neuropathic pain
- Glucocorticoids (e.g. dexamethasone) for raised intracranial pressure and nerve compression

Management of side effects
- Laxatives (bisacodyl, liquid paraffin)
- Antiemetics (metoclopramide)
- Proton-pump inhibitors (omeprazole)

Neonatal Conditions

Danger Signs in New-Borns and Young Infants

Neonates and young infants often present with non-specific symptoms and signs that indicate severe illness. These signs might be present at or after delivery, or in a new-born presenting to hospital or developed during hospital stay.

Signs and symptoms
- Not feeding well
- Convulsions
- Drowsiness or unconsciousness
- Movement only when stimulated or no movement at all
- Fast breathing (60 breaths per min)
- Grunting
- Severe chest in-drawing
- Raised temperature, > 38 °C
- Hypothermia, < 35.5 °C
- Central cyanosis
- Severe jaundice
- Severe abdominal distension

Convulsions or fits

Causes

The commonest causes of neonatal convulsions include:
- Hypoxic ischaemic encephalopathy (as a result of perinatal asphyxia)
- Central nervous system infection
- Hypoglycaemia
- Hypocalcaemia

Non-pharmacological and pharmacological treatment

Management of the neonate or young infant who is having a fit:
- Manage the airway and breathing
- Ensure circulatory access
- If hypoglycaemic, give **glucose IV** or nasogastrically (2 ml/kg of 10% glucose).
- If blood glucose cannot be measured, give empirical treatment with **glucose**.
- Treat convulsions with **phenobarbital** (loading dose 20 mg/kg IV).
- If convulsions persist, give further doses of **phenobarbital** 10 mg/kg up to a maximum of 40 mg/kg.
- Watch for apnoea. Always have a bag-mask available.
- If needed, continue **phenobarbital** at a maintenance dose of 5 mg/kg per day.
- If hypocalcaemia, symptoms may settle if the infant is given 2 ml/kg of 10% **calcium gluconate** as a slow IV infusion, and continue with oral supplementation.
- Rule out central nervous system infection. Treat if present

Serious Bacterial Infections

Localizing signs of infection are:

- Signs of pneumonia
- Many or severe skin pustules
- Umbilical redness extending to the peri-umbilical skin
- Umbilicus draining pus
- Bulging fontanelle
- Painful joints, joint swelling, reduced movement and irritability if these parts are handled

Risk factors for developing serious infections are:
- Convulsions
- Apnoea
- Inability to breast feed
- Poor motor tone: floppy or with limb stiffening (spasticity)

Non-pharmacological and pharmacological treatment

Antibiotic therapy
- Empirical antibiotics should be given to children with suspected neonatal sepsis.
- Admit to hospital.
- When possible, do a lumbar puncture and obtain blood cultures before starting antibiotics.

New-borns with signs of serious bacterial infection or sepsis administer for **7-10 days**:

Ampicillin IM or IV

Age	Dose	Frequency of administration
First week of life	50mg/kg	Every 12 hours
Weeks 2-4 of life	50mg/kg	Every 8 hours

OR
Procaine benzylpenicillin IM
50,000U/kg once a day

OR
Benzathine benzylpenicillin IM
50,000U/kg once a day

PLUS

Gentamicin

Birthweight	Age	Dose	Frequency of administration
Low birthweight	First week of life	3mg/kg	Once a day
Normal birthweight	First week of life	5mg/kg	Once a day
	Weeks 2-4 of life	7.5mg/kg	Once a day

If the new-born is at a greater risk of staphylococcus infection (extensive skin pustules, Abscess or omphalitis in addition to signs of sepsis), give

Cloxacillin IV

Age	Dose	Frequency of administration
First week of life	25-50mg/kg	Every 12 hours
Weeks 2-4 of life	25-50mg/kg	Every 8 hours

PLUS

Gentamicin IM/IV

Birthweight	Age	Dose	Frequency of administration
Low birthweight	First week of life	3mg/kg	Once a day
Normal birthweight	First week of life	5mg/kg	Once a day
	Weeks 2-4 of life	7.5mg/kg	Once a day

Note
- If an infant is not improving within 2–3 days, change the antibiotic treatment or refer the infant for further management.

Other treatments

- If the infant is drowsy or unconscious, ensure that hypoglycaemia is not present. If infant is hypoglycaemic, give **IV Glucose** 2 ml/kg of 10% glucose
- Treat convulsions with phenobarbital (*see section on convulsion*)
- Treat conjunctivitis if present (*see section on conjunctivitis)*
- Take a blood film to check for malaria. Neonatal malaria is very rare. If confirmed, treat with artesunate or quinine (*see section on of malaria*)

Meningitis

Inflammation of the covering of the brain and can also involve the brain parenchyma (encephalitis/meningoencephalitis) mostly caused by infection (bacteria, viruses, fungal)

Causes:
Bacteria e.g.: *S .pneumonia, H. influenza, meningococcus, tuberculosis*
Viruses e.g. *Enteroviruses, Herpes simplex*
Fungus e.g. *Cryptococcus, Candida albicans*

Signs and symptoms

Suspect meningitis if signs of serious bacterial infection and particularly if any one of the following is present:
The infant is:

- Drowsy, lethargic or unconscious
- Convulsing
- Has a bulging and tense anterior fontanelle
- Irritable
- Has a high-pitched cry (in-consolable).

Investigations:

- Lumber puncture for CSF analysis after ruling out contraindications
- Biochemistry (blood sugar)
- Electrolyte panel
- Chest X ray
- Gene Xpert

Note

It is important to attempt lumbar puncture once the infant has been stabilized, ideally within 2 h of initiating antibiotic treatment, because it serves to confirm the diagnosis. Please note that you can't withhold treatment when all the signs and symptoms is observed and also be mindful of contraindications in Lumbar puncture such as raised ICP, thrombocytopenia and when patient is cardiopulmonary unstable.

Pharmacological treatment

First-line antibiotics for **3 weeks**

Ampicillin

Age	Dose	Frequency of administration
First week of life	50mg/kg	Every 12 hours
Weeks 2-4 of life	50mg/kg	Every 8 hours

PLUS

Gentamicin

Birthweight	Age	Dose	Frequency of administration
Low birth weight	First week of life	3mg/kg	Once a day
Normal birthweight	First week of life	5mg/kg	Once a day
	Weeks 2-4 of life	7.5mg/kg	Once a day

Alternatively

Ceftriaxone IM/IV for 3 weeks

Age	Dose	Frequency of administration
First week of life	50mg/kg	Every 12 hours
Weeks 2-4 of life	75mg/kg	Every 12 hours

PLUS

Gentamicin (as above)
- If there are signs of hypoxaemia, give oxygen
- If the infant is drowsy or unconscious, ensure that hypoglycaemia is not present; if infant is hypoglycaemic, give 2 ml/kg 10% glucose IV.
- Treat convulsions (after ensuring they are not due to hypoglycaemia or hypoxaemia) with phenobarbital
- Make regular checks for hypoglycaemia.

Jaundice

More than 50% of normal new-borns and 80% of preterm infants have some Jaundice. Jaundice may be normal or abnormal:

Normal (physiological)
- Skin and eyes yellow but none of the signs of abnormal jaundice below.

Abnormal (non-physiological)
- Starting on the first day of life
- Lasting > 14 days in term and > 21 days in preterm infants
- With fever
- Deep jaundice: palms and soles of the infant deep yellow

Abnormal jaundice may be due to:
- Serious bacterial infection
- Haemolytic disease due to blood group incompatibility or glucose 6-phosphate
- Dehydrogenase deficiency
- Congenital syphilis or other intrauterine infection
- Liver disease such as hepatitis or biliary atresia (stools pale and urine dark)
- Hypothyroidism

Investigations for abnormal jaundice
All new-borns should be monitored for the development of jaundice, which should be confirmed by a bilirubin measurement, when possible, in all:
- Infants if jaundice appears on day 1
- Preterm infants (< 35 weeks) if jaundice appears on day 2
- Infants if palms and soles are yellow at any age.

The investigations depend on the probable diagnosis and what tests are available but may include:
- Haemoglobin or packed cell volume
- Full blood count to identify signs of serious bacterial infection (high or low Neutrophil count with > 20% band forms) and signs of haemolysis
- Blood type of infant and mother and coombs test
- Syphilis serology, such as venereal disease research laboratory tests
- Glucose 6-phosphate dehydrogenase screening, thyroid function tests,
- Liver ultrasound

Non-pharmacological and pharmacological treatment
Phototherapy is sufficient if:
- Jaundice on day 1
- Deep jaundice involving palms and soles of the feet
- Prematurity and jaundice
- Jaundice due to haemolysis

Treatment of jaundice based on serum bilirubin level

	Phototherapy		*Exchange transfusion*	
Age	Healthy infant ≥ 35 weeks	Pre-term infant < 35	Healthy infant ≥ 35	Pre-term infant < 35 weeks'

		weeks' gestation or any risk factors[1]	weeks	gestation or any risk factors
Day 1	Any visible jaundice on the body		260μmol/l (15mg/dl)	220μmol/l (10mg/dl)
Day 2	260μmol/l (15mg/dl)	170μmol/l (10mg/dl)	425μmol/l (25mg/dl)	260μmol/l (15mg/dl)
Day ≥ 3	310μmol/l (18mg/dl)	250μmol/l (15mg/dl)	425μmol/l (25mg/dl)	340μmol/l (20mg/dl)

- Continue phototherapy until the serum bilirubin level is lower than the threshold range or until the infant is well and there is no jaundice of palms and soles.
- If the bilirubin level is very high (see table) and you can safely do exchange transfusion, consider doing so.
- If infection or syphilis is suspected, treat for serious bacterial infection with **antibiotics** (*see section*)
- If fever is present check blood films for malaria parasites, and give **antimalarials** if positive.
- Encourage breastfeeding.

Conjunctivitis

Sticky eyes and mild conjunctivitis

- Treat as outpatient if child has no other serious problem.
- Show the mother how to wash the eyes with water or breast milk and how to put ointment into the eyes. The mother must wash her hands before and after doing so.
- Tell the mother to wash the eyes and put in eye ointment four times a day for 5 days.
- Give the mother a tube of **tetracycline** or **chloramphenicol eye ointment** to treat the child.
- Review 48 h after starting treatment if the child is not improving.

Severe conjunctivitis

- Presents as a lot of pus and/or swelling of the eyelids. It is often due to gonococcal infection.
- Treat as inpatient, as there is a risk for blindness,
- Review twice-daily

Non-pharmacological and pharmacological treatment

Wash the eyes to clear as much pus as possible.

Ceftriaxone IM

Age	Dose	Frequency of administration
Child	50 mg/kg up to a maximum total dose of 150 mg	Once

PLUS

Tetracycline 1% eye ointment

Age	Dose	Frequency of administration
New born	One application	2 times daily for 7 days

Congenital syphilis

Signs and symptoms

- Often low birth weight
- Palms and soles: red rash, grey patches, blisters or skin peeling

'Snuffles': highly infectious rhinitis with nasal obstruction

- Abdominal distension due to enlarged liver and spleen
- Jaundice
- Anaemia

Some very-low-birth-weight infants with syphilis have signs of severe sepsis with lethargy, respiratory distress, skin petechiae or other bleeding.

Investigation

If you suspect syphilis, do a VDRL test if possible.

Non-pharmacological and pharmacological treatment

Asymptomatic neonates born to women with a positive VDRL or rapid plasma reagin test should receive: **Benzathine benzylpenicillin** IM

[1] Risk factors include small size (< 2.5 kg at birth or born before 37 weeks' gestation), haemolysis and sepsis.

37.5 mg/kg (50 000 U/kg) IM in a single dose

Symptomatic infants should be treated with:

Procaine benzylpenicillin deep IM injection daily for **10 days**
50 mg/kg as a single dose

OR

Benzylpenicillin at 30 mg/kg every 12 h IV for the first 7 days of life and then 30 mg/kg every 8 h for a further 3 days.

- Treat the mother and her partner for syphilis and check for other sexually transmitted infections.

Paediatric Conditions

Cough or difficulty in breathing in children

Cough and difficulty in breathing are common problems in young children. They range from a mild, self-limited illness to severe, life-threatening disease.

- Common cold – most common
- Pneumonia,
- Effusion
- Croup
- Asthma
- Bronchiolitis
- Tuberculosis
- Pertussis
- Diphtheria
- COVID19

Signs and symptoms

General

- Central cyanosis
- Severe palmar pallor

Chest

- Respiratory rate (count during 1 min when the child is calm)
- Fast breathing:

Age	*Respiratory rate per minute*
< 2 months	≥ 60 breaths
2–11 months	≥ 50 breaths
1–5 years	≥ 40 breaths

- Lower chest wall indrawing
- Hyperinflated chest
- Apex beat displaced or trachea shifted from midline
- Raised jugular venous pressure
- On auscultation, coarse crackles, no air entry or bronchial breath sounds or wheeze
- Abnormal heart rhythm on auscultation
- Percussion signs of pleural effusion (stony dullness) or pneumothorax (hyper-resonance)
- Apnoea
- Gasping
- Grunting
- Nasal flaring
- Audible wheeze
- Stridor
- Head nodding (a movement of the head synchronous with inspiration indicating severe respiratory distress)
- Tachycardia

Abdomen

- Abdominal masses (e.g. lymphadenopathy)
- Enlarged liver and spleen

Investigations

- Pulse oximetry to detect hypoxia
- Full blood count
- Chest X-ray only for children with severe pneumonia or pneumonia that does not respond to treatment or complications or unclear diagnosis or associated with HIV
- Gene-Xpert

Differential diagnosis

Diagnosis	*Signs and symptoms*
Pneumonia	- Cough with fast breathing - Lower chest wall indrawing - Fever - Coarse crackles or bronchial breath sounds or dullness to percussion – Grunting
Asthma or wheeze	- Recurrent episodes of shortness of breath or wheeze - Night cough or cough and wheeze with exercise - Response to bronchodilators

Diagnosis	*Signs and symptoms*
	- Known or family history of allergy or asthma
Bronchiolitis	- Cough - Wheeze and crackles - Age usually < 1 year
Malaria	- Fast breathing in a febrile child - Blood smear or malaria rapid diagnostic test confirms parasitaemia - Anaemia or palmar pallor - In severe malaria, deep (acidotic) breathing or lower chest indrawing - Chest clear on auscultation
Severe anaemia	- Shortness of breath on exertion - Severe palmar pallor - Hb < 6 g/dl
Tuberculosis	- Chronic cough (> 14 days) - History of contact with TB patient - Poor growth, wasting or weight loss - Positive Mantoux test - Diagnostic chest X-ray may show primary complex or miliary TB - Sputum positive in older child
Pertussis	- Paroxysms of cough followed by whoop - Vomiting - Cyanosis or apnoea - No symptoms between bouts of cough - No fever - No history of DPT vaccination
Foreign body	- History of sudden choking - Sudden onset of stridor or respiratory distress - Focal areas of wheeze or reduced breath sounds
Pneumothorax[2]*	- Onset, usually after major chest trauma - Hyper-resonance on percussion of one side of the chest - Shift in mediastinum to opposite side
Pneumocystis pneumonia	- 2–6-month-old child with central cyanosis - Hyperexpanded chest - Fast breathing (tachypnoea) - Finger clubbing - Chest X-ray changes, but chest clear on auscultation - HIV test positive in mother or child
Croup	- Inspiratory stridor Current measles - Barking character to cough - Hoarse voice
Diphtheria	- No history of DPT vaccination - Inspiratory stridor - Grey pharyngeal membrane - Cardiac arrhythmia

Child with pneumonia

Pneumonia is a respiratory infection caused by viruses or bacteria. It is classified as non-severe or severe based on clinical features.

Non-severe pneumonia	*Severe pneumonia*
Fast breathing: - ≥ 50 breaths/min in a child aged 2–11 months - ≥ 40 breaths/min in a child aged 1–5 years **Chest indrawing**	**Cough or difficulty in breathing with:** - Oxygen saturation < 90% or central cyanosis - Severe respiratory distress (e.g. grunting, very severe chest indrawing) - Signs of pneumonia with a general

[2] *S. aureus as an eitiologic agent causing pneumothorax in children*

	danger sign (inability to breastfeed or drink, lethargy or reduced level of consciousness, convulsions)

Investigations

- Measure oxygen saturation with pulse oximetry in all children suspected of having pneumonia.
- Chest X-ray to identify pleural effusion, empyema, pneumothorax, pneumatocele, interstitial pneumonia or pericardial effusion.
- Gene-Xpert

Non-pharmacological and pharmacological treatment

Admit the child to hospital.

Oxygen therapy

Give oxygen to all children with oxygen saturation < 90%

- Use a pulse oximetry to guide oxygen therapy (to keep oxygen saturation > 90%).
- If a pulse oximeter is not available, continue oxygen until the signs of hypoxia (such as inability to breastfeed or breathing rate ≥ 70/min) are no longer present.

Antibiotic therapy

1st line

IV ampicillin 50 mg/kg every 6 h for at least 5 days

OR

Benzylpenicillin 50 000 U/kg IM or IV every 6 h for at least 5 days

PLUS

Gentamicin 7.5 mg/kg IM or IV once a day for at least 5 days.

If the child does not show signs of improvement within 48 hours and if staphylococcal pneumonia is suspected, switch to

Gentamicin 7.5m/kg IM or IV once a day

PLUS

Cloxacillin 50mg/kg IM or IV every 6 hours

2nd line

Ceftriaxone 80mg/kg IM or IV daily (if 1st line medicines fail)

Other treatments

- Remove by gentle suction any thick secretions at the entrance to the nasal passages or throat, which the child cannot clear.
- If the child has fever (≥ 39 °C) give paracetamol 10 mg/kg every 4-6 hours for fever
- If wheezing, give salbutamol 1-2 puffs every 4-6 hours and start steroids when appropriate.
- Rehydrate appropriately but avoid over-hydration
- If convulsions occur, give diazepam 0.5 mg/kg rectally or 0.2 mg/kg IV
- Encourage breastfeeding and oral fluids.
- Encourage the child to eat as soon as food can be taken

Child with bronchiolitis

An acute viral infection of the lower respiratory tract that occurs primarily in children less than 2 years (peaks during the rainy season). It is characterized by airways obstruction and wheezing. Episodes of wheeze may occur for months after an attack of bronchiolitis, but will eventually stop.

Causes and risk factors
- Respiratory Syncytial Virus (RSV) in 70% of cases
- Children who were never been breastfed
- Children exposed to secondary tobacco smoke

Signs and symptoms
- First 24-72 hours, rhinopharyngitis with dry cough
- Wheezing not relieved by bronchodilators
- Difficulty in breathing
- Lower chest wall indrawing
- Moderate or no fever
- Difficulty in feeding, breastfeeding or drinking owing to respiratory distress
- Nasal discharge

Signs of serious illness
- Rapid breathing, often respiratory rate of less than 50–60 breaths per minute
- Cyanosis evident in the lips, buccal membranes, and fingernails
- Nasal flaring
- Periods of cessation of breathing, especially in infants <6 weeks
- Poor feeding or refusal of feedings; difficulty drinking or breastfeeding
- Seizure as a result of hypoxia
- Altered level of consciousness
- Chest indrawing
- Chest is silent on auscultation

Evaluation
Most children can be treated at home, but those with the following signs of:
- Severe pneumonia should be treated in hospital:
- Oxygen saturation < 94% or central cyanosis.
- Apnoea or history of apnoea
- Inability to breastfeed or drink, or vomiting everything
- Convulsions, lethargy or unconsciousness
- Gasping and grunting (especially in young infants)
- Age less than 3 months

Treatment objectives
- Classify severity of illness
- Alleviate symptoms
- Treat secondary infections
- Refer appropriately

Non-pharmacological treatment
- Position child in a half-sitting position to make breathing easier
- Nasal irrigation with 0.9% NaCl before each feeding
- Small, frequent feedings to reduce vomiting triggered by bouts of coughing
- Increase fluid intake if fever and/or vomiting are present.
- Do not sedate the child

Pharmacological treatment
Oxygen therapy
- Give oxygen to all children with severe respiratory distress or oxygen saturation ≤ 90%
- Use a pulse oximetry to guide oxygen therapy (to keep oxygen saturation > 90%).
- If a pulse oximeter is not available, continue oxygen until the signs of hypoxia (such as inability to breastfeed or breathing rate ≥ 70/min) are no longer present.

Antibiotic treatment
- Give an antibiotic only if the child has signs of pneumonia (fast breathing and lower chest wall indrawing

When infant is treated, give
Amoxicillin oral

90 mg/kg/day in two divided doses for 5 days (children >1-18 yrs.)
Ampicillin 50mg/Kg/dose every 6 hours for 5 days
For Newborns, give Intravenous:
Ampicillin 50mg/Kg/dose every 12 hours

If child is allergic to Penicillins, you switch to:

Azithromycin 10mg/Kg/day for 3 days (1-18yrs)
OR
Erythromycin 12.5mg/Kg/dose every 6 hours for 5 days

If the newborn is allergic to Penicillins, switch to:

Cefuroxime 75mg/Kg/dose every 12 hours x5days
(If conditions improve, you may switch to oral medication to complete 7 days of treatment)

If there are signs of severe pneumonia
(Older Children: 1-18 yrs.) Ampicillin IV 50 mg/kg every 6 hours for at least 5 days

AND
Gentamicin 7.5 mg/kg IM or IV once a day for at least 5 days. (Older Children)
Gentamicin 3.5 mg/kg/dose IM or IV once a day for at least 5 days (Newborns)

If the child has fever ≥ 39 °C that appears to be causing distress, give

Paracetamol
10 mg/kg -20mg/Kg every 6 hours (when necessary)

Referral
- If the child fails to respond to oxygen therapy or the child's condition worsens suddenly, refer immediately for specialist attention.

Child with asthma

Asthma is a chronic inflammatory condition with reversible airway obstruction. It is characterized by recurrent episodes of wheezing, coughing and shortness of breath.

Causes

- Family history of asthma
- Past history of allergies
- Atopic dermatitis
- Childhood exposure to second-hand smoke

Triggers include:

Allergic asthma
- Environmental allergens: pollen, dust, mites, domestic animals, mould spores
- Exposure to allergens in the workplace

Non-allergic asthma
- Viral respiratory tract infections
- Chronic sinusitis or rhinitis
- Cold air
- Physical exertion for exercise-induced asthma
- Some medicines such as NSAIDS e.g. aspirin, beta-blockers
- Stress
- Irritants such as solvents, ozone, tobacco or wood smoke, cleaning agents

Signs and symptoms
- Rapid or increasing respiratory rate
- Hyperinflation of the chest
- Hypoxia (oxygen saturation ≤ 90%)
- Coughing
- Lower chest wall indrawing
- Use of accessory muscles for respiration (best noted by feeling the neck muscles)

- Prolonged expiration with audible wheeze
- Reduced or no air intake when obstruction is life-threatening
- Good response to treatment with a bronchodilator

Differential diagnosis

Asthma	***Bronchiolitis***
- History of recurrent wheeze, chest tightness, some unrelated to coughs and colds or induced by exercise - Hyperinflation of the chest - Prolonged expiration - Reduced air entry (if very severe, airway obstruction) - Good response to bronchodilators, unless very severe	- First episode of wheeze in a child aged < 2 years - Wheeze episode at time of seasonal bronchiolitis - Hyperinflation of the chest - Prolonged expiration - Reduced air entry (if very severe, airway obstruction) - Poor or no response to bronchodilators - Apnoea in young infants, especially if born preterm
Wheeze associated with cough or cold	***Foreign body***
- Wheeze always related to coughs and colds - No family or personal history of asthma, eczema, hay-fever - Prolonged expiration - Reduced air entry (if very severe, airway obstruction) - Good response to bronchodilators - Tends to be less severe than wheeze associated with asthma	- History of sudden onset of choking or wheezing - Wheeze may be unilateral - Air trapping with hyper-resonance and mediastinal shift - Signs of lung collapse: reduced air entry and impaired breathing - No response to bronchodilators

Investigations

- Chest X-ray to rule out other respiratory disease condition. E.g. pneumothorax.

Treatment objectives

- Reduce the recurrent episodes of wheezing.
- Reverse airway obstruction.

Non-pharmacological treatment

- Supportive care
- Oxygen to be less than or equals to SPO2 94%

Pharmacological treatment

Acute severe asthma or child has recurrent wheezing

Salbutamol 100mcg/dose by metered-dose inhaler and spacer device

Age	***Dose***
< 5 years	2 puffs (200mcg) in 3 rapid successions
> 5 years	2 puffs (200mcg) in 6 rapid successions

- Reassess and repeat until condition improves
- In severe cases, give several times within the hour

OR

Subcutaneous adrenaline
SC injection of 0.01ml/kg of 1:1000 solution up to a maximum of 0.3ml.
If there is no improvement after 15 minutes, repeat dose **once.**

PLUS

Steroids

Severe or life-threatening acute attack of wheezing
Oral prednisolone

Age	*Dose*	*Maximum*
2 - 5 years	1mg/kg for 3-5 days	20mg
> 5 years	1mg/kg for 3-5 days	60mg

For children who cannot take oral medication due to vomiting give
IV Hydrocortisone 4mg/kg every 4 hours until the child is able to tolerate oral medication.

PLUS

Magnesium sulphate
IV magnesium sulphate may provide additional benefit in children with severe asthma treated with bronchodilators and corticosteroids.
Give 50% **magnesium sulphate** as a bolus of 0.1mg/kg (50mg/kg) IV over 20 minutes

Aminophylline
- Not recommended in children with mild-to-moderate acute asthma. Reserved for children who do not improve after several doses of salbutamol plus steroids

Loading dose: 5-6mg/kg (up to a maximum of 300mg) over at least 20 minutes but preferably over 1 hour.
Maintenance dose: 5mg/kg every 6 hours

Caution
- IV Aminophylline can be **dangerous** as an overdose or when given too rapidly.
- Omit the loading dose if a child had received aminophylline or caffeine in the previous 24 hours.

Stop administration as soon as a child:
- Starts to vomit
- Has a pulse rate >180/min
- Develops a headache
- Has a convulsion

Oral bronchodilators
Not recommended in severe or persistent wheeze. Use only when child has improved significantly and to be discharged.

Salbutamol syrup or tablet
1month to 2 years: 100mcg/kg (maximum 2mg) up to 4 times daily
2-6 years: 1-2mg up to 4 times daily

Antibiotics
Not to be given routinely for asthma or a child with asthma who has fast breathing without fever. Give antibiotics where there is persistent fever or other signs of pneumonia.

Patient education
- Self-management of signs and symptoms and recognizing their own level of control
- The signs of progressively worsening asthma symptoms
- Environmental control and avoidance strategies of triggers
- Medication use and adherence (e.g. correct use of inhalers and other devices)
- Control of comorbid conditions

Referral
- If the child fails to respond to the above therapy, or the child's condition worsens suddenly, refer for specialist management.

Child with conditions presenting with stridor

Stridor is a harsh noise during inspiration, which is due to narrowing of the air passages in the oropharynx, sub-glottis or trachea.

Causes : The major causes of severe stridor are:
- Viral croup (commonly caused by measles or other viruses)
- Foreign body inhalation
- Retropharyngeal abscess
- Diphtheria and trauma to the larynx
- It may also occur in early infancy due to congenital abnormalities

Differential diagnosis

Diagnosis	***Signs and symptoms***
Viral croup	- Barking cough - Respiratory distress - Hoarse voice - If due to measles, signs of measles
Retropharyngeal abscess	- Soft tissue swelling in back of the throat - Difficulty in swallowing - Fever
Foreign body	- Sudden history of choking - Respiratory distress
Diphtheria	- Bull neck appearance due to enlarged cervical nodes and oedema - Red throat - Grey pharyngeal membrane - Blood-stained nasal discharge - No evidence of DPT vaccination
Epiglottitis	- Soft stridor - 'Septic' child - Little or no cough - Drooling of saliva - Inability to drink
Congenital anomaly	- Stridor present since birth
Anaphylaxis	- History of allergen exposure - Wheeze - Shock - Urticaria and oedema of lips and face
Burns	- Swollen lips - Smoke inhalation

Treatment

A child with severe croup should be admitted to the hospital

Steroid treatment

Dexamethasone oral
One dose of 0.6mg/kg

Adrenaline (nebulized)
2ml of 1:1000 solution given every hour with careful monitoring

Note

- While this treatment can lead to improvement within 30 minutes in some children, it is often temporary and may last only about 2 hours.

Antibiotics are ineffective and should not be given

Monitor child closely and if a child with severe croup is deteriorating, refer for intubation and/or tracheostomy.

Diphtheria
Diphtheria antitoxin IM or IV
Give 40,000 immediately after initial intradermal test to detect hypersensitivity.
Note
Delay in giving antitoxin can increase the risk of mortality.

PLUS

Ampicillin 50mg/Kg(in cases of Co-infection)

Caution

Avoid using oxygen unless there is incipient airway obstruction

Supportive care

- If the child has fever (≥ 39 °C) that appears to be causing distress, give paracetamol.
- Encourage the child to eat and drink. If the child has difficulty in swallowing, nasogastric feeding is required
- Avoid frequent examinations and invasive procedures when possible or disturbing the child unnecessarily

Complications
- Myocarditis and paralysis may occur 2-7 weeks after the onset of illness
- Signs of myocarditis include:
  - Weak and irregular pulse
  - Evidence of heart failure

Public health measures
- Nurse the child by staff who have been fully vaccinated against diphtheria in a **separate room**
- Give all vaccinated household contacts a **diphtheria toxoid booster**
- Give all unvaccinated household contacts:
  - One dose of **benzyl penicillin** (600,000 U for those aged ≤ 5years, 1,200.000 U for those > 5 years)
  - Give diphtheria toxoid, and check daily for 5 days for any signs of diphtheria

Child with pertussis (whooping cough)

Pertussis is most severe in young infants who have not yet been immunized. After an incubation period of 7–10 days, the child has fever, usually with a cough and nasal discharge that are clinically indistinguishable from the common cough and cold. In the second week, there is paroxysmal coughing that can be recognized as pertussis. The episodes of coughing can continue for 3 months or longer. The child is infectious for up to 3 weeks after the onset of bouts of whooping cough.

Diagnosis
Suspect pertussis if a child has had a severe cough for more than 2 weeks, especially if the disease is known to be occurring locally.
Diagnostic signs are:

- Paroxysmal coughing followed by a whoop when breathing in, often with vomiting
- Subconjunctival haemorrhages
- Child not vaccinated against pertussis
- Young infants may not whoop; instead, the cough may be followed by suspension of breathing (apnoea) or cyanosis, or apnoea may occur without coughing.
- Also, examine the child for signs of pneumonia, and ask about convulsions.

Treatment evaluation
- Treat mild cases in children aged ≥ 6 months at home with supportive care
- Admit infants aged < 6 months to hospital
- Admit any child with pneumonia, convulsions, dehydration, severe malnutrition or prolonged apnoea or cyanosis after coughing

Pharmacological treatment

Antibiotics
Erythromycin oral
(12.5 mg/kg four times a day) for 10 days.
Note:
This does not shorten the illness but reduces the period of infectiousness.

OR
Azithromycin
10 mg/kg (maximum, 500 mg) on the first day, then 5 mg/kg (maximum, 250 mg) once a day for 4 days.

Oxygen
- Give **oxygen** to children who have spells of apnoea or cyanosis, severe paroxysms of coughing or low oxygen saturation ≤ 90% on a pulse oximeter.

Supportive treatment
- Avoid, as far as possible, any procedure that could trigger coughing, such as application of suction, throat examination or use of a nasogastric tube (unless the child cannot drink).
- Do not give cough suppressants, sedatives, mucolytic agents or antihistamines.
- If the child has fever (≥ 39 °C, ≥ 102.2 °F) that appears to be causing distress, give paracetamol.
- Encourage breastfeeding or oral fluids
- If there is severe respiratory distress and maintenance fluids cannot be given through a nasogastric tube because of persistent vomiting, give IV fluids to avoid the risk of aspiration and avoid triggering coughing.
- Ensure adequate nutrition by giving small, frequent feeds. If there is continued weight loss despite these measures, feed the child by nasogastric tube.

Complications

Pneumonia

- This is the commonest complication of pertussis and is caused by secondary bacterial infection or inhalation of vomit. Signs suggesting pneumonia include fast breathing between coughing episodes, fever and the rapid onset of respiratory distress.

Convulsions

- These may result from anoxia associated with an apnoeic or cyanotic episode or toxin-mediated encephalopathy. If a convulsion does not stop within 2 min, give diazepam, following the guidelines.

Malnutrition

- Children with pertussis may become malnourished as a result of reduced food intake and frequent vomiting. Prevent malnutrition by ensuring adequate feeding

Haemorrhage and hernias

- Subconjunctival haemorrhage and epistaxis are common during pertussis. No specific treatment is needed.
- Umbilical or inguinal hernias may be caused by violent coughing. Do not treat them unless there are signs of bowel obstruction, but refer the child for surgical evaluation after the acute phase.

Public health measures

- Give DPT vaccine to any child in the family who is not fully immunized and to the child with pertussis.
- Give a DPT booster to previously vaccinated children.
- Give erythromycin estolate (12.5 mg/kg four times a day) for 10 days to any infant in the family who is < 6 months old and has fever or other signs of a respiratory infection.

Child with epiglottitis

Epiglottitis is a medical emergency that may result in death if not treated quickly.

Causes

- *H. influenzae* type B
- Other bacteria and viruses that cause upper respiratory tract infection

Treatment objectives

- Relieve the airway obstruction
- Eradicate infectious agent

Non-pharmacological and pharmacological treatment

- Provide humidified **oxygen** with close monitoring
- Call for help and secure the airway as an emergency because of the danger of unpredictable airway obstruction
- Elective intubation is the best treatment for severe obstruction
- Surgical intervention may be considered for severe obstruction to ensure airway patency
- When the airway is safe, give **IV Ceftriaxone** at 80mg/kg once daily for 5 days

Child with anaphylaxis

Anaphylaxis is a severe allergic reaction, which may cause upper airway obstruction with stridor, lower airway obstruction with wheezing or shock or all three.

Causes

Reactions to:

- Antibiotics
- Vaccines
- Blood transfusion
- Certain foods especially nuts

Signs and symptoms

Severity	*Symptoms*	*Signs*
Mild	- Itching mouth - Nausea	- Urticaria - Conjunctivitis - Oedema of the face - Red throat
Moderate	- Cough or wheeze - Diarrhoea - Sweating	- Wheeze - Tachycardia - Pallor
Severe	- Difficulty - Collapse - Vomiting	- Severe wheeze with poor air entry - Oedema of the larynx - Respiratory arrest - Cardiac arrest - Shock

Non-pharmacological and pharmacological treatment

- Remove the allergen as appropriate
- For mild cases (just rash and itching), give oral **antihistamine** and **oral prednisolone** at 1 mg/kg.

For moderate cases with stridor and obstruction or wheeze:

- Give **adrenaline** at 0.15 ml of 1:1000 IM into the thigh (or subcutaneous); the dose may be repeated every 5–15 min

For severe anaphylactic shock:

- Give **adrenaline** at 0.15 ml of 1:1000 IM and repeat every 5–15 min.
- Give 100% **oxygen.**
- Ensure stabilization of the airway, breathing, circulation and secure IV access.
- If the obstruction is severe, consider intubation or call an anaesthetist and surgeon to intubate or create a surgical airway.
- Administer 20 ml/kg **normal saline 0.9%** or **Ringer's lactate** solution IV as rapidly as possible. If IV access is not possible, insert an intraosseous line.

Childhood Diarrhoea

Diarrhoea is present when there is frequent defaecation more than three times a day, with altered stool consistency having water content of more than 75% and increased stool quantity of more than 200 to 250 grams per day.

Types of diarrhoea

- Acute diarrhoea: lasting ≤ 14 days
- Chronic or persistent diarrhoea: lasting > 14 days

Causes

- Food intolerance, e.g. lactose intolerance.
- Food ingestion history e.g. contaminated foods, food poisoning
- Drinking contaminated water
- Viral infection e.g. rotavirus, Norwalk virus etc.
- Bacterial infection e.g. E. coli, salmonella, shigella
- Parasitic infections ***Cryptosporidium enteritis***, ***Entamoeba histolytica***, and ***Giardia lamblia***
- Predisposing conditions (e.g. hospitalization, antibiotic use, immunocompromised state)
- Association with abdominal disorders (e.g., nausea and vomiting, fever, abdominal pain)

Signs and symptoms

- Fever
- Vomiting
- Excessive crying
- Abdominal cramps
- Abdominal pain
- Bloating
- Nausea
- Blood in stool

Obtain careful history of:

- Frequency of stools
- fever
- Number of days of diarrhoea
- Blood in stools
- Report of cholera outbreak in the area
- Recent antibiotic or other drug treatment
- Attacks of crying with pallor in an infant

Investigations

- Blood in stools
- Signs of severe malnutrition
- Abdominal mass
- Abdominal distension
- Investigations
- FBC
- Blood culture and sensitivity
- Urinalysis
- Microscopy
- RVS
- Stool microscopy or culture if child has bloody diarrhoea

Differential diagnosis

Diagnosis	***Signs and symptoms***
Acute watery diarrhoea	- More than three loose stools per day - No blood in stools
Cholera	- Profuse watery diarrhoea with severe dehydration during cholera outbreak - Positive stool culture for *Vibrio cholerae*
Dysentery	- Blood mixed with stools (seen or reported)
Persistent diarrhoea	- Diarrhoea lasting ≥ 14 days
Diarrhoea with severe malnutrition	- Any diarrhoea with signs of severe acute malnutrition
Diarrhoea associated with recent antibiotic use	- Recent course of broad-spectrum oral antibiotics
Intussusception	- Blood and mucus in stools - Abdominal mass - Attacks of crying with pallor in infant or young child

Classification of the severity of dehydration in children with diarrhoea

Classification	Signs or symptoms
Severe dehydration	Two or more of the following signs: - Lethargy or unconsciousness - Sunken eyes - Unable to drink or drinks poorly - Skin pinch goes back very slowly (> 2 seconds)
Some dehydration	Two or more of the following signs: - Restlessness, irritability - Sunken eyes - Drinks eagerly, thirsty - Skin pinch goes back slowly
No dehydration	Not enough signs to classify as some or severe dehydration

Treatment objectives

- To reduce the episode of the diarrhoea.
- To rehydrate the patient.
- Prevent complications and reduce hospital stay

Non-pharmacological treatment

- Health education on the cause of diarrhoea,

Pharmacological treatment

Severe dehydration

Start IV fluids immediately. While a drip is being set up, give ORS solution if child can drink.
Administer 100ml/kg of Ringers lactate or normal saline (0.9% sodium chloride) as follows:

Age	**First, give 30ml/kg in:**	**Then, give 70ml/kg in:**
< 12 months	**1 hour***	**5 hours**
≥ 12 months	**30 minutes***	**2.5 hours**

* *Repeat if the radial pulse is still very weak or not detectable*

As soon as the child can drink, give ORS (about 5ml/kg/hour) for 3-4 hours for infants and 1-2 hours for older children.

Some dehydration

In the first 4 h, give the child ORS solution according to the child's weight (or age if the weight is not known), as shown below:

Age	≤ 4 months	4 ≤ 12 months	12 months to ≤ 2 years	2 years to ≤ 5 years
Weight	< 6kg	6 to > 10kg	10kg to < 12 kg	12 to 19 kg
ORS	200 – 400ml	400 – 700ml	700 – 900ml	900 – 1400ml

Show the mother how to give the child ORS solution
- One teaspoonful every 1–2 min if the child is < 2 years
- Frequent sips from a cup for an older child.
- If the child vomits, wait 10 min; then, resume ORS solution more slowly (e.g. a spoonful every 2–3 min).

- If the child's eyelids become puffy, stop ORS solution, reduce the fluid intake and continue with breast milk.

After 4 hours
- Reassess the child and classify level of dehydration

Diarrhoea with no dehydration
Give ORS as shown below:

Age	*Amount of ORS after each loose stool*	*ORS packet needed*
<24months	50-100ml	500ml per day
2 – 5years	100-200ml	1000ml per day

Give Zinc sulphate supplement for 14 days

Age	*Dose*	*Administration*
< 6 months	10mg tablet per day	Dissolve in water or expressed milk
≥ 6 months	20 mg tablet per day	Chew tablet or dissolve in a drink

Child with Cholera
Suspect cholera in children > 2 years old who have acute watery diarrhoea and signs of severe dehydration or shock, if cholera is present in the area.
- Assess and treat dehydration as for other acute diarrhoea.
- Give an oral antibiotic to which strains of V. cholerae in the area are known to be sensitive.

Pharmacological treatment

Erythromycin
12.5mg/kg, four times a day for 3 days
OR
Ciprofloxacin
20 mg/kg, in a single dose
OR
Cotrimoxazole
24mg/kg twice daily for 3 days

Give Zinc sulphate supplement for 14 days

Age	*Dose*	*Administration*
< 6 months	10mg tablet per day	Dissolve in water or expressed milk
≥ 6 months	20 mg tablet per day	Chew tablet or dissolve in a drink

Child with persistent diarrhoea (severe)
Persistent diarrhoea is diarrhoea, with or without blood, that begins acutely and lasts for ≥14 days. When there is some or severe dehydration, persistent diarrhoea is classified as 'severe'.

Diagnosis
- Suspect HIV infection if there are other suggestive clinical signs and HIV infection is highly prevalent
- Perform stool microscopy for parasites such as Isospora and Cryptosporidium
- Impaired glucose absorption
- Examine every child with persistent diarrhoea for non-intestinal infections such as pneumonia, sepsis, urinary tract infection, oral thrush and otitis media, and treat appropriately.
- Assess the child for signs of dehydration

Non-pharmacological and pharmacological treatment
- Give fluids according to dehydration level of child
- Give all children with persistent diarrhoea daily supplementary multivitamins and minerals for 2 weeks.
- Treat persistent diarrhoea with blood in the stools with an oral antibiotic effective for Shigella

Give oral **metronidazole** at 10 mg/kg three times a day for 5 days only if:
1. Microscopic examination of fresh faeces reveals trophozoites of *Entamoeba histolytica* within red blood cells
2. Trophozoites or cysts of giardia are seen in the faeces
3. Two different antibiotics that are usually effective for Shigella locally have been given without clinical improvement
4. If stool examination is not possible, when diarrhoea persists for > 1 month.

Gastrointestinal Diseases

Gastritis

Acute or chronic inflammation of the gastric mucosa resulting in the disruption of the protective mucosal barrier of the gastrointestinal tract.

Causes

Acute gastritis
- Non-steroidal anti-inflammatory medicines (NSAIMs)
- Alcohol

Chronic gastritis
- Autoimmune disease
- H. pylori infection is the most important risk factor for chronic gastritis

Signs and symptoms
- Acute gastritis mimics peptic ulcer disease and may be associated with anorexia, nausea, vomiting, epigastric pain, and heartburn
- Chronic gastritis is mostly asymptomatic

Differential diagnosis
- Peptic ulcer disease
- Gastroesophageal Reflux Disease (GERD)
- Pancreatitis
- Cholecystitis

Complications

Acute gastritis – haemorrhage with melaena, dehydration, electrolyte imbalance.
- Chronic gastritis may develop into peptic ulcer disease or gastric cancer

Investigations
- Gastroscopy (endoscopy)
- Rapid Urease test (CLO) for *H. pylori*
- Stool examination for occult blood
- Histologic examination of biopsy specimens from endoscopy

Treatment objectives
- Eliminate pain in acute gastritis
- Restore normal histology of the gastrointestinal tract to prevent progression to peptic ulcer disease or gastric cancer

Non-pharmacological treatment
- Take small and frequent meals
- Increase milk intake if not contraindicated

Pharmacological treatment

- Rehydrate with oral fluids (**ORS**) in mild cases of dehydration and intravenous fluids in severe cases
- If **anti-emetics** are necessary (adults only) administer:

Metoclopramide IM
10mg stat dose then

Metoclopramide oral
10mg orally three times a day

Give antacids
Magnesium trisilicate tabs or suspension
1-2 tablets or 10ml suspension orally three times daily or as required

- Eradicate causative agents such as ***H. pylori*** (see treatment of peptic ulcer disease)

Prevention
- Avoid precipitating factors such as NSAIMs, alcohol, spicy foods etc.

Diarrhoeal diseases

Diarrhoea is defined as at least 3 liquid stools per day and most often a self-limiting disease. The high mortality rate from diarrhoeal diseases is due to acute dehydration and malnutrition. Acute diarrhoea lasts less than 14 days while persistent diarrhea lasts between 14-28 days and chronic diarrhea lasts more than 28 days.

Causes

- Simple diarrhoea without blood caused by viruses (rotavirus, enterovirus), bacteria *Vibrio cholerae*, *E. coli*, non-typhi salmonella) or parasites (giardiasis).
- Bloody diarrhoea or dysentery caused by bacteria (shigella, E. Coli, salmonella), or parasites (amoeba)
- Many conditions such as malaria, respiratory tract infections, irritable bowel syndrome, side effects of medicines may also manifest as diarrhoea.

Signs and symptoms

- Evaluate state of hydration, nutrition
- Assess for shock or confusion

Signs and symptoms	*Possible type of acute diarrhoea*
Profuse watery diarrhoea	Cholera, E. coli
Repeated vomiting	Cholera
Fever	Salmonella, viral diarrhoea
Presence of blood in stools	Shigellosis, amoebiasis

Complications

Most cases are self-limiting but dangerous complications can occur such as:

- Severe dehydration
- Sepsis
- Bowel perforation.
- Paralytic ileus

Investigations

- Full blood count
- Kidney function test
- Electrolytes
- Stool for ova, cyst or protozoan, blood culture for bacteria, retroviral status

Treatment objectives

- Achieve adequate hydration
- Eliminate cause of diarrhoea (where possible)
- Treat any complications

Treatment

Since most cases of acute diarrhoea are self-limited, treatment is mostly symptomatic, focusing on oral rehydration, and rarely requires medication.

- **Rehydration** (especially in children) ***see section on dehydration***
- Mild to moderate dehydration: ORS
- Severe dehydration: Hospitalize and hydrate with IV sodium chloride at 0.9% alternating with **Darrow's solution***, depending on serum potassium
- **Antibiotics**: are generally not indicated. Use only when appropriate (i.e. bloody diarrhoea, immunocompromised, elderly or cholera is suspected)
- Treat underlying conditions in cases of chronic diarrhoea (malnutrition, malaria, etc.)
- With increased fluids and continued feeding, all children with diarrhoea should be given **zinc supplementation** at 20 mg for 10–14 days; infants < 6 months should receive 10 mg.
- Give multivitamins and micronutrients daily for 2 weeks to all children with persistent diarrhoea (folate 50 µg, zinc 10 mg, vitamin A 400 µg, iron 10 mg, copper 1 mg, magnesium 80 mg).
- For diarrhoea more than 28 days refer to a physician

Prevention

- Access to safe drinking water
- Use of improved sanitation
- Frequent hand washing with soap and clean water
- Exclusive breastfeeding for the first six months of life
- Rotavirus vaccination.

Caution

- Do not administer anti-diarrhoeal drugs.

Bacillary Dysentery (Shigellosis)

This is caused by infection with the shigella bacterium, which involves the small and large intestines. Infection is through ingestion of contaminated food and fluids.

Causes

Shigella dysenteriae, *Shigella flexneri*, *Shigella sonnei* and *Shigella boydii* all cause shigellosis transmitted through faeco-oral route. Of these, *S. dysenteriae* type 1 has the highest case fatality rate and causes epidemics.

Signs and symptoms

- Frequent and painful passage of stools that consist of largely blood, mucus and pus.
- Stomach cramps
- Tenesmus (a repetitive urge to empty the bowels arising from a feeling of incomplete evacuation)
- Urgency
- Fever
- Nausea and vomiting
- Dehydration

Patients with increased risk of death:

- Under 5 years
- Over 50 years
- Temperature over 38.5^0C
- Malnourished children
- Severe dehydration

Differential diagnosis

- Amoebic dysentery
- Other causes of bloody diarrhoea

Complications

- Electrolyte derangement (especially hypokalaemia and hyponatraemia)
- Dehydration
- Septicaemia
- Severe rectal bleeding
- Intestinal perforation
- Reiter's syndrome

Investigations

- Stool microscopy, culture and sensitivity

Treatment objectives

- Eradicate causative microorganisms
- Correct dehydration if present
- Correct electrolyte derangement

Pharmacological treatment

First Line

Ciprofloxacin Oral

Adult:

500mg orally two times a day for 3 days.

Child:

> 3 months: 15mg/kg orally two times daily for 3 days

Note:

- Ciprofloxacin is contraindicated in pregnant women

For pregnant women

Ceftriaxone IM/IV

1 g daily for 3-5 days

Second Line
Co-trimoxazole Oral

Adult;
960mg orally two times a day for 5 days

Child:
6 weeks – 5 months: 120mg two times a day for 5 days
6 months – 5 years: 240 mg two times a day for 5 days
6 -12 years: 480mg two times a day for 5 days

Rehydration/correction of electrolyte derangement

Severe dehydration
Hospitalize and hydrate with IV **sodium chloride** 0.9% alternating with **Darrow's solution**, depending on serum potassium

Note
Do not give to children below 6 weeks of age

Prevention
- Provide hand washing facilities in critical places
- Educate populace on frequent hand washing with soap and clean water
- Provide safe drinking water
- Ensure adequate disposal of human waste

Cholera

A highly infectious acute diarrhoeal disease, which is endemic in many developing countries in the world.

Causes
- Vibrio Cholerae, Serotype 01 and Serotype O139 that spreads through the faecal-oral route.

Signs and symptoms
- Abrupt severe painless (not always) watery diarrhoea (rice-water stools) which quickly leads to profuse watery stools, vomiting, severe dehydration and muscular cramps.

Complications
- Hypovolemic shock with multiple organ failure
- May quickly lead to death.

Investigations
- Darkfield microscopy revealing motile curved bacillus of **fresh rice water stool specimen**
- Fresh stool or rectal swab culture

Treatment objectives
- Rapidly restore hydration
- Eradicate causative organism
- Prevent spread of the disease

Pharmacological treatment

Rehydration
- Intravenous Ringer's lactate or Darrow's solution
- Oral rehydration therapy
- Follow assessment guidelines on rehydration guidelines outlined in Diarrhoeal Diseases section

Doxycycline oral or IV
Single dose
7 mg/kg orally or intravenously and not to exceed 300 mg/dose

Multiple doses
2 mg/kg orally or intravenously twice daily on day 1

THEN
2 mg/kg on days 2 and 3
Do not exceed 100 mg/dose

OR

Ciprofloxacin oral
Single dose: 30 mg/kg orally
Multiple doses: 30 mg/kg/day orally divided every 12 hours for 3 days

OR
Azithromycin oral
1G single dose

Note
- Antibiotic therapy should be used as adjunct to appropriate fluid and electrolyte replacement

Prevention
- Proper disposal and treatment of all materials that may have come into contact with cholera patients' faeces (e.g., clothing, bedding, etc.)
- Drink clean, boiled or treated water
- Wash hands frequently with soap and clean running water after using the toilet and before handling food or eating
- Ensure adequate disposal of human waste
- Cholera vaccination

Referral
In suspected cases of cholera, notify the District Health Management Team immediately and use the latest Cholera treatment guidelines.

Note
Management of information on suspected cases should be at the highest ethical and professional standard. This is critical in ensuring that there is no public disorder, anxiety and loss of confidence in the government and MOHS.

Amoebic Dysentery

This is an acute parasitic infection of the colon that causes diarrhoea with blood and/or mucus.

Causes
- Amoebiasis is caused by *Entamoeba histolytica*. Infection is through contaminated food and/or drink.

Signs and symptoms
- Diarrhoea
- Abdominal pain, especially before and during passing of stools
- Fever
- Lack of appetite
- Blood and mucus in stool
- In rare cases, liver abscess may occur

Differential diagnosis
- Bacillary dysentery (shigellosis)
- Other causes of bloody diarrhoea

Investigations
- Stool microscopy for motile organisms
- Abdominal ultrasound scan
- Colonoscopy with colonic biopsy

Treatment objectives
- Ensure adequate hydration
- Eradicate infecting organism

Pharmacological treatment

Correct dehydration (see section on rehydration)

Metronidazole oral
Adult:
800mg orally three times a day for 10 days.
Child:
10mg/kg orally in three divided doses daily

OR
Tinidazole oral

Adult:
2G daily for 3-5 days

Child:
> 3 years: 50mg/kg daily (up to 2 g per day) for 3 to 5 days

Asymptomatic cyst carriers
Treat using:

Diloxanide Furoate oral
Adult:
500mg three times a day for 10 days

Child:
> 25kg: 20 mg/kg/day orally in 3 divided doses

Prevention
- Frequent hand washing with soap and clean water
- Proper human waste disposal
- Drink clean water

Giardiasis

A protozoan that infects the small intestines causing diarrhoea and malabsorption of nutrients.

Causes
Giardiasis is caused by the protozoan Giardia *lamblia* through ingestion of giardia cysts in contaminated food and/or drink, and touching contaminated surfaces. The cysts may survive for nearly three months in cold water.

Signs and symptoms
Symptoms can be **recurrent:**
- Offensive, mushy and greasy stools
- Watery diarrhoea - may alternate with soft stools or constipation
- Upper and mid-abdominal cramps
- Anorexia, nausea
- Early satiety
- Bloating, gas or flatulence, belching
- Retro sternal or epigastric burning
- Fatigue, malaise
- Weight loss
- Some cases may be asymptomatic

Differential diagnosis
- Other causes of malabsorption such as celiac disease and tropical sprue.

Complications
- Diseases related to vitamin B deficiency

Investigations
- Stool microscopy

- Duodenal aspiration biopsy
- Faecal fat assessment

Treatment objectives
- Ensure adequate hydration
- Correct electrolyte derangement
- Eradicate the parasite
- Replace malabsorbed/deficient nutrients

Pharmacological treatment

Metronidazole oral

Adult:
500 mg orally every 12 hours for 5-7 days

Child:
1–3 years: 250mg orally every 12 hours for 5-7 day
3–7 years: 400mg orally every 12 hours for 5-7 day
7–10 years: 500mg orally every 12 hours for 5-7 day

OR

Tinidazole
Adult:
2 g orally at once

Child:
50 mg/kg orally at once

Prevention
- Use of safe clean drinking water
- Ensure personal and food hygiene
- Wash hands before handling or eating food and after using toilets
- Ensure proper disposal of human faeces

Gastroesophageal Reflux Disease

GERD is an extension of a physiologic process by which gastric contents move retrograde from the stomach to the oesophagus producing symptoms such as heartburn and regurgitation. When there is an inflammation of the lining of the oesophagus due to reflux of stomach contents causing damage and soreness it is referred to as Reflux esophagitis when or inflammation occurs but there are symptoms it is referred to as NERD (Nonerosive reflux disease).

Causes

- Inappropriate relaxation of lower oesophageal sphincter
- Gastric outlet obstruction
- Hiatal hernias
- Dietary factors (alcohol, chocolates, fatty foods, coffee)
- Tobacco
- Reflux asthma

Signs and symptoms
- Heart burn
- Regurgitation
- Water brash
- Cough
- Sore throat/feeling of a lump in the throat
- Post-prandial nausea and vomiting

Differential diagnosis
- Dysphagia

Complications
- Esophagitis
- Oesophageal ulcers, haemorrhage, perforation
- Peptic strictures
- Barrett's oesophagus
- Oesophageal cancers
- Dental erosions

Investigations
- Gastroscopy
- 24-hour monitoring of oesophageal pH
- Oesophageal manometry

Treatment objectives
- Relieve the symptoms
- Treat mucosal lesions
- Prevent complications

Non-pharmacological treatment
- Reduce weight
- Elevate head of bed
- Encourage lying on the left lateral decubitus position.
- Reduce alcohol consumption
- Avoid tight clothes/belts
- Avoid bending especially soon after meals
- Avoid large meals especially before bedtime
- Avoid medications and foods that cause the reflux
- Stop smoking

Pharmacological treatment

First Line
Mild Symptoms

Magnesium Trisilicate (aluminium hydroxide/magnesium carbonate) mixture/tablets 10 – 20ml/2 tablets four times a day as required

Second Line
When there is no response to above or severe symptoms:

Omeprazole: Oral 40 mg two times a day for 4 weeks

OR

Ranitidine: Oral 300 mg at night for 6-8 weeks

Maintenance therapy for healed oesophagitis
Omeprazole oral

20mg daily

Prevention

Avoid the following:

- Acidic foods
- Caffeine
- Eating before going to bed
- Alcohol
- Fatty meals
- Smoking

Peptic Ulcer Disease

Peptic ulcer disease occurs when there is a break ≥ 5mm in the mucosal lining of stomach, lower oesophagus, or duodenum.

Causes

- Helicobacter pylori
- Long-term use of NSAIMs e.g. acetylsalicylic acid, ibuprofen, naproxen, indomethacin, etc.
    - *Increases the risk 5 times*
- Long term use of NSAIMs plus glucocorticoids (prednisolone, hydrocortisone, dexamethasone, and beclomethasone)
    - Increases the risk 10 to 15 times
- Long term use of anticoagulants and thrombolytics
- Selective serotonin reuptake inhibitors (e.g. fluoxetine)
- Smoking
- Alcohol use
- Crohn's disease

Signs and symptoms

- Recurrent epigastric or retrosternal pain
- Weight loss
- Nausea or vomiting
- Bloating
- Early satiety
- Features of complications
    - Gastrointestinal bleedings: anaemia, hematemesis, melaena, shock
    - Perforation: peritonitis, fever
    - Penetration: Epigastric tenderness
    - Gastric outlet obstruction: distension and vomiting

Differential diagnosis

- Functional dyspepsia
- Gastritis
- Oesophagitis
- Pancreatitis
- Gastro-duodenal malignancy
- Coronary heart disease
- Gallbladder inflammation

Complications

- Bleeding
- Perforation
- Gastric outlet obstruction

Investigations

- Gastroscopy
- Stool for occult blood
- Barium meal
- Full blood count

Treatment objectives

- Eradicate *H pylori* infection
- Reduce morbidity
- Prevent complications

Pharmacological treatment

First Line
Initially, try antacids

Aluminium hydroxide/magnesium carbonate oral
Adult
500mg at least every 4 hours as required

OR

Magnesium Trisilicate oral mixture
Adult
20ml 4-6 times a day as required. If symptoms persist, endoscopy is necessary.

For confirmed peptic ulcer
Eradication of H. pylori

Omeprazole oral
20 mg two times daily

PLUS

Clarithromycin Oral
500 mg two times daily

PLUS
Amoxicillin oral
1000 mg two times daily for 14 days

Frequent severe recurrent ulcers or patients who must continue with NSAIMS
Test and treat for H. pylori and then commence on long term NSAIM + maintenance PPI therapy.

Maintenance treatment might be required:
Ranitidine oral
150mg two times a day (or 300 mg at night)

Omeprazole oral
20 mg orally daily

Referral
For **persistent non-healing ulcers,** see a specialist for further management

Prevention
- Reduce coffee consumption
- Avoid all non-steroidal anti-inflammatory medicines and steroids
- Avoid selective serotonin reuptake inhibitors (fluoxetine)
- Encourage relaxation and regular exercise
- Avoid stress as much as possible
- Psychosocial counselling

Constipation

Constipation is defined as a reduction in bowel frequency of an individual associated with the passage of hard stools.

Causes
- Changes in eating habits and activities.
- Inadequate water intake
- Inadequate dietary fibre
- Inactivity
- Resisting the urge to pass stools
- Anorectal problems e.g. haemorrhoids, fissures
- Colonic malignancy

- Irritable bowel syndrome
- Endocrine/metabolic disorders e.g. hypothyroidism, diabetes mellitus, hypokalaemia, hypercalcaemia
- Overuse of laxatives
- Side effects of some medications (e.g. narcotics, antidepressants, iron, anticholinergics)

Signs and symptoms

- Infrequent or hard to pass bowel movements,
- Abdominal pain
- Bloating
- Flatulence

Complications

- Megacolon
- Anal fissures
- Haemorrhoids
- Rectal bleeding
- Faecal impaction

Investigations

- Digital rectal examination
- Abdominal x-ray
- Stool examination including microscopy
- Full blood count
- Electrolytes
- Serum calcium
- Thyroid function tests
- Colonoscopy

Treatment objectives

- Identify and eliminate causes
- Evacuate faecal matter

Non-pharmacological treatment and prevention

- Eliminate medications that may cause or worsen constipation like strong pain drugs such as narcotics, antidepressants, iron pills, excessive use of laxatives, etc.
- Encourage exercise/activity
- Eliminate foods identified that may cause constipation
- Encourage adequate fluid intake
- Encourage high fibre diet
- Encourage good toilet habits:
    - Sit on the toilet 5-10min after meals takes advantage of the gastro colic reflex
    - Patient should be encouraged not to resist the **urge** to pass stools
- Advise patient to avoid been stressed as much as possible
- Psychosocial counselling

Pharmacological treatment

Liquid paraffin oral
Adult:
10-30ml as needed

OR

Bisacodyl oral
Adult:
5 – 10mg at night
OR

Bisacodyl suppository
10mg per rectum at night

Note:
- Only use bisacodyl if there is no abdominal tenderness

Caution:
- Chronic use of laxatives may lead to dependency!

Referral

If no improvements, refer to a Gastroenterologist

Haemorrhoids

Haemorrhoids also called "piles" are swollen veins in the anus and lower rectum, similar to varicose veins. There are two types of haemorrhoids:

- **Internal haemorrhoids -** located inside the rectum
- **External haemorrhoids -** developed under the skin around the anus.

Causes

Cause is often unknown. They may result from:

- Straining during bowel movements due to various factors such as constipation, intrabdominal mass, pregnancy, and aging.
- Lack of exercise
- Low fibre diets

Signs and symptoms

- Painless bleeding during bowel movements with small amounts of bright red blood on toilet tissue or in the toilet bowl
- Itching or irritation in the anal region
- Anal pain or discomfort
- Swelling around the anus
- A lump near the anus, which may be sensitive or painful (may be a thrombosed haemorrhoid)

Differential diagnosis

- Colorectal cancer
- Inflammatory bowel disease
- Adenomatous polyps

Complications

- Bleeding
- Necrosis
- Perianal sepsis
- Anal mucus discharge
- Anaemia (but rare)
- Strangulated haemorrhoid - blood supply to the haemorrhoid is cut off causing extreme pain

Investigations

- Proctoscopy
- Sigmoidoscopy
- Colonoscopy
- Full blood count including blood film

Treatment objectives

- Relieve pain
- Prevent complications

Non-pharmacological treatment

- Sitz baths (sitting for 10-15 minutes in lukewarm water with a spoon of salt) 2 or 3 times a day
- Moist towelettes instead of dry toilet paper which may aggravate the problem
- Encourage high fibre diet
- Encourage adequate fluid intake
- Prevent constipation
- Regular exercise

Pharmacological treatment

Constipation

Docusate sodium oral

50-300 mg orally once daily or in divided doses

Lactulose 15-30 mL (10-20 g) **or Bisacodyl 5-20 mg OD**

Pain relief

Lidocaine ointment 5% topical

Apply topically when necessary

Referral

- Where there is no relief, refer to specialist for haemorrhoidal banding and possibly surgery

Prevention
- Encourage diet rich in fruits, vegetables and whole grains
- Encourage liberal fluid intake
- Discourage over-straining while using the toilet
- Increased physical activity
- Achieve a healthy body weight
- Avoid food and medicines that cause constipation

Acute pancreatitis

Pancreatitis is an inflammatory process in which pancreatic enzymes auto-digest the gland. The gland sometimes heals without any impairment of function or any morphologic changes (acute pancreatitis). Pancreatitis can also be intermittent or continuous, contributing to the functional and morphologic loss of the gland (chronic pancreatitis).

Causes
- Biliary tract disease (gall stones)
- Alcohol abuse
- Parasites: worm infestations e.g. ascaris
- Blunt abdominal trauma
- Certain medicines
  - Azathioprine
  - Sulphonamides
  - Sulindac
  - Tetracycline
  - Valproic acid
  - Didanosine
  - Methyldopa
  - Oestrogens
  - Furosemide
  - 6-Mercaptopurine
  - Pentamidine
  - 5-aminosalicylic acid compounds
  - Corticosteroids
- Infections (e.g. mumps, HIV, hepatitis A)

Signs and symptoms
- Constant, severe epigastric pain which:
  - Radiates towards the back
  - Worsens after meals
  - Worsens when supine and improves when patient leans forward
- Nausea and vomiting
- Fever
- Jaundice
- Tachycardia
- Hypotension
- Abdominal tenderness and distension
- Diminished or absent bowel sounds
- Dyspnoea

Differential diagnosis
- Peritonitis from other causes
- Perforated peptic ulcer
- Acute Cholecystitis

Complications
- Pancreatic pseudocysts
- Pancreatic abscess
- Necrotizing pancreatitis
- Haemorrhagic pancreatitis
- Hypovolaemic shock
- Adult Respiratory Distress Syndrome (ARDS)

Investigations
Laboratory
- Serum amylase - more than 3 times normal
- Serum lipase - more than 3 times normal (more specific than amylase)
- Liver function tests
- Full blood count
- E, U , Cr; serum calcium, RBG

Radiology
- Ultrasound scan: may reveal gall stones, pancreatic pseudocysts or **abscesses**
- Abdominal CT scan if available

Treatment objectives
- Relieve pain
- Prevent complications

Pharmacological treatment

IV fluid for resuscitation

Ringers Lactate or **Normal saline** IV

At least 250-400mls of fluid per hour in the first 48 hrs.

Mild to moderate pain and elevated body temperature

Paracetamol oral

1000 mg every 4-6 hours but not exceeding 4000 mg

Moderate-to-Severe Pain

Tramadol oral

Acute: 50-100 mg orally every 4-6hr when necessary; not to exceed 400 mg/day

Pethidine

Adult:

50-150 mg every 4 hours by subcutaneous injection or intramuscular injection

Caution
- Avoid narcotic analgesics which may cause spasm of the sphincter of Oddi
- Risks of addiction, abuse, and misuse. Reserve for patients whose pain cannot be controlled by other medicines.

For complications requiring antibiotic therapy

Ceftriaxone IV

1-2 g/day IV in single daily dose or divided q12hr for 4-7 days

PLUS

Metronidazole IV/oral

Loading dose: 15 mg/kg IV; not to exceed 4 g/day

Maintenance dose: 7.5 mg/kg orally every 6 hours for 7-10 days (or 2-3 weeks if severe)

Prevention
- To stop alcohol consumption

Referral
- Refer patients with biliary pancreatitis to surgical care for cholecystectomy

Peritonitis

Peritonitis is an inflammation of the peritoneum.

Causes

Primary peritonitis is spontaneous peritonitis that occurs in the absence of other intrabdominal abnormalities.

Secondary peritonitis (more common) affects those with pre-existing acute abdominal disease:
- Hollow organ perforation: peptic ulcer, diverticula, Cholecystitis
- Inflammation of intra-abdominal organs: appendicitis, diverticulitis, necrotizing pancreatitis
- Postoperative complications: anastomosis insufficiency, unsterile puncture site, or aseptic surgical procedures
- Traumatic (external perforation)

- Peritoneal dialysis
- Intra-abdominal abscesses

Signs and symptoms
- Diffuse abdominal pain with abdominal guarding and/or rebound tenderness
- Nausea and vomiting
- Fever and chills (esp. with underlying infection)
- Shoulder pain (referred)
- Ascites
- Patient has knees drawn up when supine and avoids movement
- Diminished bowel sounds (absent in ileus)

Differential diagnosis
- Liver abscess
- Acute Cholecystitis
- Acute cholangitis
- Splenic rupture
- Appendicitis
- Sigmoid diverticulitis
- Gastric or duodenal ulcer perforation
- Acute pancreatitis
- Acute coronary syndrome
- Intestinal obstruction
- Pelvic inflammatory disease
- Ectopic pregnancy

Investigations
- Complete blood cell count
- Peritoneal fluid analysis: biochemistry, microbiology, cytology, etc.
- Ultrasound to detect underlying disease e.g. pancreatitis, appendicitis, cholangitis
- Abdominal x-ray may detect air-fluid levels and free air under the diaphragm secondary to organ perforation

Treatment objectives
- Identify source of infection
- Remove the source of infection
- Treat underlying causes
- Provide supportive care

Pharmacological treatment

First line

Replace fluid losses as they happen with the appropriate IV fluids (Dextrose Ringers Lactate)
Ceftriaxone IV
1-2 g/day intravenously in single daily dose or divided every 12 hours for 5 to 7 days

PLUS
Metronidazole IV
15 mg/kg intravenously; not to exceed 4g per day
Maintenance dose: 7.5 mg/kg every 8 hour until conditions improve

Second line

Ciprofloxacin IV
200mg intravenously every 12 hours for 2 days

PLUS
Metronidazole IV
15 mg/kg intravenously; not to exceed 4 g/day
Maintenance dose: 7.5 mg/kg every 8 hours

Duration: 5-7 days or longer depending on the severity.

Referral
- Refer for surgical extensive irrigation (lavage), debridement, drainage

Acute appendicitis

Appendicitis, the most common cause of acute abdomen, is the acute inflammation of the appendix, which requires emergency surgery.
Diagnosis is made principally on clinical grounds. The most crucial aspect of treatment is timely intervention.

Causes

Appendicitis is caused by a blockage of the hollow portion of the appendix by:

- Lymphoid tissue
- Faecal matter
- Foreign bodies
- Worm infestations
- Intestinal infections
- Tumours

Signs and symptoms

Nonspecific symptoms

- Progressive fever
- Anorexia
- Nausea and vomiting
- Diarrhoea and/or constipation
- Abdominal pain - sharp right lower quadrant (RLQ) pain
- Male infants and children occasionally present with an inflamed hemiscrotum
- Urinary frequency from a long appendix irritating the bladder

Physical examination

- Rebound tenderness, pain on percussion, rigidity, and guarding (most specific)
- RLQ tenderness (96% of patients, but nonspecific)
- Left lower quadrant (LLQ) tenderness: May be the major manifestation in patients with situs inversus or in patients with a lengthy appendix that extends into the LLQ
- Male infants and children occasionally present with an inflamed hemiscrotum
- In pregnant women, RLQ pain and tenderness dominate in the first trimester, but in the latter half of pregnancy, right upper quadrant (RUQ) or right flank pain may occur

Differential diagnosis

- See acute abdomen

Complications

- Gangrenous perforation
- Abscess
- Peritonitis

Investigations

- Full blood count showing - leucocytosis
- Urinalysis - pyuria
- Abdominal X-ray to assess perforation
- Abdominal ultrasound scan

Treatment

- Establish IV access and administer aggressive crystalloid therapy to patients with clinical signs of dehydration
- Initiate appropriate antibiotic therapy for septicaemia
- Do not give oral medication
- Supportive care e.g. administer parenteral analgesic, antiemetic as appropriate

Antibiotics

Broad-spectrum antibiotic prophylaxis providing both gram-negative and positive coverage before every appendectomy

Ceftriaxone IV

Adult:
2 g intravenously once daily
Child: 80 mg/kg intravenously once daily

PLUS

Metronidazole
Adult: 500 mg intravenously every 8 hours
Child: 10 mg/kg intravenously every 8 hours

Referral

- Refer for specialist attention
- Appendectomy remains the only curative treatment of appendicitis

Gastrointestinal bleeding

Gastrointestinal (GI) bleeding is all forms of bleeding in the gastrointestinal tract, from the mouth to the rectum. The source can be upper GI or lower GI.
Upper GI bleeding, which is the more common type, arises from the oesophagus, stomach or duodenum. Significant upper gastrointestinal bleeding is considered a medical emergency. While lower gastrointestinal bleeding is typically from the colon, rectum or anus.

Causes

Upper GI bleeding
- Peptic ulcers
- Gastric erosions
- Oesophageal varices
- Gastric cancer
- Gastritis
- Oesophagitis

Lower GI bleeding
- Haemorrhoids
- Diverticulosis
- Cancer (e.g. colon cancer)
- Inflammatory bowel disease

Signs and symptoms

- Hematemesis (bright red blood or coffee ground vomiting)
- Melena
- Haematochezia (bright maroon-coloured stool, depending on the location of the bleeding)
- Extreme fatigue, weakness
- Dizziness or light-headedness (from hypotension)
- Tachycardia

Complications

- Iron deficiency anaemia
- Hypotension and Hypovolaemic shock

Investigations

- Full blood count
- Stool for occult blood test
- Grouping and cross matching of blood for transfusion

Upper GI Bleeding
- Endoscopy

Lower GI bleeding
- Colonoscopy

Treatment objectives

- Resuscitation and initial assessment
- Localization of the bleeding site
- Therapeutic intervention to stop identified bleeding

Pharmacological treatment

Upper GI
- IV fluids (no oral intake of food or fluids if there is active hematemesis or patient is unconscious)

Omeprazole IV
80-mg bolus, followed by a continuous infusion of 8 mg/hour for 72 hours

OR
Omeprazole IV
Loading dose 80mg stat

THEN
40 mg every 12 hours for 72 hrs

- Blood transfusion if Hb is < 7g/dl after resuscitation with IV fluids
- Institute iron supplementation therapy after acute care when there is iron deficiency

Referral

- Refer patients with oesophageal varices to a Gastroenterologist for specialist care

Haematological diseases

Anaemia

Anaemia is defined as decreased concentration of red blood cells (RBCs) and haemoglobin (Hb) in the peripheral blood and a corresponding decrease in oxygen carrying capacity of the blood.

Cut off Hb levels for anaemia

Age	Hb Less than:
Adult (female)	12 g/dL; 11 g/dL in pregnancy
Adult (male)	13 g/dL
Children 1 – 5 years of age	10 g/dL
Children > 5 years of age	11 g/dL
First week of life	13.5 g/dL

Anaemia (except in newborn) may be classified as follows:

Classification	Hb level
Mild	Above 8 g/dL
Moderate	6 – 8 g/dL
Severe	Below 6 g/dL

Causes

- Dietary deficiency – lack of **iron**, vitamin B12, folic acid in the **diet**.
- Malabsorption – where the body is not able to properly absorb or use the nutrients in the **diet**, caused by conditions such as **coeliac disease**.
- Inherited disorders – such as **sickle cell disease**.
- Chronic systemic diseases such as **HIV, TB, malignancy**
- Acute or chronic blood loss (**bleeding/haemorrhage)** e.g. caused by intestinal parasites especially hook worms, peptic ulcers, tumours, abnormal menstruation, haemorrhoids pregnancy, abortion.

Other causes include:

- Infiltration or replacement of the bone marrow e.g. leukaemia
- Aplasia due to chronic infection or disease
- haemolysis due to infection especially malaria, haemoglobinopathies e.g. sickle cell disease, G6PD deficiency, autoimmune, haemolytic anaemia and hypersplenism

Signs and symptoms

Depend on the degree of anaemia, severity of the causative disorder and age of the patient. The clinical effects of anaemia are due to anaemia itself and the disorder(s) causing it.

- Getting tired easily (easy fatigability)
- Dizziness
- Shortness of breath on exertion
- Palpitations
- Pale mucous membranes (e.g. conjunctivae) and palms
- Angular stomatitis
- "Spoon shaped" and ridged finger and toe nails
- Spleen and liver may be palpable
- Palms and soles of feet may show hyperpigmentation

Note
Patients may present with heart failure in severe anaemia. Patients with significant haemolysis may present with jaundice and those with bone marrow failure may present with petechiae and purpura.

Symptoms such as fresh blood in stools, black and tarry stools, bloodstains in the urine and coca cola-like urine may be indicative of the underlying causes.

Differential diagnosis
- Cardiac failure
- Respiratory failure

Complications
- Cardiac failure
- Death

Investigations
- Full blood count
- Reticulocyte count and blood film examination
- Sickling test and Hb electrophoresis if indicated
- Blood film for malaria parasites
- Stool for hookworm ova
- Serum iron, Vitamin B12 and folate levels
- Direct and Indirect Coomb's test
- Urine for schistosome ova
- Specialized tests depending on the suspected cause e.g. bone marrow examination in suspected bone marrow failure, antinuclear antibody (ANA) test, upper and lower GI endoscopy.

Treatment objectives
- Identify and treat underlying cause of anaemia
- Restore haemoglobin levels to normal
- Replenish iron stores after correction of anaemia in iron deficiency
- Restore haemoglobin to steady state levels in sickle cell disease patients
- Correct anaemia in proven vitamin B12 deficiency and maintain normal levels

Non-pharmacological treatment
Advise on:

- A balanced diet
- Increased Vitamin C intake (e.g. citrus fruits, guavas, strawberries) with meals to increase iron absorption from the diet.
- Regular intake of leafy foods as well as fresh fruits and vegetables, beans, liver, meat, eggs, fish
- Early reporting to hospital by persons with unusual loss of energy, bleeding, and black stools

Pharmacological treatment
In the management of anaemia, priority should be given to identification and treatment of the underlying cause(s).

Iron Deficiency anaemia

Causes
- Poor nutritional intake of iron
- Chronic blood loss, e.g. infestation with hookworms, prolonged/excessive menstrual bleeding.
- Chronic gastrointestinal bleeding (e.g. from chronic use of NSAIMS, large bowel tumours etc.)

Signs and symptoms
- Usually develop gradually
- In addition to general symptoms of anaemia, patients may present with:
    - Sore tongue
    - Erosions of the corners of the mouth (angular cheilitis)
    - Brittle, fragile fingernails

Differential diagnosis
- Conditions that cause microcytic red cells

Investigations

- Blood: full blood count (FBC)
- Low mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH)- hypochromia and mean Corpuscular Haemoglobin Concentration(MCHC)
- Hypochromic microcytic (small size) red cells
- Investigate the cause of iron deficiency

Treatment objectives

Identify, and treat cause of iron deficiency

- Improve on diet if poor diet is one of underlying causes
- Correct dietary deficiency with diet and supplemental iron

Pharmacological management

Iron deficiency

1st Line Treatment

Ferrous sulphate (dried or anhydrous), oral

Adult:

200 mg (60 mg iron) three times a day orally for 3-6 months

Child:

< 1 year: 30 – 60 mg every 8 – 12 hours for 3-6 months
1 – 5 years: 3 – 6 mg/kg every 8 – 12 hours for 3 – 5 months
5 – 7 years: 80 – 120 mg every 8 – 12 hours for 3-6 months
8 – 10 years: 200 mg daily for 3-6 months
>10 years: 200 mg every 12 hours for 3-6 months

OR

Ferrous sulphate/folic acid oral

Adult:

200 mg/0.4 mg (equivalent to 180mg elementary iron per day) every 8 hours.

Give an anthelminthic:

Albendazole oral

400 mg single dose.

Iron deficiency anaemia in patients with malabsorption

Note

Parenteral iron has no advantages over oral iron preparations expect in the rare case of malabsorption.

Iron sucrose, IV (as a slow bolus injection over 2-5 minutes)

Adult:

200 mg every three days for 5 doses

Child:

0.5 mg/kg every 4 weeks for 12 weeks (maximum 100 mg/dose), calculated based on body weight and iron deficit and the target Hb

Severe symptomatic anaemia

Give blood transfusion with packed cells and treat for cardiac failure, if signs of cardiac failure are present.

Referral

Refer of patients in the following categories for specialist care:

- *Pregnant women > 34 weeks of gestation and Hb< 7 g/dL*
- Recurrent severe anaemia
- Evidence of cardiac failure
- Anaemia associated with enlargement of the liver or spleen or lymph nodes
- Signs of chronic disease (investigate for HIV and TB before referral)
- Anaemia due to uncontrolled bleeding

- Haemoglobin levels that do not improve after two weeks on the treatment as detailed above
- Menorrhagia or dysfunctional uterine bleeding (refer to a gynaecologist)
- Blood in stool
- Children with Hb level ≤ 7 g/dL (if Hb cannot be done, look for severe palmar pallor)
- Anaemia associated with other abnormalities on FBC or blood smear
- Also refer if specialized investigations are unavailable at point of care

Anaemia in Pregnancy

Anaemia is the most common and major complication of pregnancy. It may be defined as a haemoglobin concentration level below the normal (11.5 g/dL for pregnant women). It is most commonly due to iron deficiency. Hb levels should be checked at the booking visit, repeated again between 28 and 32 weeks, and at ≥ 36 weeks.

Common causes
- Nutritional causes: iron deficiency, folic acid deficiency
- Infections and infestations: hookworm infestation, malaria, HIV/AIDS
- Haemorrhagic causes: bleeding in pregnancy, trauma
- Sickle cell

Signs and symptoms
- Gradual onset of exhaustion or weakness
- Leg swelling
- Dyspnoea, dizziness, and palpitations
- Pallor of the conjunctiva, tongue, palms, etc.
- Glossitis and stomatitis
- Pedal oedema
- Tachypnoea
- Tachycardia
- Haemic murmurs

Complications
Untreated anaemia may increase the risk of:
- Premature labour
- Poor intrauterine foetal growth
- Weak uterine contractions
- Foetal hypoxia
- Postpartum haemorrhage, and reduced ability to tolerate blood loss at delivery
- Poor lactation
- Reduced ability to tolerate anaesthesia
- Diminished resistance to infection and post-partum sepsis

Investigations
Blood:
- Full blood count: Hb <11.5 g/dL is considered abnormal
- Peripheral smear to determine the type of anaemia and presence of malaria parasites
- Sickling test followed by specific test for sickle cell disease if positive
- VDRL
- HIV screening

Stool: ova and cysts of hookworm

Treatment objectives
- Correct haematocrit.
- Treat underlying cause(s)
- Foetal surveillance: growth and wellbeing to exclude intrauterine growth retardation and intrauterine asphyxia

Note
- Treatment is recommended when the Hb falls below 10 g/dL.
- Women with iron deficiency often have 'pica', e.g. eating substances such as soil, charcoal, ice, etc.

Non-pharmacological treatment
- Encourage a balanced diet to prevent nutritional deficiency
- Do not drink tea within 2 hours of taking iron tablets or within 2 hours of eating an iron rich meal.

Note

Taking large amounts of tea, coffee, milk or dairy products and foods with high levels of phytic acid (e.g. whole grain cereals) can interfere with iron absorption.

Pharmacological treatment

Ferrous sulphate, oral
200 mg three times a day with meals

Note:

- Taking iron tablets with meals decreases iron absorption, but improves tolerability
- Do not take iron tablets with milk

Folic acid oral
5 mg daily

Parenteral iron is indicated in:

- Severe anaemia, near term (seek specialist advise)
- Malabsorption of oral iron, or when it causes serious gastroenteritis

Total required dose may be calculated as follows:

Dose (mL) = 0.0442 (Desired Hb - Observed Hb) x W + (0.26 x W)
Desired Hb = the target Hb in g/dL; W = Weight in kg.

Intravenous Injection

- First, administer an intravenous test dose of 0.5 mL slowly over at least 30 seconds. Wait for an hour or more for possible anaphylactic reactions before giving the initial therapeutic dose.
- If no adverse reaction, give the calculated amount at a rate not exceeding 50 mg (i.e. 1 mL per minute)

Intramuscular Injection

- First, administer an intramuscular test dose of 0.5 mL slowly over at least 30 seconds. Wait for an hour or more for possible anaphylactic reactions before giving the initial therapeutic dose
- Give calculated therapeutic dose by deep intramuscular injection into the upper outer quadrant of the buttock.
- Use a Z-track technique to avoid injection or leakage into the subcutaneous tissue: displace skin laterally prior to injection.

Note

- Be sure to read boxed warnings and precautions in the package insert before giving iron dextran injection.
- **Treat malaria** presumptively with **Sulphadoxine/Pyrimethamine** 500 mg/25 mg and follow up
- **De-worm** with **Mebendazole** 500 mg as a single dose in the 2nd and 3rd trimesters
- Treat any other cause found from investigations

Prophylaxis

- Give oral iron and folic acid supplements

Referral

Urgent (same day)

- When Hb level < 6 g/dL
- Hb = 6-7.9 g/dL with symptoms (dizziness, tachycardia, shortness of breath at rest).

Non-urgent (within 1 week)

- Hb = 6-7.9 g/dL without symptoms (high-risk clinic if available).
- Hb = 8-9.9 g/dL and no improvement after one month of treatment (high-risk clinic, if available)
- Hb < 9 g/dL at 36 weeks' gestation or more; transfer to hospital for further antenatal care and delivery

Normocytic anaemia

This is anaemia characterized by normal-sized red blood cells.

Causes
- Acute blood loss
- Haemolysis (destruction of red cells), e.g., auto-immune disorders, hypersplenism, haemoglobin abnormalities (sickle cell disease, thalassaemia),
- Drugs (sulphonamides, Dapsone, primaquine). For those with G6PD deficiency.
- Decreased reticulocytosis (formation of new blood cells), e.g. chronic kidney disease

Signs and symptoms
- General signs and symptoms of anaemia

Investigations
- Peripheral blood smear: spherocytes
- Evidence of haemolysis
- HIV serology

Treatment objectives
- Identify and treat cause of anaemia

Pharmacological treatment

Treat all patients with folic acid 5 mg daily in haemolytic anaemia

Note
- Do not treat with iron, folic acid or Vitamin B12 unless there is clear deficiency

Referral
- Refer to specialist for further management after initial evaluation.

Prevention of anaemia

Health education on:
- The effect of anaemia on health, and cognitive development

Dietary measures:
- Encourage exclusive breastfeeding for the first 6 months. Also, encourage intake of nutritious diet.

Hygiene:
- Encourage good hand washing habits and other measures to prevent worm infestations.

Medical:
- Encourage periodic screening for children and pregnant mothers, and presumptive iron therapy for either groups in cases of suspected iron deficiency anaemia
- Routine iron supplementation for all pregnant mothers
- Early treatment of malaria, helminthic infestations, etc.

Megaloblastic or Macrocytic anaemia

The bone marrow produces unusually large, structurally abnormal, immature red blood cells (megaloblasts) in this condition.

Causes
- Anaemia with large red blood cells is commonly due to folate or Vitamin B12 deficiency.
- Folate deficiency is common in pregnant women and in the postpartum period, and in alcoholics.
- Macrocytic anaemia in these patients can be assumed to be due to folate deficiency and does not require further investigation initially except if there is treatment failure.
- Vitamin B12 deficiency occurs mainly in middle-aged or older adults, and can cause neurological damage if not treated.
- Macrocytic anaemia outside of pregnancy or the postpartum period requires further investigations to establish the cause.

Signs and symptoms
- Depression
- Tremors
- Limb weakness (palsies)
- Mild jaundice (lemon yellow tint)

- Darkening of palms
- Gait instability (ataxia)Pallor
- Hair loss
- Pins and needles, numbness in hands or feet (paraesthesias)
- Beefy tongue

Investigations
- Full blood count: low Hb, sometimes pancytopenia, raised MCV but maybe low normal if coexisting with iron deficiency
- Peripheral blood smear: oval macrocytes, hyper segmented neutrophils
- Serum Vitamin B12 maybe low or normal
- Serum folate level
- TSH
- Urea, electrolytes, creatinine
- Liver function tests
- Reticulocyte count
- Bone marrow studies may be indicated

Note
- It is not necessary to measure folate and B12 if the patient is not anaemic.
- Zidovudine and stavudine cause elevated MCV.
- Zidovudine often causes anaemia and/or decreased white cell count.

Non-pharmacological treatment
- Dietary advice to increase intake of folic acid-rich foods such as liver, eggs, fortified breakfast cereals, citrus fruits, spinach and other green vegetables, dry beans, peanuts.
- Reduce alcohol intake

Vitamin B12 deficiency anaemia:
- High protein diet is recommended (1.5 g/kg/day).
- Increase intake of dietary vitamin B12 sources, including meat (especially liver), eggs and dairy products.

Pharmacological treatment

Vitamin B12 deficiency anaemia and other macrocytic anaemias without neurological involvement

Hydroxocobalamin, IM
Adult:
1 mg three times a week for 2 weeks, then 1 mg every 3 months

Note:
- Clinically review every 2 months with or without serum B12 levels, and if clinically indicated increase the frequency of intramuscular injections of Hydroxocobalamin to every 2 months or every month

Child:
1 mg stat then 1 mg every 3 months for life

Pernicious anaemia (B12 deficiency) with neurological symptoms and signs **Hydroxocobalamin** IM
1 mg intramuscularly initially on alternate days until no further improvement (maximum reversal or neuro-psychiatric signs and symptoms are achieved),

THEN
1 mg every 2 months

Folic acid deficiency
Folic acid oral

Adult:
5 mg daily for 30 days

Child:
2.5-5 mg daily for 30 days

Continue treatment for 3 months after haemoglobin level normalizes, in order to replenish iron stores

Note
- Do not treat with Hydroxocobalamin until diagnosis of Vitamin B12 deficiency is established.
- Folic acid should not be given alone to treat megaloblastic anaemia associated with Vitamin B12 deficiency because it may mask the features, and ongoing neurological damage may subsequently manifest as subacute combined degeneration of the spinal cord.
- Severe anaemia with signs of cardiac failure will need treatment of the heart failure in addition to blood transfusion with packed cells.

Referral
Refer patients with suspected B12 deficiency who have:
- Chronic diarrhoea
- Poor response within a month of treatment
- Macrocytic anaemia of unknown cause

Aplastic Anaemia

This is pancytopenia due to a hypoplastic bone marrow.

Causes
- Radiation and chemotherapy treatments
- Exposure to toxic chemicals
- Use of certain drugs e.g. non-steroidal anti-inflammatory drugs, antibiotics (sulphonamides, chloramphenicol, penicillin); propylthiouracil, carbonic anhydrase inhibitors; Tolbutamide, Chlorpropamide; furosemide, thiazides; chloroquine, phenothiazines, allopurinol, anti-convulsants; amphetamine
- Autoimmune disorders
- Viral infection
- Pregnancy
- Unknown factors

Signs and symptoms
- Pallor
- Purpura
- Petechiae
- Bleeding
- Frequent or severe infections

Investigations
- Full blood count and peripheral blood smear.
- Vitamin B12 and red cell folate levels.
- Appropriate investigations to exclude opportunistic infections.

Treatment objectives
- Eliminate underlying cause(s) of neutropenia and/or fever.
- Identify and withdraw precipitants e.g. medication

Pharmacological treatment

For patients with febrile neutropenia within 48 hours of admission:
Ceftriaxone IV
1 g daily intravenously

AND

Gentamicin IV
6 mg/kg daily intravenously

In suspected skin infection add
Vancomycin IV
30 mg/kg as loading dose. Followed with 20 mg/kg every 12 hours (reduce total dose by 50% in elderly persons).

Pancytopenia in HIV positive patients
Full blood count (FBC) indicates different degrees of anaemia, thrombocytopenia and leucopoenia.

Note:

Most common causes include direct effects of HIV, medication, secondary opportunistic infections, malignancies and nutritional deficiencies.

Referral

- Discuss all cases of suspected aplastic anaemia with a specialist.
- Stabilize patient if necessary, with blood products, after consultation with an expert, before transport

Haemolytic Anaemia

Haemolytic anaemia results from an increase in the rate of red cell destruction in the intravascular space or in the reticuloendothelial system in some pathological disorders

Signs and symptoms

- Pallor, jaundice, splenomegaly
- Anaemia, reticulocytosis, indirect (unconjugated) hyperbilirubinemia

Classification of haemolytic anaemias

A. Hereditary haemolytic anaemias

Metabolism

- G6PD deficiency
- Pyruvate kinase deficiency

Membrane

- Hereditary spherocytosis
- Hereditary elliptocytosis

Abnormal haemoglobins such as Hb S, C, unstable Hb

B. **Acquired haemolytic anaemias**

Immune

- Autoimmune (warm antibody, cold antibody types)

Alloimmune

- Rhesus incompatibility
- Haemolytic transfusion reactions
- Haemolytic diseases
- Allograft (especially bone marrow) transplantation
- Red cell fragmentation syndromes:
    - Arterial grafts, cardiac valve
    - Microangiopathichaemolytic anaemias

Others

- March haemoglobinuria
- Infections (malaria, clostridia)
- Chemicals and physical agents e.g. herbal intoxication
- Paroxysmal nocturnal haemoglobinuria

Signs and symptoms

- May occur at any age
- The patient may present with features of haemolysis, e.g. jaundice, pallor
- Symptoms are usually slow in onset, but rapidly developing anaemia may occur
- Splenomegaly is common but not always observed
- Hepatomegaly (occasionally)

Treatment objectives

- Eliminate the underlying cause(s) e.g. plasmapheresis for removal of antibodies
- Correct anaemia if severe

Pharmacological treatment

Immunosuppressants

Prednisolone oral

1-1.5 mg/kg/day orally for 1-3 weeks until Hb is greater than 10g/dL

AND/OR

Cyclophosphamide IV
60 mg/m^2 intravenously

OR

Azathioprine oral
100-150 mg/mg orally daily

OR
High dose **immunoglobulin** IV

400 mg/kg daily intravenously for 5 days

Folic acid oral

5 mg orally daily should be given to severe cases

Referral
- Refer for higher level care if there is failure to respond
- In all cases of haemolytic anaemia, refer to a specialist.

Sickle Cell Disease (SCD)

Sickle Cell Disease describes a group of inherited red blood cell disorders characterized by the presence of haemoglobin S or sickle haemoglobin. Sickle cell anaemia (SCA) is when an individual inherits two copies of haemoglobin S (homozygous state, Hb SS).

Signs and symptoms
- Joint and bone pain, especially during cold wet seasons
- Periodic jaundice
- Abdominal pain, especially in the splenic area
- Spontaneous sustained erection
- Symptoms usually occur after 6 months of life and may vary depending on the clinical situations as highlighted below:

Vaso-occlusive crisis:

- Pain - usually presenting in the back, upper/lower limbs, joints, abdomen, and chest. It is important that other causes of pain are ruled out; may present with priapism (spontaneous, sustained erection).

Haemolytic crisis:

- Presents with features of anaemia, jaundice, may have dark urine signifying intravascular haemolysis

Sequestration crisis:

- Sudden massive enlargement of the liver and spleen accompanied with a fall in haematocrit

Aplastic Crisis:

- Occurs when the bone marrow ceases to produce new blood cells and presents with severe anaemia.

Signs
- Jaundice
- Pallor
- Hepatomegaly
- Splenomegaly (may be absent in older patients)
- There may be old or recent scarification marks particularly over the abdominal wall
- Venous ulcers

Medical Emergencies
The following are life-threatening complications that may lead to rapid deterioration and death if not diagnosed and managed in a timely manner.
- **Acute chest syndrome** - presents with chest pain, tachypnoea, respiratory distress, fever, decreased oxygen saturation and infiltrates in the chest radiograph
- **Splenic sequestration** - usually occurs in children, characterized by splenic enlargement, left upper quadrant pain, pallor, weakness, rapidly falling haemoglobin levels and hypovolaemia
- **Infection** - most individuals with SCD develop functional asplenia (due to recurrent splenic infarction) by the age of five, and are therefore immune- compromised.
- **Stroke** - may present with headache and neurological deficit

Differential diagnosis
- Connective tissue disorders e.g. rheumatoid arthritis
- Liver disease
- Other causes of failure to thrive

Investigations
- Full blood count
- Sickling test
- Haemoglobin electrophoresis

Treatment objectives
- Prevent the development of sickle cell crises
- Identify and manage the precipitating causes
- Manage sickle cell crises and complications

Non-pharmacological treatment
- Avoid common precipitating causes of crises such as malaria, pneumonia and exposure to extremes of weather
- Encourage drinking plenty of fluids to prevent dehydration
- Maintain a good nutritional state
- Ensure prompt treatment of infections
- Provide genetic counselling and parental education
- Encourage periodic clinic visits for check ups

Pharmacological treatment
- This will vary depending on whether the patient presents in crisis, in steady state, or with complications.

In crisis
- Prompt determination and treatment of precipitating cause e.g. infection, malaria.
- Give intravenous fluids with appropriate electrolytes. (usually glucose in sodium chloride):

Glucose in **Sodium Chloride**, IV infusion

Adult:
5% Glucose in 0.9% sodium chloride 2 – 4 L daily
Child:
4.3% Glucose in 0.18% sodium chloride 150 mL/kg daily

Give pain relievers
Paracetamol, oral or suppository, every 6-8 hours

OR

Ibuprofen, oral, every 8 hours

Pain Management in sickle cell patient		
	Paracetamol	Ibuprofen
Adult:	500 mg - 1 g	400 mg - 600 mg
Child: 6 - 12 years 1 - 5 years 3 months - 1 year	 250 mg - 500 mg 120 mg - 250 mg 60 mg - 120 mg	 200 mg - 400 mg 100 mg - 200 mg Not recommended

Pethidine, IM, (for severe pain). Do not give if there is difficulty in breathing.

Adult:
25-100 mg every 4-6 hours as required
Child:
0.5-2 mg/kg every 4-6 hours as required

OR

Morphine, oral

Adult:
5-10mg, every 3-4 hours as needed

Child:
0.5 mg/kg every 3-4 hours as needed

Note
- Blood transfusion with packed cells may be required, but not routinely
- Transfusion will be necessary if haemoglobin level < 5 g/dL

In the steady state
Give daily **folic acid** 5 mg oral daily; in children under the age of 1 year give 2.5 mg **Prophylaxis against Pneumococcal Infection**

Phenoxy methyl penicillin twice daily until 5 years of age in all children with SCA

Child:

< 3 years: 125 mg
≥ 3 years: 250 mg

Immunization against pneumococcal infection

Antimalarial

Sulphadoxine/Pyrimethamine (SP)

Weekly dose by age (reference malaria)

Pneumococcal conjugate vaccine (PCV-13):

From two months of age, 3 doses 8 weeks apart (i.e. at age 2 months, 4 months and 6 months), and a booster dose between 12-15 months

- If the child has not previously received this vaccine, then at least one dose should be given between 6-18 years
- Pneumococcal polysaccharide vaccine (PPSV-23) - at 2 years, then every 5 years for life.

In severe cases
Hydroxyurea oral

Adult:
500 mg daily
Infant & child:
20 mg/kg/day

Caution
- Discontinue in all pregnant women and in all breast-feeding women
- Discontinue at least three months prior to conception ***in both males and females***

A. With Complications
- Patients who present with vascular crises should be kept warm and given adequate hydration and pain control (**see above**).
- Oxygen therapy.
- Empiric antibiotics in acute chest syndrome until specific results are available
- Vigorous therapy is recommended for stroke in children, A regular transfusion program is recommended to reduce haemoglobin S, Exchange transfusion program is recommended)

Priapism
- Should be managed with cold compress or possibly, surgical decompression.

Leg ulcers
- Bed rest, elevation and zinc sulphate dressing
- A transfusion programme or skin grafting can enhance healing

Blood transfusion

Blood transfusion is indicated if:
- There are acute symptoms of anaemia, such as dyspnoea, tachycardia, severe weakness
- Haemoglobin level is < 5 g/dL
- Haemoglobin level has dropped by > 2 g/dL below the steady-state value.

Exchange Blood Transfusion (EBT)
- Venesection to reduce the proportion of HbS red cells with transfusion of normal HbA blood is often beneficial in the treatment or prevention of life-threatening and other manifestations of sickle cell disease. The aim of EBT is to reduce HbS to 30%.

Indications for Exchange Blood Transfusion
- Cerebrovascular accidents (CVAs)
- Acute chest syndrome (ACS)
- Prior to major surgery
- Multi-organ failure, including Systemic Marrow Fat Embolism (SMFE)
- Multiple pregnancies
- Prevention of recurrent stroke

Relative Indications for Exchange Blood Transfusion
- Intractable or very frequent severe crises
- Major priapism unresponsive to other therapy

Note
- Blood transfusion is not routinely indicated in steady state SCD simply for the reason that haemoglobin level is below 8-10 g/dL, because the cardiovascular system adjusts to the chronic anaemia,

Prevention
- Avoid precipitating causes of crisis if possible, e.g. malaria, pneumonia, exposure to cold weather, and other infections
- Educate patients to disclose haemoglobin status e.g. sickle disease SC, SS etc.
- Genetic counselling

Referral
- Refer all sickle cell patients with complications such as bleeding into the eye, aseptic necrosis of the hip, priapism, haematuria, stroke, and osteomyelitis for specialist care.

G6PD Deficiency

G6PD is an inherited X-linked recessive genetic disorder. Haemolysis results from oxidative damage to red blood cells due to loss of the protective effect of the enzyme G6PD.

Signs and symptoms
- Usually asymptomatic but liable to haemolysis if infection, incriminated drugs or foods are taken (e.g. sulphonamides, fava beans, chloroquine or proguanil)

- Pallor, jaundice and dark urine (coca-coloured urine)

Laboratory findings
- Anaemia - normocytic normochromic, with spherocytes, bite cells, reticulocytosis, Heinz bodies

Non-pharmacological treatment
- Avoid incriminated agents - foods or drugs
- Transfusion of packed red blood cells in severe anaemia: give 10 mL/kg body weight over a period of 8 hours, then assess the level of haemoglobin

Pharmacological treatment

Folic acid oral 5mg once daily for 1 month

Bleeding-related Disorders

These are diseases characterized by excessive bleeding. They may be present from birth or acquired later in life. Bleeding may be spontaneous or follow trauma or surgery.

Causes
The bleeding tendency may result from:
- Coagulation defect (congenital/acquired)
- Defective blood vessels
- Platelet defects
- Clothing factor deficiency.

Specific causes
- Liver disease
- Vitamin K deficiency especially in new-borns
- Drug induced - herbal preparations, warfarin, heparin, NSAIDs e.g. aspirin, ibuprofen
- Bone marrow failure and malignancy e.g. aplastic anaemia and leukaemia
- Low platelet count from any cause
- Severe septicaemia resulting in Disseminated Intravascular Coagulation (DIC)
- Haemophilia

Diagnosis
- A good history is important in distinguishing between the various causes. Past episodes of excessive bleeding e.g. following circumcision, a family history of bleeding and drug therapy should be enquired about.
- The pattern of bleeding is a helpful guide to its cause:
    - Platelet and vessel wall defects: bleeding is usually into skin and mucosal surfaces like the gums, nose, gastrointestinal tract
    - Coagulation factor deficiency (e.g. haemophilia: bleeding is into deep tissues like the brain, joints and muscles.
    - New-borns with Vitamin K deficiency (which leads to multiple coagulation factor deficiency): spontaneous bleeding from various sites such as the umbilical cord, gastrointestinal tract, scalp, brain. There is usually a history of failure to administer Vitamin K injection at birth. Patients may be severely anaemic and in haemorrhagic shock if there is a large bleed.

Haemophilia

This is an X-linked hereditary bleeding disorder, which affects males almost exclusively.
Haemophilia A (Factor VIII deficiency)
- Is the most common of the hereditary clotting factor deficiencies, caused by deficiency of factor VIII. The inheritance is sex linked but up to 33% of patients have no family history and may result from spontaneous mutation.

Haemophilia B (Factor IX deficiency)

- Is due to deficiency of clotting factor IX, which is less common (20% of cases)

Signs and symptoms
- Spontaneous bleeding from mucous membranes
- Easy bruising
- Excessive bleeding from cuts or incisions
- Swelling at site of blood collection e.g. joints
- Pain, limiting movement
- Excessive bleeding

- Swelling at site of blood collection e.g. joints
- Tenderness
- Purpura
- Pallor

Investigations
- Full blood count
- Platelet count and blood film (with expert comments)
- Bleeding time
- Prothrombin time, partial thromboplastin time, INR
- Liver function tests

Treatment objectives
- Prevent or arrest life-threatening bleeding
- Identify and correct underlying cause

Non-pharmacological treatment
- Apply pressure dressings or ice packs to minimize bleeding where possible
- Stop any drugs thought to be responsible for bleeding or which may aggravate bleeding
- Educate haemophiliacs on their disease, encouraging them to minimize trauma-prone activities, and to inform doctors of their condition before any surgical procedure
- Avoid unnecessary injections and surgical procedures in all patients (especially those with a family history of bleeding tendencies)

Pharmacological treatment

Vitamin K therapy is relevant for management of haemorrhagic disease of the new born as well as in adults with vitamin K related bleeding disorders

Vitamin K, IV,

Adult: 10 mg stat
Child: 3-5 mg stat
Neonate (irrespective of history of vitamin K injection)
Term: 1 mg
Preterm: 500 micrograms

Fresh frozen plasma

Adult, Child, Neonate: 15-20 mL/kg

Acute severe blood loss
Fresh whole blood

Adult, Child and Neonates: 5 mL/kg for each 1 g/L Hb rise expected

Haemophilia A
Cryoprecipitate

Adult, Child, Neonate: 1.5-2.0 packs/10 kg

Haemophilia B and DIC
Fresh frozen plasma

Adult, Child, Neonate: 15-20 ml/kg
Thrombocytopenia requiring platelet transfusion
Platelet concentrate

Adult, Child, Neonate: 10 ml/kg (raises platelet count by 50,000 per microliter)

Shock
Sodium chloride 0.9%, infusion

Von Willebrand's Disease

Von Willebrand's disease is a chronic bleeding disorder caused by the lack of von Willebrand factor (VWF, a carrier protein for factor VIII). Almost always is inherited, from the mother or the father, or both, to the child.

Classification: 3 types

Type 1:

- Most common and mildest form, characterized by lower than normal levels of VWF

Type 2:

- The body makes normal amounts of the VWF, however there is qualitative and functional abnormality

Type 3:

- This is the rarest and most severe form. Here persons have very little or no VWF and low levels of factor VIII.

Signs and symptoms

- Frequent or hard-to-stop nose bleeds
- Easy bruising
- Heavy menstrual bleeding
- Longer than normal bleeding after injury, surgery, child birth, or dental procedure
- Investigations
- Full blood count
- Clotting profile: PT and APTT
- Factor VIII clotting activity
- Von Willebrand Factor antigen
- Platelet aggregation tests

Pharmacological management

Tranexamic acid oral
500 mg orally every 8 hours until bleeding stops
If no response:

Desmopressin (DDVAP), SC or IV,

0.3 microgram/kg IV; maximum dose20microgram

OR
Recombinant factor VIII, IV

Haemophilia B

Recombinant factor IX, prevention of local fibrinolysis
Tranexamic acid, oral and IV,

Referral

- Refer all haemophiliacs, all patients with unexplained recurring bleeding episodes and those requiring surgery, to the physician specialist or haematologist for further evaluation.

Coagulation Disorders

Venous thromboembolism (VTE)

- Is a common disorder that comprises deep vein thrombosis (DVT) and pulmonary embolism (PE)?
- Most clinically important pulmonary embolism arises from proximal deep vein thrombosis i.e. popliteal, femoral or iliac veins in at least 90%

Deep Vein Thrombosis (DVT) Propagative

Signs and symptoms

- Leg pain, tenderness and swelling

- A palpable cord representing thrombosed vessels
- Discoloration, venous distention and prominence of superficial veins
- Cyanosis
- May be asymptomatic
- The clinical diagnosis of DVT is highly non-specific. In most patients, the symptoms and signs are non-specific.

Pulmonary Embolism (PE)

- Features of pulmonary embolism vary, depending on the size of the clot.

Signs and symptoms

- Transient dyspnoea and tachypnoea in the absence of other clinical features
- Pleuritic chest pain, cough, haemoptysis, pleural effusion, and pulmonary infiltrates
- Severe dyspnoea, tachypnoea and right sided heart failure
- Cardiovascular collapse with hypotension, syncope, and coma
- Several less common and non-specific presentations including unexplained tachycardia or arrhythmia, refractory cardiac failure, wheezing, cough, fever, apprehension and confusion.

Treatment of Venous Thromboembolism

- Long-term anticoagulation is required to prevent frequent, symptomatic extension of thrombosis and/or recurrent venous thromboembolic events.

Warfarin is started with initial unfractionated **heparin** or low molecular weight **heparin** therapy, which should be overlapped for 4-5 days.

Warfarin oral
5 mg for 4-5 days

OR
Low molecular weight heparin SC
1mg/kg subcutaneously for 4-5 days

OR
Unfractionated heparin by 75 units/kg IV followed by continuous infusion of 18 units/kg/hour

Adolescent or child:
Lower loading dose then 15-25 units /kg/hour by IV infusion, or 250 units/kg every 12 hours by subcutaneous injection.

Pregnant women
Low molecular weight heparin 1mg/kg SC.
This should be monitored by checking anti-Xa levels.

Note

- Warfarin therapy should be monitor by INR after 5–-7 days of treatment.
- Heparin should be monitored by APTT before treatment is initiated, and every hour until APTT is twice of the initial level.

Disseminated Intravascular Coagulation (DIC) in Pregnancy

DIC in pregnancy is a life-threatening condition that maybe result from haemorrhagic events and obstetrical syndromes

Causes

A. Obstetric

- Amniotic fluid embolism
- Acute peripartum haemorrhage (uterine atony, cervical and vaginal lacerations and uterine rupture)
- Pre-eclampsia and eclampsia, HELLP syndrome (haemolysis, elevated liver enzymes and low platelets)
- Placental abruption
- Intra uterine infection and death of foetus

B. Non-obstetric

- Sepsis
- Acute fatty liver pregnancy
- Snake Bite
- Incompatible blood transfusion

Signs and symptoms
- Blood clots
- Decrease in blood pressure
- Easy bruising
- Rectal or vaginal bleeding
- Red clot on the skin surface (petechiae)

Investigations
- Platelet counts
- Prothrombin time PT

Treatment objectives
- Treat underlying disease
- Eradicate infection with appropriate antibiotic therapy
- Replace blood components using appropriate blood products
- Ensure appropriate fluid balance
- Evacuate the uterus

Pharmacological treatment

Heparin 1 mg/kg subcutaneous for 4-5days

Cardiovascular diseases

Rheumatic Fever

This is a result of immunological reaction to group A β-haemolytic streptococcus of the throat but occasionally in the skin of sensitized individual. The disease occurs mainly in children of school age with a peak age of 5 to 25 years. The onset of symptoms is usually 1–3 weeks after the throat infection. Acute Rheumatic fever may lead to damage to the heart valves resulting Rheumatic heart disease.

Cause
- Hypersensitivity reaction to group A β-haemolytic streptococcus. The commonest streptococcal strains in Africa are C and G

Signs and symptoms
- Duckett-Jones' diagnostic criteria

Major
- Cardiac involvement (e.g. pericarditis, congestive heart failure, valve disease)
- Sydenham's chorea
- Erythema marginatum
- Subcutaneous nodules
- Migratory polyarthritis

Minor
- Fever
- Leucocytosis
- Arthralgia
- Elevated erythrocyte sedimentation rate (ESR)
- Raised ASO titre (> 200 IU)
- Prolonged PR interval
- Evidence of preceding group A β- haemolytic streptococcal infection: positive throat culture or rapid streptococcal antigen

Diagnosis
- 2 major criteria

Or:
- 1 major **plus** 2 (or more) minor criteria

Differential diagnosis
- Malaria
- Viral infection
- Pyrexia of undetermined origin (PUO)
- Connective tissue disease
- Typhoid fever
- Sickle cell disease
- Myocarditis
- Tuberculosis

Complications
- Rheumatic heart disease
- Arrhythmias
- Cardiac failure

Investigations
- Full blood count (shows raised white cell count)
- ESR –> 30
- C-reactive protein > 3mg/dl (Minor Criteria)
- Antistreptolysin O (ASO) titre
- Sickling status
- Chest radiograph (heart may be enlarged)
- Throat swab for microscopy, culture and sensitivity
- Electrocardiography (Prolonged PR -interval – Minor Criteria)
- Echocardiography for carditis (Major criteria)

Treatment objectives
- Relieve symptoms
- Treat the bacterial throat infection
- Reduce or abolish inflammatory process
- Treat cardiac failure if present
- Prevent future Group A streptococcal infection

Non–pharmacological treatment
- Bed rest and supportive care

Pharmacological treatment

Phenoxy methyl penicillin (Penicillin V) oral
Adult:
500 mg orally every 6 hours, increased up to 1g every 6 hours in severe infections
Child:
1 month - 1 year: 62.5 mg orally every 6 hours
Increased in severe infection to ensure at least 12.5mg/kg/dose
1 - 6 years: 125 mg every 6 hours
Increased in severe infection to ensure at least 12.5 mg/kg/dose
6 - 12 years: 250 mg every 6 hours
Increased in severe infection to ensure at least 12.5 mg/kg/dose
12 - 18 years: 500 mg every 6 hours, increased in severe infection up to 1 g/dose

OR
Erythromycin oral
Adult and child over 8 years:
250 - 500 mg orally every 6 hours
OR
500 mg - 1 g every 12 hours; up to 4 g daily in severe infections
Child:
Up to 2 years:125 orally mg every 6 hours
2 - 8 years 250 mg every 6 hours

Note:
- Double doses in severe infections

Salicylates - **Acetylsalicylic acid** oral
Adult:

300 mg - 1 g orally every 4 hours after food
Maximum dose in acute conditions 8 g daily
Child: not recommended for use

Prednisolone oral
Prednisolone should be given in severe rheumatic fever with carditis
Initially, up to 10 - 20 mg orally daily; up to 60mg daily in severe disease.
High dose prednisolone 1mg per Kg for 2 weeks then taper dose over four weeks

Note:
- Do not discontinue steroid therapy suddenly if patient has taken it for more than 5 days. Dose tapering is mandatory to prevent acute adrenal insufficiency which is life threatening.

Rheumatic fever prophylaxis:
- Early diagnosis and treatment of Group A streptococcus throat infections
- Ensure continuous prophylaxis in patients who have rheumatic fever or rheumatic heart disease, as follows:

Type of rheumatic fever (RF)	**Duration of prophylaxis after last attack**	**Secondary prophylaxis**
RF with carditis and persistent Valvular disease	10 years or until age 40 years, whichever is longer. Lifelong prophylaxis sometimes required	**Benzathine penicillin:** Weight 27 kg or less: 600,000 units IM every 4 weeks Weight more than 27 kg: 1,200,000 units IM every 4 weeks Macrolide (e.g. **erythromycin**) antibiotics for persons with allergy to penicillin
RF with carditis but no Valvular disease	10 years or until age 21 years, whichever is longer	
RF without carditis	5 years or until age 21 years, whichever is longer	

Referral
- Patients who have been treated for heart failure should be referred for further evaluation.

Rheumatic Heart Disease

Disease of the heart valves following an episode of rheumatic fever.

Causes
- Mitral valve (most commonly affected) - stenosis, incompetence or both
- Aortic valve stenosis - incompetence or both
- Tricuspid valve - stenosis, incompetence or both

Signs and symptoms
- Exertional dyspnoea
- Paroxysmal nocturnal dyspnoea
- Orthopnoea
- Leg and abdominal swelling
- Cough with frothy sputum
- Pedal and sacral oedema
- Small volume pulse which may be irregular
- With or without tachycardia
- With or without hypotension
- Raised JVP
- Displaced apex
- Left ventricular hypertrophy
- Right ventricular hypertrophy
- Thrills
- Palpable P2
- Soft S1; loud P2 S3 or S4
- Systolic/diastolic murmurs

Differential diagnosis
- Constrictive pericarditis
- Endomyocardial fibrosis
- Dilated cardiomyopathy

Complications
- Arrhythmias e.g. atrial fibrillation, heart block
- Cardiac failure

- Embolic phenomena
- Endocarditis

Investigations
- Electrocardiography (resting/exercise)
- Lipid profile
- Echocardiography
- Chest radiograph
- Coronary angiography

Treatment Objectives
- Relieve symptoms
- Prevent recurrence of rheumatic fever
- Repair and replace affected valves

Non-pharmacological treatment
- Bed rest
- Low salt diet

Pharmacological treatment
- Treat for heart failure if present (see section on heart failure)
- Oral anticoagulants therapy to prevent embolus formation if the patient is in atrial fibrillation:
- Warfarin requires close monitoring of INR with a achievable therapeutic range of 2 to 3
- Warfarin has extensive drug-drug and drug food interactions. Therefore, Clinician should provide appropriate counselling and follow up
- Prophylaxis against endocarditis undergoing dental or urogenital procedure (see section on infective endocarditis)

Referral
- Refer to cardiologist for specialist care

Prevention
- Personal hygiene and other measures to prevent recurrence of rheumatic fever

Hypertension (HTN)

A persistent elevation of the blood pressure above normal values (taken three times on at least two different occasions with intervals of at least 24 hours) Blood pressure ≥ 140/90 mmHg irrespective of age is regarded as hypertension.

Classification of Hypertension

Category	**Systolic (mmHg)**	**Diastolic (mmHg)**
Normal	<120	<80
Elevated(pre-hypertension)	120-129	>80
Stage 1	130-139	80-89
Stage 2	>equal 140	> equal 90

Causes
- **Primary or** essential **hypertension (**accounts for 90-95% of cases) the cause is unknown.

Associated risk factors:

- Increasing age
- Gender
- Race
- Family history
- Sedentary lifestyle
- Obesity
- Excessive alcohol intake
- Excessive sodium intake

Secondary: in about 10–15% of cases, hypertension may be due to a specific disease or abnormality such as:

- Renal/renovascular disease- chronic renal failure, polycystic kidneys, renal artery stenosis
- Coarctation of aorta
- Endocrine disorders: hyperaldosteronism, Cushing's syndrome, phaechromocytoma, hyperthyroidism, acromegaly
- Cocaine, other stimulants

- Medications - oral contraceptives, steroids, tricyclic antidepressants, non-steroidal anti-inflammatory medicines (NSAIMs).

Signs and symptoms
- Largely asymptomatic until complications arise ("silent killer")
- Symptoms and signs of target organ damage e.g. cardiac failure, stroke and chronic kidney disease

Occasionally, patients may complain of:
- Headache
- Palpitation
- Dizziness
- Easy fatigability

Differential diagnosis
- White coat hypertension
- Anxiety/fright/stress

Complications
- Cardiac: heart failure, ischaemic heart disease, left ventricular hypertrophy
- Blood vessels: aortic aneurysm, peripheral arterial disease
- Neurologic: stroke
- Eye: hypertensive retinopathy
- Kidneys: renal failure

Investigations
- Full blood count
- Urinalysis;
- Urea, electrolytes, creatinine
- Uric acid
- Fasting blood glucose
- Lipid profile
- Chest radiograph
- Electrocardiography
- Echocardiography

Treatment objectives
- Achieve a normal blood pressure target
- Prevent complications

Non-pharmacological treatment
- Low salt intake
- Weight reduction in overweight individuals
- Regular exercise in sedentary patients
- Stop smoking and alcohol consumption
- Dietary changes i.e. diet rich in fruits, vegetables, and low-fat dairy products
- Recommend dietary potassium, calcium, and magnesium consumption
- Appropriate stress management practices

General principles of drug treatment
- All patients require lifestyle modification
- Treatment should be individualized
- Most patients will require combination chemotherapy using drugs from different classes
- Fixed dose combination is desirable when 2 or more drugs are required
- Drugs with at least 24 hours duration of action are preferred to enable once daily dosing
- Blood pressure should be lowered to < 140/90 mmHg, with 135/85 mmHg the minimum goal in patients with diabetes or renal insufficiency
- Diuretics should be included unless contraindicated
- First line for blacks is either a calcium channel blocker or a diuretic
- ACEI and beta blockers are ineffective when used as monotherapy in blacks
- Treat coexisting cardiovascular risk factors

Initiating therapy
- Start with a monotherapy. One of four classes of antihypertensive drugs can be chosen as first line treatment, according the characteristics of the patient (e.g. age, comorbidities, contraindications, race etc.).
- In the black race, thiazide or calcium channel blockers either as monotherapy or in combination are the preferred medications.
- Dual therapy should be started earlier if the blood pressure is more than 180/110mmHg

Patient with no comorbidities	*Patient with comorbidities*
Give thiazide diuretic	After a stroke give **thiazide** diuretic
Patient > 65 years: **thiazide diuretic** or **calcium channel blocker**	For a **diabetic** patient give: **ACE inhibitor** **OR** **Beta blocker** if there is pre-existing cardiovascular disorder
Blacks: **thiazide diuretic** or **calcium channel blocker** (avoid ACE inhibitors)	**Renal** impairment (based on eGFR) give **ACE inhibitor**

- In patients with no comorbidity start with a thiazide diuretic and check BP after 4 weeks of treatment.
- If the treatment has been correctly taken but there is no improvement after 4 weeks, add a second antihypertensive drug.
- After 4 weeks of bi-therapy, re-evaluate. If the patient's BP remains too high, consider triple-therapy.
- In diabetic patients, if there is no improvement after 4 weeks of ACE inhibitor treatment taken correctly, add a calcium channel blocker.
- In patients with a cardiac disorder (heart failure or coronary heart disease), bi-therapy is usually necessary from the start (AEC inhibitor + beta-blocker).

Pharmacological treatment

Antihypertensive Class	Comments
Thiazide diuretics **Hydrochlorothiazide** oral 12.5-50 mg once daily **Bendroflumethiazide** (Bendrofluazide), oral, Initially 5-20 mg per day Maintenance dose 2.5 mg- 15 mg per day	- Avoid in gout - Use low doses to reduce unwanted metabolic effects - Enhances effectiveness of other classes of Antihypertensives when used in combination
Beta–blockers **Bisoprolol**, oral 2.5-5 mg daily; may increase to 10 mg and if necessary to 20 mg daily	- Contraindicated in asthma, chronic obstructive pulmonary disease and heart block - Do not stop abruptly (risk of malaise, angina)
Angiotensin–converting enzyme (ACEI) inhibitors **Enalapril** oral Start with 5 mg once daily. Gradually increase, every 1 to 2 weeks, according to BP, up to 10 to 20 mg once daily (max. 40 mg daily).	- Avoid in pregnancy and renovascular diseases - Can be used in heart failure, diabetes nephropathy and left ventricular dysfunction - Commonest side effect is dry persistent cough
Angiotensin receptor blockers **Losartan** oral 25-100 mg/day in one to 2 daily doses.	- Useful alternative to ACE inhibitors when dry persistent cough is a problem - Monitor serum potassium level especially in the elderly
Calcium channel blockers **Nifedipine retard** oral 10–40 mg twice daily **Amlodipine** oral 5 mg per day, may be increased by 2.5 mg/day every 7-14 days Do not to exceed 10 mg/day. Maintenance dose 5-10 mg/day	- Particularly useful in isolated systolic hypertension - Short acting formulations should not be used (see hypertensive emergencies)
Centrally acting agents **Methyldopa** oral 250 mg 2–3 times daily maximum 3 g daily	- Effective in the treatment of hypertension in pregnancy - May be used in asthma and heart failure
Vasodilators **Hydralazine** **Oral**, 25–50 mg twice daily **Slow IV injection** over 20min 5–10 mg diluted with 10 ml normal saline. Repeat after 20–30 minutes if necessary	- Used **ONLY** in hypertension associated with pregnancy ***Caution** ***Hydralazine may cause unexpected drop in blood pressure if used injudiciously***

Hypertensive emergencies

- Hypertensive encephalopathy
- Acute left ventricular failure associated with severe hypertension
- Cerebrovascular accident with haemorrhage or infarction
- Subarachnoid haemorrhage
- Myocardial infarction
- Dissecting aortic aneurysm
- Acute kidney ischaemia
- Retinopathy
- Eclampsia (in pregnant women)

For hypertensive emergencies, refer to specialist

Hypertension (HTN) in Pregnancy

- Severe hypertension in pregnant women should be treated immediately to prevent maternal end-organ damage. Hypertensive women who become pregnant or plan to become pregnant should be transitioned to **methyldopa** and/or **Nifedipine**, during pregnancy. Diuretics are relatively safe.
- Hypertensive women who become pregnant should not be treated with ACEIs, ARBs, or direct renin inhibitors Because of risk of teratogenicity.

Pharmacological treatment

Mild Pregnancy Induced Hypertension (PIH)
Acetylsalicylic acid oral
75 mg orally once daily
Note:
Plan immediate delivery at gestation > 37 weeks

Admit and monitor BP up to 6 times per day, and give **alpha methyldopa** 250 – 500 mg orally every 6-8 hours daily or **Nifedipine retard,** 10–40 mg orally twice daily

Severe PIH Diastolic>110
Alpha methyldopa oral
250 – 500 mg orally every 6-8 hours daily
OR
Nifedipine retard oral
10–40 mg orally twice daily

OR
Nifedipine (sublingually) 10 mg

The need for more doses indicates the urgency for delivery.

Note
- Do not give **acetylsalicylic acid** in PIH with severe elevation of blood pressure because of risk of intracerebral bleeding.

Pre-Eclamptic Toxemia (Proteinuria PIH)
Treatment objectives

Mild pre–eclampsia
- Control blood pressure
- Allow foetus to grow and mature for delivery
- Prevent or treat complications that may arise

Non–pharmacological treatment

- Admit for bed rest if possible
- Encourage patients to lie on their left side to avoid supine hypotension
- Urine proteins must be determined daily
- Monitor blood pressure every 4 hours
- Weigh patient on alternate days.
- Plan delivery at 37 weeks or before

Pharmacological treatment

Acetylsalicylic acid 75 mg once daily

AND

Methyldopa, 250 mg orally twice daily, up to 500 mg 3 times daily

OR

Nifedipine retard, 10–40 mg orally twice daily

Exclude UTI, Check urine for protein daily, Plan delivery at 37 weeks or before

Imminent Eclampsia

This is proteinuria PIH characterized by visual disturbance or epigastric pain and/or brisk reflexes.

Treatment objectives

- Reduce the blood pressure, ***but not lower than 140/90 mmHg***.
- (NOTE: lowering the blood pressure further may cause foetal distress)
- Prevent fits
- Stabilise the patient and deliver baby if eclampsia is imminent

Non–pharmacological treatment

- Assess progress by 15–30-minute BP monitoring until the BP is reduced and the patient is stable.

Thereafter monitoring can be done by BP readings every 2-4 hours

- Daily weighing
- Daily urine examination for protein
- If eclampsia is imminent stabilise mother and deliver baby
- If the patient is not symptomatic and the pregnancy is less than 34 weeks allow pregnancy to continue - if the foetal condition would allow
- If the pregnancy is 34 weeks or more consider delivery after stabilisation
- When the obstetrician considers that the foetus is not viable, the patient should be transferred to a hospital with an associated neonatal intensive care unit capable of looking after the immature baby

Pharmacological treatment

Prevent convulsions by:

Diazepam IV infusion

40 mg diluted in 1 litre of 0.9% sodium chloride given over 6 hours

If diastolic pressure is still >110 mmHg, give antihypertensive:

Hydralazine slow IV

5–10 mg by slow intravenous injection, over 20–30 minutes

Eclampsia (Proteinuria PIH with Fits)

Therapeutic objectives

- Lower the blood pressure
- Prevent further fits
- Deliver baby when patient is stable
- Protect patient from injury

Non–pharmacological Treatment

During a fit:

- Turn the woman on her left side and maintain the airway by either holding up the chin or, if possible, inserting a mechanical airway to hold down the tongue
- Prevent patient from biting her tongue
- Prevent patient from falling

Pharmacological treatment

- **Diazepam** by intravenous infusion 40 mg diluted in 1000 ml of 0.9% sodium chloride infused over 6 hours.
- If diastolic pressure is > 110 mmHg give antihypertensive as above
- Plan urgent delivery

Referral

- Urgent referral to obstetrician after initial stabilization of patient e.g. abort fits.

Prevention

Advice on adherence to anti-hypertensive management (pharmacological and non-pharmacological)

- Low salt intake
- Weight reduction in overweight individuals
- Regular exercise in sedentary patients
- Reduction in alcohol consumption
- Dietary changes i.e. diet rich in fruits, vegetables, and low-fat dairy products
- Recommend dietary potassium, calcium, and magnesium consumption
- Advice on adherence to prescribed drugs

Ischemic Heart Disease (IHD)

A condition in which there is insufficient blood flow through the coronary arteries, leading to ischaemia and/or infarction. IHD includes:
- Stable coronary artery disease and acute coronary syndromes
- Stable Angina pectoris
- Myocardial infarction (MI)
  - ST segment elevation MI (STEMI)
  - Non-ST segment elevation MI (NSTEMI). a 1

Causes
- Deposition of fatty material (cholesterol plaques) and platelet aggregation inside the coronary arteries causing partial or total obstruction of blood flow

Risk factors
- Age: men > 45 years; women> 55 years
- Sex: male gender
- Family history
- Cigarette smoking
- Hypertension
- Diabetes Mellitus
- Dyslipidaemia

Angina Pectoris

This is a symptom complex characterised by chest pain or discomfort that may radiate to the neck, jaw, shoulder or left arm. It is classified into stable and unstable angina.

Stable Angina:
Individual with stable angina are at risk of developing acute coronary syndrome or myocardial infarction (heart attack)

Signs and symptoms
- Chest discomfort on exertion lasting > 10 -15 minutes, radiating to the left arm, neck or jaw; aggravated by exertion; relieved by rest
- Nicotine stains on lips and nails
- Cardiomegaly- sometimes

Differential diagnosis
- Pulmonary embolism
- Pericarditis
- Aortic dissection
- Pleurisy
- Costochondritis
- Oesophageal spasm

Complications
- Unstable Angina
- Myocardial infarction

Investigation
- Full blood count and differentials
- Cardiac enzymes – Creatine Kinase – MB (CK-MB)
- Urea, electrolytes and creatinine
- Fasting blood glucose
- Urinalysis; urine microscopy
- Electrocardiography: resting, treadmill exercise
- Echocardiography (resting/exercise)
- Coronary angiography

Therapeutic objectives
- Minimise symptoms
- Prevent or reduce ischaemia
- Prevent myocardial infarction

Non–pharmacological treatment
- Reassure patient that the condition is not rapidly fatal
- Encourage cessation of smoking
- Encourage cessation of alcohol consumption
- Reduce weight (in obese and overweight individuals)
- Regular exercise but avoid strenuous exercise that would produce pain

Pharmacological treatment

Antiplatelet therapy:
Aspirin oral
150 – 300 mg oral once daily

OR
Clopidogrel
75 mg orally once daily

Beta–blocker (if not contraindicated):
Atenolol oral
50-100 mg oral once daily

OR
Metoprolol 50-200 mg oral once daily

Glyceryl trinitrate tablet (short-acting) 0.3-1mg sublingually
OR
Isosorbide dinitrate (long acting)
30-120 mg 2–3 times daily (maximum dose is 240 mg)

Nifedipine 20-60 mg once daily

OR

Amlodipine 5-10 mg daily

OR
Verapamil 80-120 mg once daily

AND

Atorvastatin 10-20 mg daily

Referral
- Refer for specialist care

Acute coronary syndrome

This is a spectrum of coronary artery comprising:
- Myocardial infarction (MI) with ST segment elevation (STEMI), or without ST segment elevation (NSTEMI)

And
- Unstable angina (UA)
- Depending on clinical, ECG, and enzyme changes

In unstable angina, oxygen demand is unchanged. Blood supply is decreased because of reduced resting coronary flow. This is in contrast to stable angina, where there is increased oxygen demand.

Causes
Myocardial Infarction is due to the necrosis of myocardium resulting from abrupt cessation of blood flow to any area of the heart.

Risk Factors

- Angina pectoris
- Diabetes mellitus
- Hypertension
- Cigarette smoking
- Plasma lipid abnormalities
- Obesity
- Family history of heart disease

Signs and symptoms

- Chest pain: similar in character to stable angina pectoris, but greater in severity and
- persisting for more than 30 minutes, not relieved by rest or glyceryl trinitrate,
- Autonomic disturbance: diaphoresis, vomiting, dizziness and anxiety
- Cyanosis: may be peripheral or central
- Pulse: tachycardia/bradycardia/arrhythmias
- Hypotension (following extensive damage to heart muscle)
- Elevated jugular venous pressure: associated congestive heart failure
- Bibasal crepitations: associated with left ventricular failure

Complications

- Arrhythmia
- Pulmonary oedema
- Septal/chordae/myocardial wall rupture
- Stroke
- Ventricular aneurysm
- Pericarditis

Investigations

- ECG: ST segment elevation > 7-8 mm, pathological Q waves in two consecutive leads
- Cardiac enzymes: elevated in MI
  - Creatinine Kinase-MB (CK–MB)
  - Serum aspartate transaminase (AST)
  - Lactic dehydrogenase (LDH)
  - Troponin I and T
- Echocardiography:
  - Regional wall abnormality
  - LV dysfunction
  - RV dysfunction
- Random blood glucose
- Serum lipid profile
- FBC, ESR
- Blood urea, electrolytes and creatinine
- Chest radiograph

Therapeutic objectives

- Relieve distress and pain
- Limit further infarction
- Prevent and treat complications
- Prevent re-infarction

Non–pharmacological treatment

- Reassure patient and encourage bed rest in the first 48 hours

Pharmacological treatment

Oxygen by facemask or nasal cannula

Acetyl salicylic acid oral
300 mg immediately orally (to be chewed)
Then 150-300 mg daily

Glyceryl trinitrate sublingual
500 microgram sublingually

- Insert intravenous cannula for emergency intravenous medications

Beta-blocker (if not contraindicated):

Atenolol oral**,**
50-100 mg orally daily
- ACE inhibitor (if not contraindicated):

Lisinopril oral
2.5-20 mg daily, orally
- Treat acute complications such as pulmonary oedema and cardiac arrhythmias (see appropriate section)
- Treat hyperglycaemia with insulin. Change diabetic patients previously on oral glucose lowering agents to insulin (see section on diabetes mellitus)

Do not give a Beta–blocker if there is/are:
- History of asthma
- Heart failure (severe breathlessness, lung crepitations, raised jugular venous pressure)
- Bradycardia (pulse rate less than 60 beats/minute)
- Severe hypotension (BP less than 90/60 mmHg)

Do not give an ACE inhibitor if there is/are:
- Severe hypotension (BP less than 90/60 mmHg)

Do not give IV fluids indiscriminately
- In view of the possibility of heart failure and cardiogenic shock in acute myocardial infarction, IV fluids must be given with extreme caution (if at all), and with regular examination of the lung bases and jugular venous pressure.

Long – term Treatment
- The following treatments may prevent re-infarction and other cardiovascular complications:

Antiplatelet therapy
Aspirin, 75-150 mg orally, daily indefinitely.

Beta-blocker (if not contraindicated)
Atenolol 50-100 mg orally, daily

OR

Bisoprolol
- ACE inhibitors or Angiotensin Receptor Blockers (ARB) e.g. **Losartan** (if not contraindicated).
- Treat other underlying conditions such as hypertension, diabetes mellitus, and high serum lipid levels.

Note
- All post myocardial infarction patients should be given a statin:

Atorvastatin oral
10-20 mg daily (usually at night) (if not contraindicated) *irrespective of lipid level*

Referral
- Refer all patients who have suffered a myocardial infarction to a physician after initial management as outlined above.

Infective Endocarditis

This is an infection of the heart valves and lining of the heart chambers by microorganisms.

Causes
It is classified into three types:
- *Sub-acute endocarditis:* caused by low virulence organisms such as *Streptococcus viridans and* enterococcus*;* occurs on damaged heart valves
- *Acute endocarditis:* caused by common pyogenic organisms such as Staphylococcus *aureus;* occurs usually normal heart valves.
- *Post-operative endocarditis:* following cardiac surgery and prosthetic heart valve placement. The most common organism involved is *Staphylococcus aureus*

Risk Factors
- Rheumatic heart disease
- Congenital heart disease
- Prosthetic valve
- Invasive dental/diagnostic/surgical procedures (including cardiac catheterization)
- Immunosuppression

- Intravenous drug abuse

Signs and symptoms
- Acute:
- High fever with rigors
- Delirium
- Shock
- Development of new murmurs
- Severe cardiac failure
- Abscesses may form in many parts of the body (e.g. brain)

Subacute:
- Low-grade fever
- Signs of carditis
- Finger clubbing
- Arthralgia
- Splenomegaly
- Osler's nodules
- Janeway lesions
- Roth spots
- Fatigue
- Weight loss

Complications
- Cardiac failure
- Myocardial abscess
- Solid organ damage from emboli
- Septi
- Glomerulonephritis

Differential diagnosis
- Myocarditis
- Rheumatic heart disease

Investigation
- Full blood count and differentials
- ESR
- Urinalysis and microscopy
- Blood cultures X 3 (the yield is higher if blood is taken at the time of pyrexia)
- Echocardiography

Treatment objectives
- Stop the infection
- Treat cardiac failure
- Prevent coagulation disorders

Non-pharmacological treatment
- Bed rest
- Low salt diet

Pharmacological treatment

Benzylpenicillin 7.2 g daily by slow IV injection or IV infusion in 6 divided doses for 4-6 weeks; may be increased up to 14.4 g daily if necessary

PLUS
Gentamicin 60-80mg intravenously or intramuscularly every 8 hours for 2 weeks

Following bacteriological confirmation institute appropriate antimicrobial therapy

Staphylococci:
Flucloxacillin IV
250 mg-2 g intravenously every 6 hours for 4-6 weeks

Vancomycin IV
1 gm intravenously every 12 hours

Gentamicin IV
60-80 mg intravenously every 12 hours for 2 weeks

Enterococci:
Amoxicillin IV

2 gm intravenously every 4 hours

Gentamicin IV
60-80 mg intravenously every 12 hours

Candida: Systemic antifungals

Prevention
Prophylactic antibiotics for patients at risk who are undergoing:
- Dental procedures
- Genito-urinary tract manipulation
- Obstetric, gynaecological and gastrointestinal procedures

Pericarditis

This is an inflammation of the pericardium; may be acute or chronic.

Causes
- Infectious and non-infectious pericarditis
- Tuberculous Pericarditis is a common cause for Pericarditis in the black race
- Viral, bacterial, fungal or protozoal infections
- **Other causes**: metabolic, malignancy, connective tissue disease, radiation, trauma etc.

Signs and symptoms
Acute pericarditis:
- Chest pain: not always present; sharp, retrosternal, often severe and pleuritic, radiating to the left shoulder, made worse by breathing or coughing, aggravated by lying supine but relieved by sitting up and leaning forward.
- Fever: low grade
- Pericardial friction rub: best heard during expiration with patient sitting up, and stethoscope placed firmly against the chest

Chronic pericarditis:
Insidious onset
There may be:
- Dyspnoea on exertion
- Leg and abdominal swelling

Differential diagnosis
- Endomyocardial fibrosis
- Sarcoidosis
- Amyloidosis

Investigations
- Electrocardiography
- Full blood count and differentials
- Chest radiograph
- Echocardiography
- Investigate for Tuberculosis
- ESR and CRP
- Pericardial fluid analysis if significant effusion present
-

Treatment objectives
- Relieve distress from pain and tamponade
- Relieve constriction
- Treat the effect on the heart
- Treat complications
- Eradicate the organism (if cause is infection

Non-pharmacological treatment
- Bed rest

Pharmacological treatment

NSAIMs (mainstay of treatment)

Indomethacin oral
50 mg orally every 8 hours

OR
Ibuprofen oral
400-800 mg orally every 12 hours

Steroids:
Prednisolone oral
30 mg orally every 8 hours and tapered

Anti-tuberculous drugs or other antimicrobial agents (if mycobacterium or other microbes are causative)

Prevention
- Avoid radiation
- Prevent infection

Cardiac (Heart) Failure

This is a condition in which the heart is unable to maintain adequate cardiac output to meet metabolic requirements, or does so at the expense of increased pressures.

Causes
- Hypertension
- Valvular heart diseases
- Rheumatic heart diseases
- Cardiomyopathy
- Severe anaemia
- Myocardial ischaemia/infarction
- Thyrotoxicosis
- Congenital heart disease
- Arrhythmia
- Bacterial endocarditis

Signs and symptoms

Left Heart failure	**Right heart failure**
Symptoms - Breathlessness with physical activity (exertional dyspnoea) - Breathlessness on lying down (orthopnoea) - Intermittent breathlessness at night (paroxysmal nocturnal dyspnoea) - Wheezing (cardiac asthma, associated with pulmonary congestion) - Cough with frothy sputum which may be blood-stained - Fatigue	***Symptoms*** - Swelling of the feet and lower extremities - Abdominal swelling and discomfort
Signs - Tachypnoea (increased respiratory rate) - Tachycardia (increased heart rate) - Basal crackles on auscultation of chest - Occasionally rhonchi may be heard. - Gallop rhythm - Apex beat may be displaced - A murmur may be heard	***Signs*** - Tachycardia (increased heart rate) - Dependent pitting oedema - Ascites - Tender, smooth, soft hepatomegaly - Raised jugular venous pressure - Gallop rhythm

In children:

- Failure to thrive
- Difficulty in feeding

Functional classification[3]

Class I: No limitation of physical activity. Ordinary physical activity does not cause undue fatigue, palpitation, or dyspnoea

Class II: Slight limitation of physical activity. Comfortable at rest, but ordinary physical activity results in fatigue, palpitation or dyspnoea

Class III: Marked limitation of physical activity. Comfortable at rest, but slight activity causes fatigue, palpitation or dyspnoea

Class IV: Unable to carry out any physical activity without discomfort. Symptoms of cardiac insufficiency are present at rest. If any physical activity is undertaken, discomfort is increased

Investigations

- Electrocardiography
- Chest Radiograph
- Echocardiography
- Full blood count
- Blood urea, electrolytes, creatinine
- Blood glucose
- Cardiac enzymes, if myocardial infarction is suspected
- Liver function test
- Thyroid Function Test if thyroid disease is suspected

Treatment objectives

- Improve cardiac output and efficiency
- Relieve symptoms and improve quality of life
- Treat complications
- Treat precipitating cause(s)
- Prevent hospitalisation
- Prevent premature death

Non–pharmacological treatment

Encourage the following:

- Low salt diet
- Weight reduction
- Avoid alcohol
- Avoid smoking
- Encourage low level endurance muscular activity, such as walking
- Rest (only in acute heart failure or exacerbation of chronic heart failure)

Pharmacological treatment

Initial therapy of mild heart failure (NYHA CLASS I–II)
Furosemide (furosemide) oral
Adult:
40-80 mg orally daily
Child: 1-2 mg/kg

ACE Inhibitor for left ventricular systolic dysfunction (LVSD):
Lisinopril oral
Adult: 5-20 mg daily

- Identify and treat precipitating factors

Initial therapy of moderate heart failure (NYHA CLASS III)
Furosemide (furosemide) oral
Adult: 80-120 mg daily
Child: 2-4 mg/kg

[3] New York Heart Association (NYHA)

ACE inhibitor for Left ventricular Systolic Dysfunction (LVSD) :
Lisinopril oral
Adult: 5-20 mg orally daily

Patients with atrial fibrillation and low BP who have not taken digoxin within the past 2 weeks
Digoxin oral
Adult:
250 micrograms orally twice daily for 24–48 hours
Elderly:
125 micrograms orally twice daily for 24–48 hours
Child:
5 micrograms/kg orally twice daily

Note
- Diuretics may cause hypokalaemia, therefore monitor serum electrolytes closely and give potassium when necessary
- Do not give both potassium-sparing diuretics such as spironolactone and potassium chloride supplements together in the same patient.

Potassium chloride sustained release tablets if needed for the patient
Adult:
600-1200 mg, orally every 12 hours

Initial therapy of severe heart failure (NYHA CLASS IV); e.g. acute pulmonary oedema
- Admit patient
- Prop patient up in bed
- Give oxygen by nasal cannula or face mask
- Insert an intravenous cannula

Furosemide IV
40-80 mg; repeat after 30 minutes if necessary.

THEREAFTER
40-80 mg intravenously every 8 hours

If patient improves, change to oral route after 24-48 hours of IV treatment
Furosemide oral
40-80 mg, 3 times daily

If patient does not improve, continue intravenous furosemide

PLUS:
Morphine IV
5-10 mg IV slowly

AND
Metoclopramide IV
10 mg to prevent vomiting

For fast atrial fibrillation:
Digoxin Oral
250 micrograms orally twice daily for 24-48 hours

Note:
- Monitor urine output
- Identify and treat (if possible) precipitating causes such as hypertension, myocardial infarction, anaemia or thyrotoxicosis

Pregnancy
- **Diuretics** are the first line of treatment for most pregnant women with heart failure

Referral
- All patients must be referred to a specialist when clinically stable for the identification and treatment of the underlying cause of the heart failure and for long–term maintenance therapy

Cardiac Arrhythmias/Dysrhythmias

These are disorders of cardiac rate, rhythm and conduction.
The following are examples of common arrhythmias:

- Atrial fibrillation
- Atrial flutter
- Complete heart block
- Extrasystoles
- Supraventricular tachycardia
- Ventricular tachycardia

Causes

- Rheumatic heart disease
- Ischaemic heart disease
- Hypertension
- Thyrotoxicosis
- Cardiomyopathy
- Hypokalaemia
- Digitalis poisoning
- Pericardial disease
- Post cardiac surgery
- Excessive ingestion of caffeine as in tea or coffee

Signs and symptoms

- Palpitations (an awareness of the heart beat)
- Dizziness
- Syncopal attacks
- Chest discomfort
- Dyspnoea
- Headache
- Sudden death
- Patients with intermittent arrhythmias may have a normal cardiac rhythm on presentation. However, during an arrhythmia, examination of the peripheral pulse and the heart may give an accurate diagnosis.
- Pulse rhythm and volume are irregularly irregular in atrial fibrillation, and the rate of cardiac activity when counted (by auscultation over the heart) exceeds the pulse rate.
- In Extrasystoles, the pulse is regular, but missed beats may occur either at regular or random intervals.
- In paroxysmal supraventricular tachycardia, the pulse rate is usually fast and regular between 140 and 220 beats a minute.
- In complete heart block the pulse is slow (30 to 50 beats a minute), and regular.

Investigations

- Electrocardiography
- Serum urea, electrolytes and creatinine
- Echocardiography
- Chest radiograph
-

Treatment objectives

- Control heart rate
- Restore sinus rhythm
- Prevent or treat associated complications
- Treat the underlying condition

Non–pharmacological treatment

- Reassure the patient
- Avoid excessive intake of alcohol, coffee or tea (if these are the precipitating factors)
- Massaging the carotid sinus on one side for a few seconds may terminate an attack of paroxysmal supraventricular tachycardia

Pharmacological treatment

- It will be dangerous to use an antiarrhythmic drug without doing an ECG
- Refer symptomatic patients to hospital immediately
- The choice of drug treatment depends on the type of arrhythmia and severity of symptoms

Atrial Flutter

See section on atrial fibrillation
- Treatment for atrial flutter is the same as for atrial fibrillation
- Precipitating conditions such as thyrotoxicosis should be treated

Pregnancy
- The treatment of foetal arrhythmias is possible by either treating the mother or treating the foetus directly.
- Antiarrhythmic agents that have been used to treat foetal arrhythmias include digoxin, beta-blocking agents, verapamil, procainamide and quinidine.
- ***Warfarin is best avoided in the first trimester and before labour.***

Referral
- Refer all patients for specialist evaluation

Atrial Fibrillation

A cardiac arrhythmia characterised by an irregular pulse which is usually rapid ventricular rate due to the loss of the normal atrial electrical activity.

Risk Factors
High-risk factors
- Prior stroke or transient ischemic attack (TIA)
- Systemic thromboembolism
- Age 75 years or older

Moderate-risk factor
- Age 65-74 years
- Female sex
- Hypertension
- Diabetes mellitus
- Heart failure
- Arterial disease (previous myocardial infarction, peripheral arterial disease, aortic plaque)
- Hyperthyroidism

Causes
- Exact mechanisms are not fully understood

Signs and symptoms
- May be asymptomatic
- Irregular pulse
- Palpitations, dizziness, fainting, chest pain, shortness of breath
- Heart failure or pulmonary oedema
- Embolic stroke
- Cardiogenic shock

Investigations
- Electrocardiography
  - Irregular ventricular complexes
  - Absence of normal p waves
  - Heart rate usually over 110 beats per minute
  - Left ventricular hypertrophy
  - Bundle branch block
  - Intraventricular conduction delay
  - Evidence of acute or previous MI
- Transthoracic electrocardiography if available

Treatment objectives
- Control heart rate
- Restore normal rhythm if possible (specialist only)
- Prevent or treat complications
- Treat underlying conditions

Pharmacological treatment

Antiplatelet

- For patients with NO risk or one moderate risk factor:

Acetylsalicylic acid oral
75-300 mg once daily

Anticoagulation

For patients with one or more moderate risk factors, or any high-risk factor or CHADSVASc Score

Low molecular weight heparin SC
1 mg/kg subcutaneously, twice daily.

Concomitantly begin:

Warfarin oral
5 mg orally daily, to achieve INR of 2-3

Rate control:

Digoxin oral
125-375 microgram orally daily

Beta-blocker

Atenolol oral
50-100 mg orally daily

Calcium channel blocker

Verapamil oral
40-120 mg daily

Rhythm control: external cardioversion

- Treat cardiac failure and other complications
- Provide supportive care and patient education

Refer for specialist care

Pulmonary Oedema

Occurs when there is congestion of the lungs with fluid, resulting in stiffness of the lungs and flooding of the alveoli, with difficulty in breathing. May be acute or chronic and may result from cardiac or non-cardiac causes.

Cardiac causes

- Cardiac failure
- Myocardial infarction
- Cardiomyopathy
- Valvular heart disease (mitral stenosis or regurgitation)
- Cardiac arrhythmias
- Left to right shunts

Non-cardiac causes

- Acute respiratory distress syndrome (ARDS)
- Pancreatitis
- Head injury
- Aspiration of gastric contents
- Amniotic fluid embolus
- Fluid overload
- High altitude pulmonary oedema (HAPE)
- Transfusion-related acute lung injury (TRALI)

- Neurogenic pulmonary oedema
- Opioid overdose
- Salicylate toxicity

Conditions predisposing to Acute Respiratory Distress Syndrome (ARDS) includes:
- Systemic sepsis – particularly gram negative infection
- Shock
- Trauma (fat embolism, lung contusion)
- Liquid aspiration (e.g. acid, drowning)
- Drug overdose (e.g. heroin, barbiturates)
- Inhaled toxins (e.g. chloride gas)
- Haematological disorders (e.g. DIC, massive blood transfusions, post cardiopulmonary bypass)
- Metabolic disorders (e.g. uraemia, hepatic failure)
- Miscellaneous (e.g. increased intracranial pressure, eclampsia, pancreatitis, paraquat poisoning)

Signs and symptoms

Common presentation:

Cardiac causes	*Non-cardiac*
- May be hypertensive or present with shock - Clinical evidence of cardiac disease or in ECG - Signs of cardiac failure e.g. Bibasal crackles - Gallop rhythm on auscultation - ↑JVP, oedema, tender hepatomegaly - Pulmonary capillary wedge pressure > 20 mmHg	- Evidence of underlying disease - Usually hypotensive and hypokalaemia - Cardiac failure not evident - Pulmonary capillary wedge pressure < 10 mmHg

- Other include: dyspnoea, tachypnoea, orthopnoea, cough productive of frothy (sometimes pink) sputum, central cyanosis, features of respiratory failure

Investigations

- Chest radiograph
- Electrocardiography
- Echocardiography
- Arterial blood gases
- Blood urea, electrolytes and creatinine
- ***D-Dimer***

Initial treatment

- Maintain airway
- Bed rest in Fowler's position except if hypotensive or comatose
- Administer oxygen to keep arterial oxygen > 60 mmHg (O2 saturation > 90%)
- Correct acid-base and electrolyte derangement
- Treat arrhythmias

Cardiac Failure	*Non-cardiac (ARDS)*

- Furosemide 20-80 mg IV; may be repeated in 10 - 15 minutes - If symptoms persist: - Morphine 1-3 mg IV diluted - Inotropic support if hypotensive: Dobutamine 2-20 microgram/kg/min - Intravenous vasodilator: Nitroglyceride if SBP us > 100 mmHg	- Treat the underlying conditions - Ventilate with PEEP – if in respiratory Failure (RF) - Inotropic support if SBP is <90 mmHg - Dialysis if in renal failure

Note

- Echocardiography is mandatory if available

Referral

- All cases of suspected pulmonary oedema should be referred to a specialized centre with high dependency unit or ICU.
- Patient should be stabilized before referral.

Skin diseases

Bacterial skin diseases

Impetigo

A very superficial and highly contagious bacterial infection of the epidermis (upper/outer layer of skin).

Causes

- Streptococcus species (usually *pyogenes*)
- Staphylococcus aureus

Signs and symptoms

- Blisters and sores on the skin and scalp.
- Superficial pustules or blisters which become oozing with yellow crusts as it spread

Differential diagnosis

- Pemphigus
- Herpes simplex

Investigations

- Skin swab for gram stain, culture and sensitivity (exudate from unroofed lesion)

Treatment objectives

- Treat infection
- Treat underlying pruritic dermatoses
- Prevent complications

Non–pharmacological and pharmacological treatment

Lesions are mild and localized

- Clean lesion with

Chlorhexidine/cetrimide diluted 1 in 20ml

OR

Betadine solution **or saline**

OR
Wash with **betadine** shampoo
Hydrogen peroxide 2%

For wet lesions
Gentian violet 0.5% - apply every 12 hours for 3 days
- Keep skin clean by frequent washing and drying
- Use soap and water to soften, and gently remove

For single or few lesions
1st line treatment
Bacitracin cream 500IU apply three times a day for 10 days

2nd line treatment
Fusidic acid 5% ointment
Apply three times a day for 10 days

N**eomycin topical**
Apply three times daily for 10 days

For lesions, widespread, complicated or associated with systemic features (fever, malaise, diarrhoea)

1st line treatment
Amoxicillin-clavulanate oral
400mg/57mg 12hrly

2nd line treatment
- If there is no improvement with the first line
- Patient is allergic to penicillins

Azithromycin oral
Child:
10mg /kg once daily for 3 days
Adult:
500mg once daily for 3 days

OR
Erythromycin oral
Child: 30-50mg/kg/day 2-3 divided doses for 7 days
Adult: 3g/kg in 3 divided doses for 7 days

Note: Impetigo is contagious until the lesions have dried up

Prevention
- Proper hygiene with use of antiseptic soap

Referral
- Refer conditions not responding to the above treatment to a specialist.

Folliculitis

Folliculitis is an inflammation of the hair follicles.

Causes
- Staphylococcus aureus and/or streptococci

Signs and symptoms
- Pain, pustules, Acne
- Multiple pustular lesions on the beards (folliculitis barbae)
- Multiple pustular lesions at times on the back of the neck (folliculitis nuchae)

Investigations
- No specific investigation is needed

- In cases resistant to standard therapy, Gram stain, cultures, potassium chloride (KOH) preparation, and biopsy are the diagnostic tests of choice.

Treatment objectives
- Relieve pain
- Enhance the cosmetic appearance of the patient

Non-pharmacological and pharmacological treatment
- Bath affected parts with antiseptic soap/solution and water

In case of acne, folliculitis barbae, folliculitis nuchae,
Benzoyl peroxide 5% gel
Apply every night

OR
Calamine lotion
Apply for itchiness

In case of severe (nodulocystic) acne
Doxycycline oral
Adult:
100mg once a day for 2 – 4 weeks

Cloxacillin oral
Adult:
3g/day in 3 divided doses
Child:
<10yrs: 50mg /kg in 3 divided doses

Erythromycin oral
Adult
3g/day in 3 divided doses
Child:
30-50mg/kg/day

Prevention
- Personal hygiene with use of antiseptic soap

Referral
- Refer all cases not responding to above treatment to a specialist.

Furunculosis and Carbuncles

A boil or furuncle is a deep-seated infection of the hair follicles with a walled-off collection of pus. A carbuncle is a cluster of interconnected furuncles.

Causes
- Mostly caused by Staphylococcus aureus

Signs and symptoms
- Purulent swellings on the skin in single or multiple areas of skin
- Swellings may be warm and/or tender
- Pain, swollen lymph nodes, fever

Differential diagnosis
- Folliculitis
- Cutaneous myiasis
- Acne
- Epidermal cyst

Investigations
- No specific investigation is needed

- Swab of exudate or discharge for gram stain, microscopy, culture and sensitivity
- If recurrent, screen for diabetes mellitus, HIV infection

Treatment objectives
- Treat infection
- Correct predisposing factors
- Prevent complications

Non-pharmacological treatment
- Consider incision and drainage
- Intermittent hot compresses

Pharmacological treatment

For treatment of infection

1st line treatment
Flucloxacillin
Adult:
500 mg oral every 6 hours for 5-7 days
Child:
up to 2 years: 125mg every 6 hours
2-10 years: 250mg every 6 hours

OR
Erythromycin oral
Adult:
500 mg four times a day for 5 – 7 days
Child:
up to 2 years: 125mg every 6 hours
2 – 8 years: 250 mg every 6 hours

2nd line treatment
Doxycycline oral

Adult:
100mg every 12 hours for 7days

For pain relief
Paracetamol oral
Adult:
1 g 3 – 4 times a day as required
Child:
> 3years: 250mg every 6-8 hours
< 3years: 125 mg every 6-8 hours

Prevention
- Personal hygiene with use of antiseptic soap

Referral
- Refer all cases not resolving with the above treatment to a specialist

Erysipelas

Erysipelas is an acute superficial dermal bacterial infection, which can extend into superficial cutaneous lymphatics.

Cause
- Streptococci, Staphylococcus aureus

Signs and symptoms
- Growing redness and swelling of affected area
- Fever
- Painful, enlarged regional lymph nodes

Differential diagnosis
- Lymphedema
- Acute osteomyelitis
- Deep vein thrombosis (DVT)
- Blunt trauma/fracture
-

Complications
- Gangrene
- Abscess
- Scarring
- Chronic oedema
- Bacterial sepsis

Investigations
- Blood culture and susceptibility tests
- Blood glucose (to screen for diabetes)

Treatment objectives
- Relieve pain
- Treat predisposing factors
- Limit the spread of the infection
- Prevent complications

Non-pharmacological/pharmacological Treatment

- Hydration (oral intake if possible)
- Cold compresses
- Elevation and resting of the affected limb to reduce pain and local swelling
- Apply saline wet dressings to ulcerated and necrotic lesions every 12 hours
- Debridement of the necrotic lesions

First line Treatment
Penicillin V oral
Adult:
250mg oral every 6 hours for 5-7 days
Child:
125-250mg every 6 hours for 5-7 days)

Note:
To be taken on an empty stomach

OR
Erythromycin oral
Adult: 500mg four times a day for 5-7 days.
Child:
Up to 2 years: 125mg
2 – 8years: 250mg

For pain:
Paracetamol oral
Adult:
1 g 3 – 4 times a day as required
Child:
<3years: 125 mg every 6 hours
>3years: 250mg every 6 hours)

Prevention
- Personal hygiene with use of antiseptic soap

Referral
- Refer all non-resolving cases to a specialist

Cellulitis

A suppurative bacterial infection of the skin and soft tissue, often with involvement of underlying structures: fascia, muscles and tendons

Causes
- Mostly caused by Staphylococcus aureus and Streptococcus pyogenes
- Less common causes include anaerobic bacteria, mycobacteria, proteus, pseudomonas

Signs and symptoms
- Growing redness and swelling of affected area, with pitting
- Fever
- Painful, enlarged regional lymph nodes
- Systemic signs of toxicity

Differential diagnosis
- Erysipelas
- Deep vein thrombosis

Investigations
- Blood culture and susceptibility tests
- Full blood count with differentials
- Fasting blood glucose
- HIV screening

Treatment objectives
- Eradicate infection
- Treat underlying cause(s) of immunosuppression if present
- Prevent complications

Non pharmacological/pharmacological treatment

- Cold compresses
- Elevation and rest of the affected limb to reduce pain and local swelling
- Apply saline wet dressings to ulcerated and necrotic lesions every 12 hours
- Debridement of the necrotic lesions

First line Treatment
Penicillin V oral
Adult:
250mg oral every 6 hours for 5-7days
Child:
125-250mg every 6 hours for 5-7days

Note:
Should be taken on an empty stomach

OR
Flucloxacillin oral
Adult: 250-500 mg every 6 hours for 7 days
Child:
5-12 years: 250 mg every 6 hours for 7 days
1-5 years: 125 mg every 6 hours for 7 days
<1 year: 62.5 mg every 6 hours for 7 days

In patient allergic to penicillin:
Erythromycin oral
Adult:
500mg four times a day for 7-10 days.
Child:
Up to 2 years 125mg
2 – 8years: 250mg for 5 days

For pain give
Paracetamol oral
Adult:
1 g three to four times a day as required
Child:
<3years: 125 mg every 6-8 hours

>3years: 250mg every 6-8 hours

Referral
- Refer patient to dermatologist if no improvement

Abscess

Abscess is a collection of pus

Cause
- Staphylococcus aureus.

Signs and symptoms
- Painful pus-filled nodule
- Inflammatory erythematous plaque
- Fluctuant palpable swelling
- Fever is rare
- Lymphangitis and satellite nodes may be present.

Non-pharmacological/ pharmacological treatment

Placing hot compresses over the swelling until it breaks
Erythromycin oral
Adult:
500mg every 8 hours for 7–10 days
Child:
25–50mg/kg every 8 hours for 7–10 days

OR
Flucloxacillin oral
Adult:
500mg every 6 hours for 7–10 days
Child:
25mg/kg every 6 hours for 7–10 days

Surgical Treatment:
- Incision and drainage

Paronychia

Paronychia is a painful infection that usually occurs at the nail fold. It may occur after injury or minor trauma.

Causes and Types
- **Acute:** Painful and purulent condition; most frequently caused by Staphylococcus *aureus*
- ***Chronic:*** Usually caused by fungal infection

Signs and symptoms
- Painful nail
- Redness and swelling at the affected area

Diagnosis
- Diagnosis is clinical
- Swabs or scrapings of the nail fold for microscopy, culture and sensitivity if diagnosis is uncertain
- Potassium hydroxide (KOH) 5% smears - for diagnosis of paronychia caused by candida infection

Treatment objectives
- Relieve pain
- Prevent complications

Pharmacological treatment

Acute Paronychia
Amoxicillin 500mg with **clavulanic acid** 125mg oral
500mg/125mg every 8 hours for 14 days.

OR
Penicillin V oral

500mg every hours for 7-14 days

Chronic Paronychia (commonly due to fungal infection)
Clotrimazole cream 1%
Apply topically every 12 hours for 14 days

PLUS
Ketoconazole oral
200mg once daily for 14 days
Note: For both acute and chronic paronychia, incision and drainage may be needed

Referral
- If infection persists refer to a specialist

Fungal Skin Infection

Tineas

Is a superficial fungal infection, most common on the exposed surfaces of the body, face, nails, head and feet. They are not very infectious but are usually recurrent.

Cause
- *Trichophyton mentagrophytes* or *T. rubrum, Epidermophyton, Microsporum*

Body parts affected	Features
Tinea capitis	Bald, scaly patches with hairs broken off when very short The lesion may sometimes be inflamed with multiple pustules (pockets of pus) Especially in children and immunosuppressed
Tinea corporis (ringworm)	Single or multiple plaques on the face, trunk or limbs Well demarcated, scaly and raised border with relatively clear centre Pruritus
Tinea/pityriasis) versicolor	A chronic fungal infection of large areas of skin Well-defined round/oval patches Pale or discoloured spots on the skin, e.g., chest, back, face Not scaly, but peels off when scratched Rare in children, onset usually around puberty
Nails (Onychomycosis)	Thickened, discoloured nails, can be white, yellow, green, or black Brittle nails that break easily
Tinea pedis (Athletes' foot)	White scaling usually between the 4th and 5th toes or between the 3rd and 4th toes on one foot only Scales, vesicles, cracks Burning or itching between toes and under foot especially when shoes and socks are removed May be secondary infection

Differential diagnosis
- Seborrheic dermatitis, eczema, contact dermatitis
- Alopecia areata
- Jiggers, hookworm
- Candida
- Cellulitis
- Psoriasis
- Maceration from tight footwear

Investigations

- Scales from the active edge of the lesions are scraped off, placed in 10-20% potassium hydroxide (KOH) for 30minutes, and examined microscopically for mycelia
- Culture of specimen on Sabouraud's agar

Pharmacological treatment

Tinea capitis
Clotrimazole 1% cream
Apply two times daily for 2 weeks

OR
Ketoconazole 2% cream
Apply two times daily for 2 weeks

OR
Imidazole cream

OR
To accelerate clearing of scaly lesions
Benzoic acid + salicylic acid ointment

If extensive

ADD
Griseofulvin oral
Adult
500mg-1g once a day for 2-4 weeks
Child
10-20mg/kg once a day for 2-4 weeks

In severe cases treat for up to 3months

OR
Fluconazole oral
Adult
200mg once daily for 4-6 weeks
Child
3-6mg/kg once a day for 4-6 weeks

Tinea corporis (ringworm)
Benzoic acid + salicylic acid (Whitfield ointment)
Apply every 12 hours until 2 weeks after lesions clear

Clotrimazole 1% topical
Apply cream twice a day

OR
Miconazole 2% cream
Apply every 12 hours for 2-3 weeks

If topical treatment fails
Griseofulvin oral
10 mg/kg in 2 divided doses for 4-6 weeks

Pityriasis versicolor
Clotrimazole cream
Apply every 12 hours until lesions disappear

OR
Miconazole 2% cream
Apply every 12 hours for 2-3 weeks

If topical treatment fails
Fluconazole oral
300 mg once weekly for 2 weeks

OR
Ketoconazole oral
400mg single dose or 200mg daily for 5 consecutive days

Nails (Onychomycosis)
Griseofulvin oral
10 mg/kg per day as single dose once daily after meals for 6-12 months

Tinea pedis (Athletes foot)
Clotrimazole cream
Apply every 12 hours and continue for 14 days after the lesions have healed

OR
Miconazole cream
Apply every 12 hours and continue for 14 days after the lesions have healed

Apply **powder** (not necessarily medicated) to the feet rather than to the shoes

For persistent or non-responsive infection
Griseofulvin oral
10 mg/kg /day as single dose once daily after meals for 4-6 weeks

Prevention
- Clean all contaminated objects, e.g., combs, brushes
- Avoid sharing combs, towels, clothes, etc.
- Advise patient on the need to comply with treatment
- Personal foot hygiene: keep feet clean and dry and wash socks daily
- If patient has repeated fungal infections, refer for HIV counselling and testing

Referral
- If infection persists refer to specialist

Candidiasis

Candidiasis is a fungal infection caused by yeasts, **Candida *albicans***.

Types
- Mouth or throat thrush or oropharyngeal candidiasis
- Vaginal

Signs and symptoms of oropharyngeal candidiasis	***Signs and symptoms of vaginal candidiasis***
- White patches on the inner cheeks, tongue, roof of the mouth, and throat - Redness or soreness, loss of taste - Cotton-like feeling in the mouth - Pain while eating or swallowing - Cracking and redness at the corners of the mouth	- Vaginal itching or soreness - Pain during sexual intercourse - Pain or discomfort when urinating - Abnormal vaginal discharge

For more information on candidiasis treatment, refer to STI Chapter

Mycetoma (Madura Foot)

Mycetoma is a disease caused by certain types of bacteria and fungi found in soil and water.

Cause
- Bacteria (actinomycetoma) or fungi (eumycetoma).

Signs and symptoms
- Both appear as firm, painless masses under the skin foot but can form anywhere on the body.
- Oozing sores, and cause the affected limb to become deformed or unusable

Complications
- Long-term mycetoma can lead to muscle and bone damage.

Investigations
- Macroscopic and microscopic examination of the grains discharged from sinuses
- Biopsy
- Ultrasound scan of the affected foot

- Radiograph of the affected foot

Non-pharmacological treatment
- Use of appropriate footwear

Pharmacological treatment

Treatment of Actinomycetoma (bacteria form)
Co-trimoxazole oral
480mg–960mg every 12 hours for 5 weeks

PLUS
Dapsone oral
Adults:
100 mg once a day for 4–6 months;
Child:
25–50 mg once a day for 5 weeks

Treatment of Eumycetoma (Fungi form)
Griseofulvin oral
10mg/kg daily as a single dose for 4 weeks or longer

Referral
- In complicated cases refer for specialist care

Scabies

- Is a contagious skin disease associated with severe itching

Cause
- Sarcoptes *scabies*.

Signs and symptoms
- Itchy vesicles and papules
- Short elevated serpiginous (S-shaped tracks in the superficial epidermis (burrow)
- "Norwegian" scabies presents with extensive crusting (psoriasis-like lesions) of the skin with thick, hyperkeratotic scales overlying the elbows, knees, palms, and soles

Differential diagnosis
- Papular urticaria
- Atopic or seborrheic dermatitis
- Drug eruptions
- Onchocerciasis

Investigations
- Microscopic identification of mites, their eggs or faeces obtained from the vesicles or mite burrows

Treatment objectives
- Relieve symptoms
- Prevent spread and recurrence of the infection.

Non-pharmacological treatment
- Good personal hygiene
- Avoid sharing personal items and toiletries

Pharmacological treatment

After normal bathing apply
Gamma benzyl benzoate 1% lotion
Apply from neck downwards twice a day and wash off after 24 hours.

Caution
- In pre-pubertal children, the lotion should be washed off after 12 hours.
- Hot baths and scrubbing should be avoided to prevent systemic absorption.

Alternative in pregnancy, lactating mothers or children < 6 months

Benzyl benzoate 25% emulsion

- Apply form neck downward once at night for 3 nights.
- Wash off the next morning.
- Repeat if necessary, within 10 days.

Note:
Child: Dilute with one-part water (1:1)
Infant: Dilute with three parts water (1:3)

OR
Sulphur ointment 10%
Apply twice a day for 1 – 2 weeks

To relieve itching
Calamine lotion apply as needed

PLUS
Chlorpheniramine oral
Adult
4mg three times a day for 5 days
Child
0.1mg/kg

If above treatment is ineffective or unsuitable give

Ivermectin oral
Two doses of oral **Ivermectin** (200µg/kg/dose) should be taken with food, each approximately one week apart

Note:
Avoid in pregnancy, and in children <15 kg

Pediculosis (Lice)

Infestation by lice, usually in the hairy parts of the body. Usually found on the scalp, armpits, chest or pubic area.

Causes
- Pediculosis *humanus* (capitis, corporis, pubis)

Signs and symptoms
- Severe itching of affected areas, scratch marks
- Nits (white eggs) attached to hairs
- Visible lice
- Secondary bacterial infection and eczemas

Differential diagnosis
- Seborrheic dermatitis

Investigations
- Diagnosis is clinical

Non-pharmacological/pharmacological treatment
- Shave the affected area
- Apply pediculicide to kill lice

Benzyl benzoate lotion 25%
Apply lotion and leave on overnight

Child
2-12 years: dilute the lotion with an equal part of water before application
<2 years: dilute 1 part of lotion with 3 parts of water, leave on for 12 hours.

Note:
- Apply **ONLY** once
- Comb with a fine-toothed comb if not shaved

Note

Head lice

- Do not use undiluted **benzyl benzoate** lotion in children <2 years. It is very irritant to the eyes
- If the head is not shaved, ensure that the **benzyl benzoate** lotion is massaged well into the scalp

Pubic lice

- Treat all sexual partners at the same time

Tungiasis (jiggers)

Burrowing, fungal infestation of the feet, hands, elbows, and sometimes buttocks.

Cause

- Sand flea, *Tunga penetrans*

Signs and symptoms

- Punctum or ulceration, often described as a white patch with a black dot on affected area
- There may be redness and swelling around affected site
- A serosanguineous exudate may ooze from the central opening, and eggs may be seen with the naked eye
- Lesions can be painful and very itchy
- Loss of toe nails and deformed toes

Differential diagnosis

- Cercarial dermatitis
- Scabies
- Creeping eruption (ancylostoma species)
- Tick or flea bite - myiasis

Complications

- Tissue necrosis, suppuration, gangrene
- Disfigurement, disability

Investigations

- Diagnosis is clinical

Treatment objectives

- Treat the infection
- Prevent complications

Non-pharmacological/pharmacological Treatment

Self-healing

In many cases tungiasis will heal on its own as the burrowed flea dies within 2–5 weeks, and naturally sloughs off as the skin sheds

Surgical removal

Physical removal of the flea using sterile forceps, or needles, or safety pins

Medicine treatment and suffocation of flea

Apply **benzyl benzoate** 25% emulsion twice daily
to the affected area for 6 days

OR

Apply **calamine** lotion to relieve pruritis

Immerse affected area in **potassium permanganate** 0.05% once a day for 10 minutes for 10 days
Then follow with application of thick **petroleum jelly** or 20% **salicylated petroleum jelly** (Vaseline) daily for 7 days

Cutaneous Larva Migrans (Creeping Eruption)

Creeping eruption is a skin infection caused by hookworms, also called sandworm disease.

Signs and symptoms

- Winding, snake-like rash

- Itching
- Blisters

Investigations
- Diagnosis is clinical

For treatment detail on Cutaneous Larva migrans refer to Worm Infestations Chapter

Viral infections

Herpes Simplex

Is a viral infection transmitted by direct contact, which is characterized by a localized primary lesion, latency, and recurrence. Lesions can be oral (lips, oral mucosae) or genital.

Cause
- Herpes simplex virus types 1 and 2

Oral herpes infection:
- Caused by HSV-1
- Mostly asymptomatic
- Painful blisters or open sores called ulcers in or around the mouth
- Sores on the lips ("cold sores.") with tingling, itching or burning sensation around the mouth, before the appearance of sores.

Genital herpes
- Caused by HSV-2
- May be asymptomatic.
- There may be one or more genital or anal blisters or ulcers**.**

Differential diagnosis
- Aphthous ulcers
- Other causes of genital ulcer e.g. syphilis

Complications
- Keratitis (eye infection)
- Encephalitis

Investigations
- Diagnosis is clinical
- Swabs **of blister fluids for viral studies**

Treatment objectives
- Relieve itching
- Treat infection
- Prevent complications

Pharmacological treatment

For adults and adolescents with a first clinical episode of genital HSV infection
Clean lesions with antiseptic, e.g. **chlorhexidine solution** 0.05%

OR
Diluted **hydrogen peroxide solution** 6%

In severe or extensive infection
Acyclovir oral

Adult:
400 mg every 8 hours by mouth for 10 days
Child:
100-200 mg 5 times a day for 5-7 days

Dosages for pregnant women:
Acyclovir oral
400 mg orally thrice daily for 5 days
OR

800 mg twice daily for 5 days,

Dosages for people living with HIV and people who are immunocompromised:
Acyclovir oral
400 mg orally thrice daily for 5 days

Prevention
- Promote personal hygiene
- Avoid direct contact with infected people
- Advise patients to use condoms as applicable

Referral
- Refer patient for specialist care

Herpes Zoster (Shingles)

Is an infection that results when Varicella-zoster virus reactivates from its latent state in the posterior dorsal root ganglion.

Signs and symptoms
- Pre-eruptive pain, itching or burning: generally localized to the dermatome, precedes the eruption by 4-5 days.
- Followed by characteristic crops of very painful vesicles on the dermatome
- Multi-dermatomal and disseminated forms may occur in immunocompromised states, especially in HIV infection
- Mild chills, fever, malaise, headache etc.

Differential diagnosis
- Chicken pox

Complications
- Pain may persist long after rash has healed (post herpetic neuralgia)
- Dissemination of infection in the immunocompromised
- Haemorrhagic and necrotic lesions

Investigations
- Diagnosis is clinical
- Serology test for HIV

Treatment objectives
- Manage the infection
- Prevent complications

Pharmacological treatment

Symptomatic and supportive treatment
Clean lesions with antiseptic, e.g. **chlorhexidine** solution 0.05%
Or diluted hydrogen peroxide solution 6%

Apply **calamine** lotion 2–3 times daily

For neuropathic pain
Amitriptyline oral
25 mg nocte,

OR
Carbamazepine oral
200 mg nocte as necessary

Acyclovir oral
800 mg 5 times a day for 7-10 days can be given, especially if the disease is diagnosed very early or is disseminated

Prevention
- Protect high-risk individuals (e.g. the immunosuppressed) from direct contact with the disease

If the lesions involve the eye
- Refer to an ophthalmologist (Eye Specialist)

Varicella (Chicken pox)

It is a highly infectious disease caused by Varicella *zoster* virus (VZV)

Signs and symptoms
- Red macular rash with a central vesicle (blister) on the trunk, face, oral mucosa and scalp
- Pustules, crusting; intense pruritus
- Fever, headache, loss of appetite

Complications
- Bacterial infections of the skin and soft tissues in children
- Pneumonia and encephalitis (especially in adults and immunocompromised patients)

Investigations
- Diagnosis is clinical

Treatment objectives
- Reduce morbidity
- Relieve itching and treat secondary bacterial infection
- Prevent complications

Non-pharmacological
- Avoid scratching if possible
- Cut long nails

Pharmacological treatment

Adult:
Apply **calamine** lotion 2–3 times daily to the skin
Paracetamol oral
500 mg–1g every 6-8hrs if necessary, in case of fever.

If lesions are infected, give antibiotics
Adult:
Flucloxacillin oral
500 mg every 6 hours for 5–7 days
Child:
125 – 250 mg every 6 hours for 5–7 days.

Note:
- If patent is allergic to penicillins, give erythromycin

In severe cases of itching, give antihistamines
Promethazine oral
25 mg 1 to 3 times daily

Acyclovir oral
Adult:
200mg/kg (up to a maximum of 800mg) 4-5times daily for 5days
Child:
2yrs of age and older **(40kg or less):**20mg/kg, for 4times a day for 5days

Treat pain and fever
Paracetamol oral
3 months–1 year: 60–120 mg every 6-8hrs if necessary
1–5 years: 120–250 mg every 6-8hrs if necessary
6–12 years: 250–500 mg every 6-8hrs if necessary

- Apply **calamine** lotion 2–3 times daily to the skin
- Give **promethazine** orally to relieve itching

Child:
2–5 years: 5 mg twice daily
5–10 years: 10 mg twice daily
Give antibiotics only if lesions are infected.

Eczema (Dermatitis) Conditions

Contact Dermatitis

Is due to delayed hypersensitivity reaction as a result of skin contact with an irritant

Cause
- The irritant causing the dermatitis may be a dye, perfume, rubber, leather, jewelleries, drugs, lanoline containing skin preparations and others.

Signs and symptoms
- Red papulo-vesicular rash with ill-defined margins
- Itching, which may be severe; dry, cracked, scaly skin - if chronic
- Blisters, draining fluid (weeping) and crusting; with severe dermatitis - swelling, burning or tenderness

Differential diagnosis
- Seborrheic dermatitis, atopic dermatitis
- Psoriasis
- Tinea corporis

Investigations
- Diagnosis is clinical
- Patch test

Treatment objectives
- Relieve itching and other symptoms
- Identify cause(s)

Non- pharmacological treatment
- Avoid contact with known irritant(s)

Pharmacological treatment

Triamcinolone acetonide IM (deep intramuscular injection)
40 mg by deep IM injection for five days.

For non-wet or open lesions keratolytic agents
Diprosalic ointment15/30g
Apply two times daily for 2 weeks days

If wet lesions, then
Betamethasone valerate 0.025% cream
Apply twice daily until skin improves then decrease to once daily

Prevention
- Avoid contact with allergen

Atopic Eczema

This is eczema on the background of atopy and common in children

Cause
- The eczema is often associated with family history of atopy (bronchial asthma, hay fever, or atopic dermatitis)

Signs and symptoms

The clinical presentation depends on the age:

- **Infantile eczema (also called milk crust)** – This normally appears at around 3-4 months of age and is characterized by oozing and crusting normally on the cheeks, forehead and scalp.
- **Flexural eczema:** This atopic eczema normally starts at 3–4 years, and affects the flexural surfaces of elbows, knees and nape of the neck and there is normally thickening and lichenification with severe itching that could be worse at night and tending to confuse it with scabies.

Treatment objectives

- Suppress inflammations
- Relieve itching and other symptoms
- Prevent complications

Non-pharmacological treatment

- Encourage liberal use of emulsifiers, bath oils and soap substitutes

Pharmacological treatment

Antihistamines
Promethazine oral
25mg at bedtime
OR
Cetirizine oral
10mg daily, during the day

Emollients
Hydrocortisone 1% ointment
Apply every 12 hours

OR
Betamethasone valerate 0.025% cream or ointment
Apply every 12 hours for two weeks.

Antibiotics if there is bacterial infection
Erythromycin oral
500mg 4 times a day for 7-10 days

Prevention

- Educate parents about the self-limiting course of the disease process and explanation that it could be self-limiting
- Control for, and remove possible precipitating factors such as skin allergens and soap

Referral

- If the eczema worsens with the above treatment, refer for specialist care

Steven-Johnson Syndrome (SJS) and Toxic Epidermal Necrolysis (TEN)

These are potentially life-threatening hypersensitivity reactions that affect the skin and the mucous membranes. SJS affects up to 10% of the body surface area, while TEN affects >30%.

Causes

Most well-known causes are:

- Certain medications such as HIV medication (Nevirapine), anti-TB medications, anticonvulsants e.g. carbamazepine, lamotrigine; sulpha-containing drugs (e.g. co-trimoxazole, allopurinol)
- Infections, especially in immunocompromised persons
- Cause may be unknown (idiopathic)

Signs and symptoms

- Dark macular skin rash, progressing to confluence with epidermal necrosis and large flaccid blisters which rupture, leaving large areas of denuded skin
- Usually sparing the scalp but involving mucosa (genitalia, mouth, anal area, eyes) with multiple erosions
- Fever, malaise

Complications

- Dehydration, electrolyte imbalances
- Hypovolaemia
- Hypoalbuminemia

- Secondary infection and sepsis
- Acute kidney injury

Investigations
- Diagnosis is usually clinical
- Serology for HIV
- Electrolytes, urea and creatinine
- Swab of exudates for microscopy, culture and sensitivity if indicated

Treatment objectives
- Maintain adequate hydration
- Maintain electrolyte balance
- Prevent secondary infections
- Reduce morbidity
- Prevent complications

Non-pharmacological treatment
- Remove offending medicine or agent
- Stop all medications if possible
- Barrier nursing

Pharmacological treatment
- Supportive care e.g. analgesics for pain
- Intravenous rehydration (with strict intake and output monitoring)
- Appropriate skin care
- Maintain good hygiene
- Provide adequate nutrition
- If eyes are involved, consult eye specialist
- Treat secondary bacterial infection
- There is no strong evidence to support the use of corticosteroids (may increase risk of infection and catabolism)

Prevention
- Avoid unnecessary medications

Refer all patients to hospital

Papulosquamous Disorders

Psoriasis

A chronic recurrent skin disease that affects the scalp, back of the elbows and front of the knees. Psoriasis can have extra cutaneous manifestation (e.g. arthritis)

Causes
- Attributed to genetic, climatic, nutritional, ecological and immunological factors
- Can be precipitated by alcohol, smoking, deficiencies of B12 or folate, stress and infections
- May be unknown

Signs and symptoms
- Red patches of skin covered with thick, silvery scales
- Small scaling spots (commonly seen in children)
- Dry, cracked skin that may bleed, itching, burning or soreness
- Thickened, pitted or ridged nails, swollen and stiff joints

Differential diagnosis
- Fungal infections; mycosis fungoides
- Lichen planus
- Seborrheic dermatitis
- Secondary syphilis
- Medicine-induced eruptions

Investigations

- Diagnosis is largely clinical
- Blood: Serum uric acid, rheumatoid factor, and antinuclear factor
- Histology to rule out other diseases like rheumatoid arthritis, SLE, skin malignancies etc.

Treatment objectives
- Relieve symptoms
- Retard epidermal proliferation
- Reduce inflammation
- Prevent complications

Non-pharmacological treatment
- Remove scales, then apply medicine as below

Pharmacological treatment

Mild cases (lesions <20% of the body)
Give topical steroids, e.g. **betamethasone** cream applied on the lesions once in the morning for 3weeks

Apply **Crude Coal tar** 5% in Vaseline in the morning for two weeks
Severe cases (lesions >20% of the body surface area) ***Refer for specialist care***

Prevention
- Avoid drugs that precipitate/exacerbate psoriasis e.g. lithium, beta-blokers, antimalarials and systemic steroids
- Encourage use of moisturizing lotions
- Ensure appropriate skin and scalp care
- Avoid dry, cold weather.

Referral
- Refer patient for specialist care if no improvement with the above treatment

Lichen Planus

Lichen Planus is an extremely pruritic chronic inflammatory skin condition.

Cause
- Viral infections
- Allergens, stress, genetics
- Mostly autoimmune
- May be unknown

Signs and symptoms
- Purplish, pruritic, polygonal, papules (4Ps) - most often on the inner forearm, wrist or ankle, and sometimes the genitals
- Itching, hair loss
- Blisters that break to form scabs or crusts
- Lacy white patches in the mouth or on the lips or tongue
- Painful sores in the mouth or vagina
- Change in scalp colour, nail damage or loss

Differential diagnosis
- Psoriasis
- Atopic dermatitis
- Pityriasis rosea
- Lupus erythematosus
- Candidiasis

Complications
- 20-nail dystrophy
- Sexual dysfunction

Investigations
- Biopsy and histology
- Serology for Hepatitis C virus

Treatment objectives
- Relieve itching
- Clear lesions and suppress inflammation

- Prevent complications

Non-pharmacological treatment
- Discourage scratching
- Apply cool compresses to the rash

Pharmacological treatment

Antihistamines tablets
Cetirizine oral
10 mg daily for two weeks

PLUS
Keratolytic agents:

Diprosalic ointment or lotion 15/30g
Apply twice daily

OR

Prednisolone oral
20 - 40 mg orally daily for several weeks with reduction of dosage or switch to alternate-day therapy as soon as improvement is seen.

Caution*:* Not recommended for children

Referral
- For recalcitrant cases of lichen planus refer for specialist care

Acne Vulgaris (Pimples)

Acne is a common chronic skin disease involving blockage and/or inflammation of hair follicles and sebaceous glands. It commonly occurs in puberty and adolescence and is associated with hormonal changes.

Causes
Acne develops because of the following four factors:
- Release of inflammatory mediators into the skin
- Follicular hyperkeratinisation with subsequent plugging of the follicles
- Propionibacterium acnes follicular colonization
- Excess sebum production

Signs and symptoms
- Inflammatory papules, pustules and nodules
- Infected parts may be painful
- Cysts and scars in severe cases
- May worsen during menstruation

Differential diagnosis
- Acne rosacea
- Dermatosis papulosa nigra
- Molluscum contagiosum
- Carbuncles

Investigations
- Diagnosis is clinical

Treatment objectives
- Reduce severity of acne
- Prevent complications

Non-pharmacological treatment
- Avoid underlying precipitating factor e.g. stress, groundnuts, chocolate, overuse of ointments on skin, petroleum jelly and steroids
- Encourage a healthy lifestyle – exercise, sunshine exposure, etc.
- Encourage regular and adequate intake of water
- Discourage all forms of handling of acne foci

Pharmacological treatment

Mild to moderate acne without scarring
Benzoyl peroxide 5% solution
Apply once at night for two weeks

OR
Retinoid 0.05% solution
Apply once nocte for two weeks

Note:
- Avoid in pregnant women and women of childbearing age
- Must do a pregnancy test before use
- During drug, use must be on contraceptive method.

Moderate acne with scarring
Doxycycline oral
100mg two times daily for 1–3 month
OR
Erythromycin oral
500mg every 6 hours for 1–3 month during pregnancy

PLUS
Benzoyl peroxide or topical retinoid as above

Acne fulminans
Prednisolone oral
45mg start then 5mg reduction daily

Prevention
- Sunshine is helpful, but avoids sunburn
- Clean face twice daily with mild soap and water, do not use strong soap
- Commercial facial wash cleansers can decrease skin oiliness

Referral
- Refer to dermatologist if no improvement

Urticaria/Papular Urticaria

Is an acute, sub-acute or chronic inflammation of the skin, caused by endogenous or exogenous agents. Urticaria is an itchy skin rash.

Causes
- Endogenous: familial, also associated with other allergic diseases
- Exogenous: agents include sunlight, chemicals, certain foods, insect bites

Signs and symptoms
- Inflammation of skin: transient itching hives and wheals
- Papular urticaria: vesicles, redness, oedema, oozing in site of insect bites

Differential diagnosis
- Fungal and bacterial infections of the skin
- Helminthic infestations

Investigations
- No satisfactory investigations
- Stool: microscopy to exclude worms

Treatment objectives
- Alleviate Signs and symptoms
- Eliminate and treat cause(s)

Pharmacological treatment

Chlorphenamine oral
Adult:
4 mg every 8 hours
Child:

1-2 mg per dose

OR
Promethazine oral
Adult: 25 mg at night. Increase to every 12 hours if necessary
Child: 1 mg/kg daily in 1-2 divided doses

If severe/unresponsive
Prednisolone oral
1 mg/kg orally once a day for 3-5days

Prevention
- Avoid contact with known allergens
- Treat helminthic infections

Referral
- If no improvement with the above drugs refer to dermatologist

Leg Ulcers

Chronic ulcerative skin lesion caused by various aetiologies and often triggered by a minor trauma

Causes/risk factors
- Vascular: venous or arterial insufficiency
- Bacterial: leprosy, Buruli ulcer (by *Mycobacterium ulcerans*) etc.
- Parasitic: guinea worm, leishmaniasis
- Others: diabetes, sickle cell disease, malnutrition

Signs and symptoms
- Often in lower third of the leg
- Ulcerated lesion with necrotic tissue, slough, discharge, oedema around the lesion, scarring
- Features of cellulitis due to secondary infection may be present
- Features of underlying disease

Investigations
- Swab for microscopy culture and sensitivity
- Radiograph of the affected limb
- Blood glucose (Rule out diabetes Mellitus)

Treatment objectives
- De-slough ulcer and promote healthy granulation tissue formation
- Promote healing
- Treat underlying cause(s)

Non-pharmacological/pharmacological treatment

Clean the wound
If exudating/dirty lesions: use **chlorhexidine** solution 0.05% or **hydrogen peroxide** solution 6% or **povidone iodine** 2%

If clean wound: use clean water or normal saline
- Remove necrotic tissue
- Elevate and rest the leg
- Perform daily dressing
- Apply **silver Sulphadiazine** or **povidone iodine** if the wound is dirty and exudative
- Otherwise use gauze moistened with normal saline
- Analgesics for pain if needed

If signs of cellulitis are present:
Treat as per guidelines (for Cellulitis)

Prevention
- Ensure personal hygiene
- Ensure good nutrition
- Avoid trauma

***Referral*:** If the leg worsens refer to specialist for proper care

Hepatic and biliary diseases

Hepatitis

Hepatitis is an inflammation or injury of the liver with multiple causes. It may present as an acute illness with jaundice and altered liver function tests.

Causes

Viral hepatitis	*Non-viral hepatitis*
- Hepatitis A virus (HAV) - Hepatitis B virus (HBV) - Hepatitis C virus (HCV) - Hepatitis D virus (HDV) - Hepatitis E virus (HEV)	- Bacteria - Autoimmune - Parasites - Fungi - Alcohol - Medicines - Toxins - Haemorrhagic fevers (Ebola and Marburg)

Hepatitis virus	*Transmission route*	*Incubation period (days)*	*Serological markers*	*Complications*
HAV	- Oro-faecal	15–50	- Anti-HAV IgM	- Recovery in about 3 months - No chronic phase
HBV	- Sexual - Blood contaminated instruments - Contaminated blood products - Mother to child	30-180	- HBsAg - Anti-HBc - HBeAg	- Fulminant hepatitis - Cirrhosis - Hepatocellular Carcinoma
HCV	- Blood contaminated instruments - Rarely - Sexual - Mother to child	14–180	- Anti-HCV IgM - HCV RNA	- Cirrhosis - Hepatocellular Carcinoma
HDV	- Blood contaminated instruments - Rarely - Sexual - Mother to child	45–160	- HDV-RNA - Anti-HDV IgM	- Fulminant hepatitis - High risk of severe chronic liver disease
HEV	- Oro-faecal	15–64	Anti-HEV IgM	- Fulminant hepatitis - High mortality rate in pregnant women

Signs and symptoms

Acute hepatitis
- May be asymptomatic
- Prodromal phase presents with non-specific and flu-like symptoms
- Fever
- Fatigue
- Malaise
- Abdominal discomfort (right upper quadrant)
- Nausea
- Diarrhoea
- Anorexia

Followed by
- Jaundice
- Dark urine
- Clay coloured stool

Chronic hepatitis
- May be asymptomatic
- Weakness and malaise
- Low grade fever
- Nausea
- Loss of appetite
- Vomiting
- Pain or tenderness over the right upper abdomen
- Jaundice
- Dark urine, severe pruritus
- Enlarged liver

Investigations
- Complete blood count
- Liver function tests
- Serology for Hepatitis A,B,C,D, E
- Abdominal ultrasound scan
- Slide or RDT for malaria parasites

Management

Virus type	*Treatment objectives*	*Treatment*	*Complications*	*Prevention*
HAV	- Reduce symptoms	- Supportive	- Recovery in about 3 months - No chronic phase	- Safe drinking water - Food hygiene - Immunization
HBV	- Reduce symptoms - Prevent complications - Inhibit viral replication	- Acute: supportive - Chronic: interferon-α or tenofovir	- Fulminant hepatitis - Cirrhosis - Hepatocellular Carcinoma	- Safe sex - Screen blood products - Use sterile instruments - HBV vaccination - PEP
HCV	- Decrease replication or eradicate HCV - Prevent disease progression to cirrhosis and hepatocellular	- Acute: interferon-α or peginterferon-α - Chronic: interferonα plus ribavirin or DAAs (cure possible) - Liver transplantation	- Cirrhosis - Hepatocellular Carcinoma	- Safe sex - Screen blood products - Use sterile instruments - No vaccination available - No PEP

Virus type	*Treatment objectives*	*Treatment*	*Complications*	*Prevention*
	carcinoma - Reduce symptoms - Treat extrahepatic complications			
HDV	- Reduce symptoms	- Peginterferon-α PLUS Lamivudine	- Fulminant hepatitis - High risk of severe chronic liver disease	- Safe sex - Screen blood products - Use sterile instruments - HBV vaccination - PEP
HEV	- Reduce symptoms	- Acute: supportive	- Fulminant hepatitis - High mortality rate in pregnant women	- Safe drinking water - Food hygiene

Non-pharmacological management

- Encourage rest and hydration
- Encourage high intake of carbohydrates and vegetable proteins.
- Discourage intake of animal proteins e.g. meat
- Avoid unnecessary medicines, but especially sedatives and hepatotoxic drugs
- No alcohol consumption
- Avoid ferrous a
- Limit vitamin supplements that contain fat soluble vitamins and vitamin C
- Ensure effective infection control measures

Pharmacological management

Hepatitis B Virus (HBV)
Tenofovir oral
300mg once daily

OR
Entecavir oral
0.5mg–1mg once daily

OR
Lamivudine oral
100mg once daily

Hepatitis C Virus (HCV)
Ledipasvir oral
90mg in divided doses orally for 12–24 weeks

PLUS
Sofosbuvir oral
400mg in divided doses for 12–24 weeks

PLUS
Ribavirin oral
600mg–1000mg in divided doses for 12–24 weeks

Referral

- Refer negative results for Hepatitis A & B for vaccination
- Refer all positive cases for specialist care

Amoebic Liver Abscess (ALA)

Amoebic liver abscess is the most frequent extraintestinal manifestation of ***Entamoeba histolytica*** infection

Cause
- Entamoeba histolytica

Signs and symptoms
- Right upper abdominal pain
- Abdominal distension
- Fever
- Cough
- Large tender liver
- Tenderness and/or bulging at right intercostal spaces
- Jaundice
- Dullness to percussion on the right lower zones with right basal crepitation

Investigations
- Stool microscopy for cysts and motile organisms
- Abdominal ultrasound scan
- Chest radiograph
- Liver function tests

Treatment objectives
- To eradicate infection
- To prevent further destruction of liver tissue
- To prevent rupture of abscess into pleural, pericardial or peritoneal space
- To prevent sepsis
- To prevent death

Non-pharmacological treatment
- Therapeutic aspiration of abscess - if large, or when pharmacological therapy fails (for experts only)

Pharmacological treatment

Metronidazole oral
Adults:
800mg orally every 8 hours for 10 days
Child:
10mg/kg (maximum 250mg) orally every 8 hours for 10 days

OR
Tinidazole, oral
Adult: 2g once daily for 3 days (with food)
Child: 50-60mg/kg daily for 5 days (with food)

FOLLOWED BY:
A luminal amoebicidal agent to eradicate the intestinal carriage:

Diloxanide furoate oral
Adult:
500mg orally every 8 hours for 10 days.
Child:
6–7mg/kg (maximum 500mg) orally every 8 hours for 10 days

Prevention

- Avoid eating unpeeled fruits or uncooked vegetables have a potential risk of contamination by *Entamoeba histolytica* cysts in endemic regions
- In areas with high concentration of amoeba, water should be boiled before use, as chlorinated water may not adequately prevent infection.

Referral
Patients with abscesses that are large or not responding to treatment will need to be referred to a surgical specialist.

Liver Cirrhosis

Cirrhosis is a condition caused by chronic damage to the liver and replacement of some destroyed hepatocytes with fibrous tissue. It is most commonly caused by excessive alcohol consumption or hepatitis C infection. The progression of liver injury to cirrhosis may occur over weeks to years.

Causes
- Alcohol,
- Hepatitis B and C
- Non-alcoholic fatty liver disease
- No known aetiology in up to 30% of cases

Signs and symptoms
- Fatigue
- Pruritus
- Pedal oedema
- Bruise easily
- Jaundice
- Abdominal fluid up (ascites)
- Pedal oedema
- Spider angioma
- Hematemesis
- Hepatosplenomegaly
- Liver may be shrunken or enlarged
- Hormone disorders e.g. gynecomastia, hypogonadism, erectile dysfunction

Differential diagnosis
- Granulomatous lesion of the liver
- Primary or secondary neoplasms of the liver

Complications
- Portal hypertension
- Spontaneous bacterial peritonitis
- Hepatic encephalopathy
- Dilated veins in the oesophagus
- Liver cancer
- Hepato-renal syndrome
- Intractable oedema
- Coagulopathy
- Upper gastrointestinal tract bleeding
- Decompensated cirrhosis

Investigations
- Blood tests
- Liver biopsy
- Liver function tests
- Serum albumin
- Ultrasound of the liver
- Screening for Hepatitis B and C

Treatment objectives
- Prevent further liver damage

- Possibly achieve regression of cirrhosis.
- Eliminate aetiologic agent
- Treat complications

Non-pharmacological treatment
- Encourage high fibre
- Encourage low salt diet
- Low protein diet
- Enhance opening of bowel

Pharmacological treatment
- Treat/eliminate causative factors
- Give supplemental Vitamin B complex
- Treat complications (see sections)

Prevention
- Vaccination (such as hepatitis B and C)
- Avoid hepatotoxic substances (e.g., alcohol, medication)

Referral
- Refer decompensated severe cirrhosis for possible liver transplant (definitive treatment)

Ascites

Ascites describes the condition of abnormal fluid collection within the abdominal cavity. It is a common complication of diseases presenting with portal hypertension such as liver cirrhosis, acute liver failure.

Causes
- Liver cirrhosis
- Cancer
- Heart failure
- Pancreatitis
- Tuberculosis
- Pancreatitis
- Conditions that cause blockage of the hepatic vein such as portal hypertension, acute liver failure
- Kwashiorkor (childhood protein-energy malnutrition)

Signs and symptoms
- Progressive abdominal distension resulting in:
  - Early satiety
  - Weight gain
  - Dyspnoea
  - Features of malnutrition

- Signs of underlying disease
  - Enlarged liver
  - Jaundice
  - Erythema
  - Weight loss
  - Spider angioma
  - Jugular venous pressure

Differential diagnosis
- Cirrhosis
- Portal hypertension
- Acute liver failure
- Biliary dysfunction
- Hepatocellular adenoma
- Hepatorenal syndrome
- Nephrotic syndrome
- Viral hepatitis

Complications
- Spontaneous bacterial peritonitis
- Hepatorenal syndrome
- Hyponatremia

Investigations
- Abdominal ultrasound scan
- Diagnostic paracentesis - biochemistry, microbiology, cytology

Treatment objectives
- Relieve symptoms
- Reduce morbidity
- Prevent complications
- Correct sodium imbalance

Non-pharmacological treatment
- Therapeutic paracentesis - to relieve abdominal pressure from ascites
- Low sodium diet - not more than 2000 mg/day in outpatient setting and 500 mg/day in patients on admission
- Avoid overhydration
- Peritoneovenous shunt - alternative for patients with medically intractable ascites

Pharmacological treatment

- Treat the underlying conditions
- Diuretics:

Spironolactone oral
25 - 400 mg orally every 12 hours daily

In cases of massive ascites

ADD
Furosemide oral
20-80 mg every 12 hours

To prevent variceal bleeding (associated with portal hypertension)
Propranolol oral
40-80 mg orally once daily

Referral
- Refer all patients with ascites especially those that are medically intractable to the specialist

Hepatic encephalopathy (HE)

HE is a syndrome characterised by neuropsychiatric abnormalities resulting from severe liver disease such as cirrhosis. In hepatic dysfunction, there is inadequate elimination of metabolic products resulting in the accumulation of neurotoxic metabolites. More than 40% of people with cirrhosis develop hepatic encephalopathy

Causes
- Accumulation of neurotoxic metabolites like ammonia
- Renal failure
- Gastrointestinal bleeding
- Infection
- Constipation
- Medications may worsen HE (CNS depressants such as opiates, benzodiazepines, antidepressants, and antipsychotic agents
- Diuretic therapy

Signs and symptoms

Grade	*Symptoms*	*Signs*
Grade 0	Mild decrease in intellectual ability and coordination	– Inability or difficulty to build, assemble, or draw objects. – Increased risk of traffic accidents
Grade 1	Trivial lack of awareness	– Altered performance of addition or subtraction – Shortened attention span – Insomnia, or inversion of sleep pattern
Grade 2	Lethargy or apathy	– Disorientation for time or place

Grade 3	Somnolent but can be aroused	– Gross disorientation – Unable to perform mental tasks – Amnesia – Incoherent speech
Grade 4	Coma	

Differential diagnosis
- Intracranial lesions (haemorrhage, tumour, abscess etc.)
- CNS infections (encephalitis, meningitis)
- Other metabolic encephalopathies (uraemia, hyper/hypoglycaemia etc.)
- Hypertensive encephalopathy
- Alcohol intoxication
- Drug toxicity e.g. sedatives, heavy metals

Investigations
- Liver function tests
- Electrolytes and urea
- Prothrombin time (INR)
- Blood glucose
- Electroencephalography (EEG)
- Full blood count

Treatment objectives
- Recognize and treat precipitating factors
- Reverse neuropsychiatric symptoms
- Minimize nitrogenous substances
- Treat underlying factors

Non-pharmacological treatment
- Reduce protein intake - 1.25-1.5g/kg per day
- Increase carbohydrate intake
- Maintain fluid and electrolyte balance

Pharmacological treatment

Lactulose oral
10-30 mL three time daily orally to achieve 2-3 loose stools per day

Metronidazole oral
400-800 mg every 8 hours

Vitamin K (Phytonadione) IM
10 mg intramuscularly

Prevention
- Avoid precipitating factors
- Diagnose and treat liver disorders early

Referral
- Specialist referral for severely ill patients
- Specialist referral for all children

Hepatorenal syndrome (HRS)

HRS is rapid deterioration in kidney function in patients with cirrhosis or fulminant liver failure and who have ascites and portal hypertension. At least 40% of patients with cirrhosis and ascites will develop HRS. The risk of death in hepatorenal syndrome is very high.

Causes
Deterioration of condition of patients with cirrhosis, severe alcoholic hepatitis, or liver failure precipitated by:
- Loss of volume
- drainage of ascites
- Forced diuresis
- Excess use of laxatives (e.g. lactulose)

Type 1 HRS entails a rapidly progressive decline in kidney function and is most commonly precipitated by spontaneous bacterial peritonitis (SBP). Median survival of Type 1 is 2 weeks.

Type 2 HRS is associated with ascites. It is characterized by a moderate and stable reduction in the GFR and commonly occurs in patients with relatively preserved hepatic function. The median survival is 3-6 months.

Signs and symptoms
- Oliguria progressing to anuria, with progression of kidney failure
- Oedema and anasarca due to renal water retention

Differential diagnosis
- Prerenal azotaemia
- Drug-induced nephrotoxicity: NSAIMs, aminoglycosides, diuretics
- Renal vascular disease

Investigations
- Renal ultrasound scan
- Serum creatinine > 1.5 mg/dL
- Elevated BUN: creatinine ratio (> 20:1)
- Protein excretion < 500 mg/d
- Hyponatremia with relative sodium deficiency
- Low sodium excretion in urine (< 10 mmol/L)

Treatment objectives
- Establish a precipitating cause of hepatorenal syndrome (HRS)
- Palliative care where there are no possibilities of kidney transplant

Non-pharmacological treatment
- Low-salt (not more than 2 g) diet
- Do not restrict protein intake unless patient has severe encephalopathy
- Cessation of alcohol ingestion

Pharmacological treatment
- Correct hypovolemia
- Treat precipitating factors
- Refer for specialised management

Referral
- Refer patients to specialist for dialysis, liver transplant and other treatment

Hepatocellular Carcinoma

Hepatocellular carcinoma (HCC) is a malignant tumour of the liver, which occurs primarily in patients with pre-existing liver cirrhosis or chronic hepatitis. It is the third leading cause of cancer-related deaths worldwide and it has high incidence in Africa due to the high prevalence of Hepatitis B and C infections.

Causes
- Liver cirrhosis (80% of cases)
- Chronic hepatitis B or C virus infection
- Schistosomiasis
- Chronic ingestion of food contaminated with aflatoxin (aflatoxins are considered one of the most potent carcinogens)

Signs and symptoms
- Usually asymptomatic apart from symptoms of the underlying disease
- Advanced stages
    - Weight loss
    - Hepatomegaly
    - Ascites
    - Jaundice
    - Metastasis

Differential diagnosis
- Metastasis liver disease
- Liver abscess, hydatid cyst
- Intrahepatic cholangiocellular carcinoma
- Hepatic angiosarcoma

Investigations

- Abdominal ultrasound scan
- Abdominal CT scan
- Alpha fetoprotein
- Liver function tests
- Hepatitis B surface antigen; anti-Hepatitis C virus
- Clotting profile
- Liver biopsy - *if no contraindication*

Treatment

- Liver resection
- Liver transplantation
- Ablative therapies (mostly palliative, but can also be curative) result in shrinking and scarring of the tumour
- Transplantation remains the best option for patients with HCC
- Palliative care for decompensated disease, unresectable, multinodular disease, or metastatic disease

Prevention

- Hepatitis B vaccination for all new-borns and high-risk groups
- Once cirrhosis is established, antiviral therapy is beneficial in preventing cirrhosis progression and decompensation

Referral

- Candidates for liver transplantation should be referred in a timely manner

Hepatic schistosomiasis (see schistosomiasis)

Jaundice

Jaundice is a condition where the skin, mucous membranes and sclera take on a yellowish coloration due to overproduction or under-clearance.

High unconjugated bilirubin (indirect)	*High conjugated bilirubin (direct)*

– Excess red blood cell breakdown
– Large bruises
– Genetic conditions such as Gilbert's syndrome
– New-born jaundice
– Thyroid problems
	– Cirrhosis
	– Viral hepatitis
	– Medications (oestrogens, arsenic)
	– Blockage of the bile duct
	– Infections
	  ○ Leptospirosis
	  ○ Schistosomiasis
	  ○ Malaria
	– Gallstones
	– Cancer
	– Pancreatitis

Signs and symptoms

- Yellowish discoloration of the sclera, mucous membranes and skin
- Dark urine
- Pruritus
- Pale, clay-coloured (acholic) stool
- Fat malabsorption (steatorrhea, weight loss)

Test	*Pre-hepatic jaundice*	*Hepatic jaundice*	*Post-hepatic jaundice*
Total bilirubin	Normal or increased	Increased	Increased
Conjugated bilirubin	Normal	Increased	Increased
Unconjugated bilirubin	Normal or increased	Increased	Normal
Urobilinogen	Normal or increased	Decreased	Decreased/negative
Urine color	Normal	Dark	Dark

Test	*Pre-hepatic jaundice*	*Hepatic jaundice*	*Post-hepatic jaundice*
Stool color	Brown	Slightly pale	Pale
Large spleen	Present	Present	Absent

Differential diagnosis
- Pseudojaundice: deposition of carotene in the skin (carotenoderma) consumption of too much carrots, mangoes, oranges, multivitamins, etc.

Complications
- Hyperbilirubinemia due to the unconjugated may cause irreversible neurological damage in neonates leading to kernicterus or death.

Investigations
- Liver function tests
- Hepatitis B surface antigen and anti-Hepatitis C virus
- Full blood count
- Abdominal ultrasound scan
- Urinalysis

Treatment objectives
- Eradicate infections
- Prevent complications
- Avoid hepatotoxic medicines

Pharmacological treatment
- Treat underlying conditions
- Cholestyramine (3-6 g orally every 6 hours) for severe obstructive jaundice
- Surgical excision of biliary cysts is the preferred treatment.

Prevention
Monitor newborn closely for jaundice as it may cause irreversible brain damage

Genitourinary diseases

Cystitis

Cystitis is inflammation of the urinary bladder. While both men and women are at risk for this condition, it is more common in women due to their shorter urethra.

- Women may be at a higher risk for cystitis if they
    - Are sexually active
    - Are pregnant
    - Use diaphragms with spermicide
    - Have reached menopause
    - Are utilizing irritating personal hygiene products
- Men with lower urinary tract symptoms-LUTS may be at a higher risk for cystitis

Causes

- Bacteria -when bacteria enter the bladder/urethra and multiply
- Viruses
- Fungi
- Chemicals
- Exposure to radiation
- Indwelling urinary catheters
- Immunocompromised states
- Schistosomiasis
- Vesical calculi

Signs and symptoms

- Fever - sometimes present
- Dysuria - painful micturition
- Suprapubic pain
- Increased frequency of micturition by day and night
- Urgency
- Bloody urine (haematuria)- sometimes present
- Urine may be cloudy and offensive
- Pain during sexual intercourse
- Suprapubic tenderness

Differential diagnosis

- Vulvo-vaginitis
- Urethritis
- Pelvic inflammatory disease
- Interstitial cystitis

Investigations

- Full blood count
- Urinalysis

- Urine microscopy, culture and sensitivity tests
- Blood cultures - if urosepsis is suspected
- Ultrasound scan of the urinary bladder
- **Cystoscopy**

Treatment objectives
- Eradicate the infection and risk factors
- Reduce morbidity
- Prevent complications

Non-pharmacological treatment
- Liberal oral fluid intake

Pharmacological treatment

Amoxicillin oral
Adult:
500mg every 8 hours orally for 7days
Child:
<10 years: 125mg every 8 hours for 7 days
>10 years: 250mg every 8 hours for 7 days

OR
Amoxicillin + clavulanic acid oral
500 mg (as trihydrate) + 125 mg every 8 hours **for 7 days**

OR
Cotrimoxazole oral
Adult:
960mg every 12 hours for 7-14 days
Child:
<10 years: 125mg, oral, two times daily for 7 days
>10 years: 480mg tab, oral two times daily for 7days

OR
Nitrofurantoin oral
Adult:
100mg four times daily for 7-14 days
Child:
5-7 mg/kg/day three times a day

Note:
- Doses can be doubled for severe infections.

Referral
Refer if the patient does not respond to treatment or there are no facilities for urine microscopy, culture and sensitivity testing **or cystoscopy.**

Prevention
- Women should wipe from front to back after a bowel movement to prevent the spread of bacteria from faeces (*E. coli*)
- Avoid any products that irritate the area
- Women should empty their bladders after sexual intercourse (both sexes: avoid postponing micturition).

Acute Pyelonephritis

Acute pyelonephritis is a sudden and severe upper urinary tract infection involving one or both kidneys.

Risk Factors
- Bladder outlet obstruction
- Malformations of urinary tract
- Pregnancy
- HIV and other immunocompromised states
- Old age
- Diabetes
- **Intravenous drug abuse**

Causes
- Bacteria such as E. *coli* (most frequent cause); Proteus, Klebsiella, Enterobacter and Pseudomonas spp.

Signs and symptoms
- Fever (may be very high grade) with tachycardia
- Nausea and vomiting
- Severe pain in the affected loin
- Urine may be cloudy and offensive
- Dysuria and urgency
- Blood pressure maybe low
- Tenderness in the affected loin

Differential diagnosis
- Appendicitis
- Diverticulitis
- Endometriosis
- Pelvic inflammatory disease
- Kidney stones

Investigations
- Full blood count
- Blood cultures
- E/U/Cr
- Urine microscopy, culture and sensitivity testing
- Ultrasound scan of the kidneys, ureters and bladder

Treatment objectives
- Treat according to culture and sensitivity test results. Empirical treatment can be commenced while waiting for the results

Pharmacological treatment

Amoxicillin IV
500 mg every 8 hours for 14 days

OR
Amoxicillin/clavulanate
Adult:
1.2 g IV every 8 hours until patient's condition improves and fever subsides, and then commence oral treatment.
500/125 mg -orally every 8 hours
Child:
30 mg/kg IV every 8 hours
250 mg orally every 8 hours

OR
Ciprofloxacin I.V
Adult: 200mg every 12 hours
THEN commence oral treatment
Oral 500mg every 12 hours
OR
Ceftriaxone IV
Adult:
1-2 g IV once daily
Child:

80-100 mg/kg IV once daily
When fever subsides, continue with oral antibiotics

Note
- Avoid ***Gentamicin*** until the renal status is established**.**
- Patients may require IV fluids if vomiting

Prevention
- Encourage liberal oral fluid intake
- Avoid postponing micturition
- Advise females to wipe from front to back

Referral
- Refer if the patient is not responding to treatment or if she is pregnant.

Acute Renal Failure

Acute renal failure is characterised by a sudden decline in renal function. It is often associated with oliguria (less than 400 mL of urine/24 hours) and or anuria (≤100 mL of urine/24 hours). Treated immediately, acute renal failure is usually reversible.

Causes
- Sepsis
- Postpartum haemorrhage
- Eclampsia
- Severe trauma
- Acute tubular necrosis
- Haemolysis
- Typhoid fever
- Drugs e.g. gentamicin, herbal concoctions)
- Severe dehydration
- Obstructive uropathy
- Acute glomerulonephritis

Signs and symptoms
- Generalized swelling or fluid retention; demonstrable oedema
- Fever
- Anorexia, fatigue, nausea and vomiting
- Other uraemic symptoms: bloody stools, fetor, lethargy, chest pain (from pericarditis), changes in mental status, paraesthesias, clotting abnormalities and prolonged bleeding
- Raised blood pressure.
- Reduced urine output
- Flappy tremors

Investigations
- Full blood count
- Serum urea, electrolytes and creatinine
- 24-hour urine output
- Ultrasound scan of the kidneys, ureters, bladder and prostate (where indicated).

Treatment objectives
- Identify and manage the causes
- Slow down the progression of the disease
- Plan renal replacement therapy well before end stage kidney disease sets in

General measures
- Appropriate fluid management: hydration or fluid restriction depending on the volume status of the patient
- Pass a Foley urethral catheter and monitor urine output
- High calorie and low protein diet
- Transfuse packed red blood cells if necessary
- Check serum electrolytes, urea and creatinine levels daily.
- Check patient's weight daily.
- Check blood pressure every 4 hours (or more frequently if indicated)
- Maintain strict fluid input/output monitoring.
- Treat underlying cause

- Refer to nephrologist for expert care

Note
- Do no further damage to the kidneys.
- Specific treatment is directed to the underlying cause(s) of the acute renal failure.
- A functioning dialysis unit is critical to the management of acute renal failure
- Hyperkalaemia is raised serum potassium (>6.5mmol/L) - common complication of acute renal failure

Hyperkalaemia can be treated with:**
Adult:
Calcium gluconate 10%IV
10-20mL over 2-5 minutes.

PLUS
Insulin regular/soluble IV
10 units in 50 mL 50% Dextrose (IV) infusion for 20 minutes

PLUS
Sodium Bicarbonate 8.4% IV
50 milli equivalents over 5 minutes
PLUS
Furosemide IV
80mg intravenous once daily
Note:
- Poor management of acute renal failure would lead to chronic or end stage renal failure

** Do not treat without specialist supervision

Referral
Refer if patient is not responding to treatment within 48 hours or local resources are inadequate

Chronic Kidney Disease (CKD)

Chronic kidney disease is defined as any structural or functional abnormality of the kidney lasting for more than 3 months with implications for health. It may occur at any age.

The presence of one or more of the following markers of kidney damage can establish/or may suggest the diagnosis:
- Albuminuria at least one plus (+) of albuminuria on dipstick
- Urine sediment abnormalities like cells, casts, crystals
- Electrolyte and other abnormalities due to tubular disorders
- Histologic abnormalities from renal biopsy tissue
- Structural abnormalities detected by ultrasound scan
- History of kidney transplantation

Staging of CKD by eGFR

Stage	*Reduction in GFR*	*Glomerular Filtration Rate (GFR)*
Stage 1	Kidney damage with normal or increased GFR	>90 mL/min/1.73 m ^{2}
Stage 2	Mild reduction in GFR	60-89 mL/min/1.73 m ^{2}
Stage 3a	Moderate reduction in GFR	45-59 mL/min/1.73 m ^{2}
Stage 3b	Moderate reduction in GFR	30-44 mL/min/1.73 m ^{2}
Stage 4	Severe reduction in GFR	15-29 mL/min/1.73 m ^{2}
Stage 5	Kidney failure	< 15 mL/min/1.73 m ^{2}

Causes
- Hypertension
- Chronic glomerulonephritis
- Diabetes mellitus
- Interstitial nephritis

- Adult polycystic kidney disease
- Acute renal failure (if prolonged)
- Cardiovascular disease
- Obstructive uropathy

Signs and symptoms

Symptoms are usually noticed late when the disease is at an advanced stage and include:

- Bilateral leg swelling or oedema,
- Facial puffiness,
- Reduction in urine output
- Passage of frothy urine.
- Itching
- Pruritus
- Muscle cramps
- Nausea and vomiting
- Loss of appetite
- Loss of weight
- Passing small or large volumes of urine
- Dyspnoea on exertion
- Insomnia
- Nose bleeds

Signs

- Patient looks unwell
- Pallor
- Loss of weight
- Pedal and ankle oedema
- Features of pulmonary oedema ~~and/or effusion~~
- Ascites
- Oliguria or polyuria
- Hypertension
- Features of ureamia

Investigations

- Full blood count
- Urinalysis
- Serum urea, electrolytes and creatinine
- eGFR (Estimated glomerular filtration rate)
- Fasting blood glucose
- Electrocardiography
- Ultrasound scan of the kidneys, ureters, urinary bladder and the prostate gland ~~where appropriate~~

Treatment objectives

- Delay or halt the progression of CKD
- Diagnose and treat the manifestations of CKD
- Timely planning for long-term renal replacement therapy

Management of CKD

Management of CKD may be conservative or definitive. Conservative management includes:

- Fluid restriction of 1-2L/day
- Dietary restrictions like salt and protein restriction
- Reduce dietary potassium and phosphate
- Control hypertension, diabetes mellitus and dyslipidaemia
- Manage fluid overload with furosemide
- Manage anaemia with blood transfusion (if patient is not fluid overloaded)
- Advice patient to stop smoking
- Avoid nephrotoxic drugs like aminoglycosides, NSAIDS
- Promptly treat recurrent urinary tract infection and obstruction

Prevention of Chronic Renal Failure

Note that diabetes mellitus and hypertension are the commonest causes of chronic renal failure. Therefore, the following preventive actions should be considered:

- Control diabetes and/or hypertension.
- Encourage a low salt, and a low-fat diet and a low protein diet

- Encourage regular exercises
- Encourage regular medical check up
- Discourage cigarette smoking.
- Advise reduction in alcohol intake.
- Treat dyslipidaemia
- Avoid nephrotoxic agents

Referral
- Definitive management includes dialysis and kidney transplantation.
- Refer all patients with eGFR < 30mls/kg/min. This will give time for adequate preparation for commencement of renal replacement therapy (dialysis and kidney transplantation).

Nephrotic Syndrome

Nephrotic syndrome is characterised by albuminuria ≥3g/day, hypoalbuminaemia, generalised oedema and hypercholesterolaemia. It affects children as well as adults. May be primary or secondary.

Causes
- Minimal change disease
- Membranous glomerulonephritis
- Infections (viral, parasitic infections)
- Malignancy
- Drugs - e.g. lithium, mercury
- Diabetes mellitus
- Systemic lupus erythematosis
- Amyloidosis
- Multiple myeloma
- Fever

Signs and symptoms
- Generalized oedema (anasarca)
- Abdominal distension
- Poor appetite
- Foamy urine
- Symptoms of the underlying cause
- Feeling very tired
- weight gain due to fluid retention
- Signs of the underlying cause

Differential diagnosis
- Cardiac failure
- Liver disease
- Malnutrition with oedema e.g. kwashiorkor
- Malabsorption syndrome
- Allergic states causing generalised body swelling

Complications
- Deep vein thrombosis
- Infections
- Anaemia
- Hypertension
- Hypercholesterolemia
- Renal failure
- Heart disease

Investigations
- Urinalysis
- 24-hour urine protein Estimation
- Serum proteins - especially albumin
- Serologic studies for ~~infection and~~ immune abnormalities
- Serum urea, electrolytes and creatinine
- Serum lipid profile
- USS of the kidneys

- Renal biopsy and histology
- Viral screening for hepatitis B, hepatitis C and HIV

Treatment objectives
- Treatment is directed at the underlying cause(s)

Non-pharmacological and pharmacological treatment

- Treat fluid retention by bed rest, salt restriction and diuretics:
- Normal protein diet to avoid malnutrition
- Control hypertension if present

Furosemide IV
Adult:
160mg intravenously daily
Child: (seek specialist advise)
1-2mg/kg daily

- Treat with medicine that can reduce proteinuria and high cholesterol like ACE inhibitors (for proteinuria) and statins for (hypercholesterolaemia)
- Treat with medicine that can prevent blood clots like unfractionated heparin

Referral
Refer the patient to a physician, preferably a nephrologist for management of the underlying cause.

Prostatitis

Prostatitis is an infection or inflammation of the prostate gland. Prostatitis is categorized as follows:

Category		***Characteristics***	*Signs and Symptoms*		
			Pain	***Bacteria***	***WBCs***
I	Acute prostatitis	- Bacterial infection of the prostate gland - Requires urgent medical treatment.	Yes	Yes	Yes
II	Chronic bacterial prostatitis	- Rare - Intermittent urinary tract infections	±	Yes	Yes
IIIa	Inflammatory	- Chronic prostate inflammation - Chronic pain - 90%-95% of prostatitis diagnoses	Yes	No	Yes
IIIb	Non-inflammatory		Yes	No	No
IV	Asymptomatic inflammatory prostatitis	- Asymptomatic - No history of genitourinary pain complaints - Leukocytosis is present	No	No	Yes

Causes
UTI and STI pathogens

Signs and symptoms
- Fever
- Acute pain in the pelvis and perineum
- Dysuria and frequency
- Urinary retention or difficulty to void
- Acutely tender prostate on rectal examination
- Painful ejaculation
- Blood in the semen

Complications
- Bladder outlet obstruction
- Urinary retention
- Abscess formation
- Infertility
- Recurrent cystitis
- Pyelonephritis

- Renal damage
- Sepsis

Investigations
- Full blood count
- Blood cultures
- Urine analysis
- Urine microscopy, culture and sensitivity

Treatment objectives
- Alleviate symptoms
- Eradicate causative microorganisms
- Prevent recurrence

Non-pharmacological treatment
- Sitz baths may provide symptomatic improvement
- Increase fluid intake to 3 to 4 litres per day

Pharmacological treatment

Acute bacterial prostatitis
Four-to-eight weeks of prostate-penetrating antibiotic therapy is typically required

If there are features of associated urethritis (STI regimen):
Ceftriaxone IV
1gm twice-daily stat

THEN
Ciprofloxacin oral
500mg twice daily for three to six weeks

OR
Ciprofloxacin IV
200mg every 12 hours until pain and fever subside

THEN
Ciprofloxacin oral
500 mg orally every 12 hours for 3-6 weeks

Chronic/relapse/persistent infection:
Ciprofloxacin oral
500 mg orally every 12 hours

Referral
Refer to urologist if:
- There is no response to treatment
- Urinary retention present
- Prostatitis is chronic or relapsing

Urolithiasis

E.g. Kidney Stones (Nephrolithiasis)

Kidney stones are calculi found in the kidneys (nephrolithiasis) or in the ureter (ureterolithiasis). Kidney stones can cause severe pain and may lead to kidney infections

Signs and symptoms
- Sudden onset of flank or pelvic pain
- Nausea and vomiting
- Blood in the urine (haematuria)
- Sometimes, features of concomitant urinary tract infection
- There may be tenderness in the affected flank
- There may be signs of dehydration (from reduced fluid intake and vomiting)

Types
- Calcium stones (most common)
- Uric acid stones

Predisposing factors
- Male gender
- High-protein diet
- Low-fibre diet
- Low fluid intake
- Inactive lifestyle
- Family history of kidney stones
- Prior kidney stone episode
- Medicines – aspirin, antacids, loop diuretics, some antibiotics, anti-epileptics, some anti-retrovirals
- Urinary tract infections

Investigations
- Urinalysis – may reveal infection, haematuria, presence of sediments, calcium oxalate crystals
- Urine microscopy, culture and sensitivity
- Serum urea, electrolyte and creatinine
- Plain radiograph of the kidneys, ureter and bladder (KUB)-x-ray can detect up to 90% of calculi
- Renal ultrasound scan
- CT urogram/IV urogram-if available

Differential diagnosis
- Abdominal aortic aneurysm
- Diverticulitis
- Appendicitis
- Pyelonephritis

Treatment objectives
- Relieve pain and other symptoms, especially nausea and vomiting
- Treat underlying infection
- Aid removal of renal calculi

Pharmacological treatment

Mild pain
Non-steroidal anti-inflammatory medicines (NSAIMs)

Ibuprofen oral
400mg orally every 8 hours

OR
Diclofenac oral 100mg twice daily

OR

Diclofenac oral
50/100mg every 12 hours
PLUS
Paracetamol oral
1G every 8 hours

Moderate to severe pain
Diclofenac IV/IM
75mg for pain relief and may be repeated after 6 hours

Vomiting
Metoclopramide IM
10 mg every 8 hours (when necessary) to control vomiting

Note:
- Give IV fluids as part of treatment of a vomiting patient

Prevention
- Encourage liberal fluid intake (3 to 4 litres) to achieve production of more than two litres of urine are produced per day
- Achieve alkalinisation of urine through dietary modification:

Encourage ingestion of citrate rich foods e.g. citrus fruits
Encourage ingestion of foods that produce alkaline urine (if no contraindications) e.g. milk, cream, plums, prunes; all vegetables (except corn), beans, lentils, coconut

Referral
- Refer patient with calculi to a urologist for specialist care. Removal of calculi may be by medical or surgical means

Benign prostatic hyperplasia (BPH)

BPH is a non-cancerous increase in size of the prostate gland, which is a common cause of lower urinary tract obstruction in elderly males. It partially or totally obstructs urine outflow.

Signs and symptoms
- Frequency
- Urgency
- Urge incontinence
- Poor stream
- Hesitancy
- Straining
- Intermittency
- Retention of urine
- Haematuria
- Recurrent urinary tract infections
- Progressive renal failure
- Feeling of incomplete emptying of the urinary bladder

Digital rectal examination
- Enlarged prostate; firm and symmetrical

Differential diagnosis
- Prostate cancer
- Bladder cancer
- Bladder calculi
- Urethral stricture
- Prostatitis
- Neurogenic bladder

Complications
- Acute or chronic urine retention
- Recurrent urinary tract infections
- Bladder calculi
- Haematuria
- Hydroureter/hydronephrosis
- Progressive renal failure

Investigations
- Urinalysis
- Urine microscopy, culture and sensitivity
- Serum urea, electrolytes and creatinine
- Prostate Specific Antigen (PSA)
- Trans-rectal ultrasound scan (only after ultrasound of the kidneys, ureters, bladder and prostate have been considered)
- Abdominal ultrasound scan
- Full blood count

Treatment objectives
- Relieve obstruction
- Prevent and/or treat complications

Pharmacological treatment

Alpha-adrenergic blockers
Doxazosin 2mg/4mg oral at night (to reduce the effect of dizziness)

OR

5-Alpha reductase inhibitors
Finasteride oral
5 mg daily

OR
Dutasteride 0.5mg oral daily for a minimum of 6 months

Notable adverse reactions, caution
- Alpha-adrenergic blockers: dizziness, syncopal attacks, tachycardia
- *Should therefore be taken at night before going to bed*
- 5- Alpha reductase inhibitors: loss of libido, erectile dysfunction, gynaecomastia
- *Ensure adequate counselling before commencing therapy*

Prevention
Advise patient on:
- Weight loss and avoidance of overweight
- Regular physical activity
- Vegetable consumption
- Reduction of fatty food
- Reduced intake of red meat
- 5-alpha reductase inhibitors

Referral
- All patients with BPH and associated complications like recurrent UTI, haematuria, renal insufficiency, hernia and urinary tract stones who needs surgery should be referred to centres where specialized care can be offered.

Carcinoma of the Prostate

This is the most commonly diagnosed malignancy affecting men beyond the middle age. About 90-95% are adenocarcinomas.

Risk factors
- Age
- Race- blacks
- High fat diet
- Positive family history
- Exposure to herbicides and pesticides

Signs and symptoms
Asymptomatic (most common)
Obstructive symptoms:
- Poor stream
- Straining
- Incomplete bladder emptying
- Terminal dribbling (occurs late)
- Other symptoms may include frequency, urgency, nocturia , haematuria, bone pains and weight loss

Differential diagnosis
- Benign prostatic hyperplasia
- Chronic prostatitis
- Bladder cancer or calculi
- Prostatic calculi
- Urethral stricture

Investigations
- Prostate Specific Antigen
- Prostate biopsy
- Trans-rectal ultrasound scan
- Abdomino-pelvic ultrasound scan
- CT scan of pelvis and lumbar spine
- Liver function tests
- Chest radiographs of pelvis, spine

- Serum urea, electrolytes and creatinine
- Full blood count

Complications
- Urinary retention
- Urinary tract infection
- Hydroureter or hydronephrosis
- Progressive renal failure
- Paraplegia
- Pathological fractures
- Lymphoedema

Treatment objectives
- Aim at cure for early disease
- Palliation for advanced disease

Pharmacological treatment

Luteinising hormone releasing hormone (LHRH) Agonists

Goserelin acetate
3.6 mg by subcutaneous injection into the anterior abdominal wall every 28 days

Note:
Bicalutamide oral 150mg must be given a few days before **Goserelin injection** is given as described

OR
Bicalutamide oral
50–150 mg once daily

OR
Docetaxel oral
75mg/m^2 every 3 weeks

Surgical treatment
- Orchidectomy (i.e. castration) for locally advanced or metastatic prostate cancer.

Referral
- Patients with suspected prostate cancer should be referred to a urologist for specialist care

Prevention
- Encourage dietary modifications: reduction of fat intake; increase fruits and vegetable
- Maintenance of healthy weight
- Avoid charred (burnt) meat
- Regular physical exercises
- Reduced alcohol intake
- Discourage smoking
- Stay sexually active
- Increased Vitamin D intake

Urethral stricture

This is an abnormal narrowing or loss of distensibility of any part of the urethra. It is one of the commonest causes of urine retention in tropical Africa. It is very rare in females.

Causes
- Trauma
- Inflammation
- Gonococcal urethritis
- Non-gonococcal urethritis from chlamydia, tuberculosis or schistosomiasis
- Urethral instrumentations e.g. catheterization and urethroscopy
- Congenital

Signs and symptoms
- Dysuria

- Frequency
- Urgency
- Poor stream
- Straining
- Hesitancy
- Dribbling

Examination of the external genitalia may reveal:
- Purulent urethral discharge
- Urethral indurations
- Periurethral or perineal abscess
- Urethrocutaneous fistula

Differential diagnosis
- Benign prostatic hypertrophy
- Prostate cancer
- Bladder calculi
- Bladder neck stenosis

Complications
- Urinary tract infections
- Urethral/bladder calculi
- Urinary retention
- Fournier's gangrene
- Perineal urinary fistulae
- Progressive renal failure

Investigations
- Urinalysis
- Urine microscopy, culture and sensitivity **(tests)**
- Urethroscopy
- Retrograde urethrogram/Micturating cystourethrogram
- Uroflowmetry
- Abdominal ultrasound
- Serum Urea, Electrolytes and Creatinine
- Full Blood Count

Treatment objective
- Restore urethral patency
- Treat STIs with appropriate antibiotics
- Restore micturition through the normal route

Treatment
- Surgical procedures (refer to specialists)

Prevention
- Ensure prevention of sexually transmitted infections
- Prompt and appropriate treatment of sexually transmitted infections
- Care and attention to asepsis during instrumentation procedures involving the urethra

Hepatic and Biliary diseases

Hepatitis

Hepatitis is an inflammation or injury of the liver with multiple causes. It may present as an acute illness with jaundice and altered liver function tests.

Causes

Viral hepatitis	*Non-viral hepatitis*
- Hepatitis A virus (HAV) - Hepatitis B virus (HBV) - Hepatitis C virus (HCV) - Hepatitis D virus (HDV) - Hepatitis E virus (HEV)	- Bacteria - Autoimmune - Parasites - Fungi - Alcohol - Medicines - Toxins - Haemorrhagic fevers (Ebola and Marburg)

Hepatitis virus	*Transmission route*	*Incubation period (days)*	*Serological markers*	*Complications*
HAV	- Oro-faecal	15–50	- Anti-HAV IgM	- Recovery in about 3 months - No chronic phase
HBV	- Sexual - Blood contaminated instruments - Contaminated blood products - Mother to child	30-180	- HBsAg - Anti-HBc - HBeAg - Anti HBe	- Fulminant hepatitis - Cirrhosis - Hepatocellular Carcinoma
HCV	- Blood contaminated instruments - Rarely - Sexual - Mother to child	14–180	- Anti-HCV IgM - HCV RNA	- Cirrhosis - Hepatocellular Carcinoma
HDV	- Blood contaminated instruments - Rarely - Sexual - Mother to child	45–160	- HDV-RNA - Anti-HDV IgM	- Fulminant hepatitis - High risk of severe chronic liver disease
HEV	- Oro-faecal	15–64	Anti-HEV IgM	- Fulminant hepatitis - High mortality rate in pregnant women

Signs and symptoms

Acute hepatitis
- May be asymptomatic
- Prodromal phase presents with non-specific and flu-like symptoms
- Fever
- Fatigue
- Malaise
- Abdominal discomfort (right upper quadrant)
- Nausea
- Diarrhoea
- Anorexia

Followed by
- Jaundice

- Dark urine
- Clay coloured stool

Chronic hepatitis
- Maybe asymptomatic
- Weakness and malaise
- Low grade fever
- Nausea
- Loss of appetite
- Vomiting
- Pain or tenderness over the right upper abdomen
- Jaundice
- Dark urine, severe pruritus
- Enlarged liver

Investigations
- Complete blood count
- Liver function tests
- Serology for Hepatitis A,B,C,D, E
- Abdominal ultrasound scan
- Slide or RDT for malaria parasites

Management

Virus type	*Treatment objectives*	*Treatment*	*Complications*	*Prevention*
HAV	- Reduce symptoms	*Supportive*	- Recovery in about 3 months - No chronic phase	- Safe drinking water - Food hygiene - HAV vaccine
HBV	- Reduce symptoms - Prevent complications - Inhibit viral replication	*Acute: supportive* *Chronic:* **Tenofovir** **OR** **Peginterferon-α (if** indicated)	- Fulminant hepatitis - Cirrhosis - Hepatocellular Carcinoma	- Safe sex - Screen blood products - Use sterile instruments - HBV vaccination - PEP
HCV	- Decrease replication or eradicate HCV - Prevent disease progression to cirrhosis and hepatocellular carcinoma - Reduce symptoms - Treat extrahepatic complications	*Acute:* **Interferon-α** **OR** **Peginterferon-α** *Chronic:* **Interferon α** **PLUS** **Ribavirin or DAAs** (usually curable) *Liver transplantation*	- Cirrhosis - Hepatocellular Carcinoma	- Safe sex - Screen blood products - Use sterile instruments - No vaccination available - No PEP
HDV	- Reduce symptoms	**Peginterferon-α** **PLUS** **Lamivudine**	- Fulminant hepatitis - High risk of severe chronic liver disease	- Safe sex - Screen blood products - Use sterile instruments - HBV vaccination - PEP
HEV	- Reduce symptoms	*Acute: supportive*	- Fulminant hepatitis - High mortality rate in pregnant women	- Safe drinking water - Food hygiene

Non-pharmacological management
- Encourage rest and hydration
- Encourage high intake of carbohydrates and vegetable proteins.
- Discourage intake of animal proteins
- Avoid unnecessary medicines, but especially sedatives and hepatotoxic drugs
- No alcohol consumption
- Avoid ferrous

- Limit vitamin supplements that contain fat soluble vitamins and vitamin C
- Ensure effective infection control measures

Pharmacological management

Hepatitis B Virus (HBV)
Tenofovir oral
300mg once daily for life*

OR
Entecavir oral
0.5mg–1mg once daily for life (0.5 mg daily if no cirrhosis, 1mg daily if there is cirrhosis)

Hepatitis C Virus (HCV)
Ledipasvir oral
90mg in divided doses orally for 12–24 weeks

PLUS
Sofosbuvir oral
400mg in divided doses for 12–24 weeks

PLUS
Ribavirin oral
600mg–1000mg in divided doses for 12–24 weeks

- ***For patient with cirrhosis***

Referral
- Refer negative results for Hepatitis A & B for vaccination
- Refer all positive cases for specialist care

Amoebic Liver Abscess (ALA)

Amoebic liver abscess is the most frequent extraintestinal manifestation of ***Entamoeba histolytica*** infection

Cause
- Entamoeba histolytica

Signs and symptoms
- Right upper abdominal pain
- Abdominal distension
- Fever
- Cough
- Large tender liver
- Tenderness and/or bulging at right intercostal spaces
- Jaundice
- Dullness to percussion on the right lower zones with right basal crepitation

Investigations
- Abdominal USS
- Stool microscopy for cysts and motile organisms
- Chest radiograph
- Liver function tests

Treatment objectives
- To eradicate infection
- To prevent further destruction of liver tissue
- To prevent rupture of abscess into pleural, pericardial or peritoneal space
- To prevent sepsis
- To prevent death

Non-pharmacological treatment

- Therapeutic aspiration of abscess - if large, on the left lobe of the liver or when pharmacological therapy fails (for experts only)

Pharmacological treatment

Metronidazole oral
Adults:
800mg orally every 8 hours for 10 days
Child:
10mg/kg (maximum 250mg) orally every 8 hours for 10 days

OR
Tinidazole, oral
Adult: 2g once daily for 3 days (with food)
Child: 50-60mg/kg daily for 5 days (with food)

FOLLOWED BY:
A luminal amoebicidal agent to eradicate the intestinal carriage:

Diloxanide furoate oral
Adult:
500mg orally every 8 hours for 10 days.
Child:
6–7mg/kg (maximum 500mg) orally every 8 hours for 10 days

Prevention

- Avoid eating unpeeled fruits or uncooked vegetables have a potential risk of contamination by *Entamoeba histolytica* cysts in endemic regions
- In areas with high concentration of amoeba, water should be boiled before use, as chlorinated water may not adequately prevent infection.

Referral

Patients with abscesses that are large or not responding to treatment will need to be referred to a surgical specialist.

Liver Cirrhosis

Cirrhosis is a condition caused by chronic damage to the liver and replacement of some destroyed hepatocytes with fibrous tissue. It is most commonly caused by chronic HBV infection, excessive alcohol consumption or hepatitis C infection. The progression of liver injury to cirrhosis may occur over weeks to years.

Causes

- Alcohol,
- Hepatitis B and C
- Non-alcoholic fatty liver disease
- No known aetiology in up to 30% of cases

Signs and symptoms

- Fatigue
- Pruritus
- Pedal oedema
- Bruise easily
- Jaundice
- Ascites
- Pedal oedema
- Spider angioma
- Haematemesis

- Hepatosplenomegaly
- Liver may be shrunken or enlarged
- Hormone disorders e.g. gynecomastia, hypogonadism, erectile dysfunction

Differential diagnosis
- Granulomatous lesion of the liver
- Primary or secondary neoplasms of the liver

Complications
- Portal hypertension
- Spontaneous bacterial peritonitis
- Hepatic encephalopathy
- Esophagogastric Varices
- Liver cancer
- Hepato-renal syndrome
- Intractable oedema
- Coagulopathy
- Upper gastrointestinal tract bleeding
- Decompensated cirrhosis

Investigations
- Blood tests
- Liver biopsy
- Liver function tests
- Serum albumin
- Ultrasound of the liver
- Screening for Hepatitis B and C
- PT/aPTT

Treatment objectives
- Prevent further liver damage
- Possibly achieve regression of cirrhosis.
- Eliminate aetiologic agent
- Treat complications

Non-pharmacological treatment
- Encourage high fibre
- Encourage low salt diet
- Low protein diet
- Enhance opening of bowel

Pharmacological treatment
- Treat/eliminate causative factors
- Give supplemental Vitamin B complex
- Treat complications (see sections)

Prevention
- Vaccination (such as hepatitis B and C)
- Avoid hepatotoxic substances (e.g., alcohol, medication)

Referral
- Refer decompensated severe cirrhosis for possible liver transplant (definitive treatment)

Ascites

Ascites describes the condition of abnormal fluid collection within the abdominal cavity. It is a common complication of diseases presenting with portal hypertension such as liver cirrhosis, acute liver failure.

Causes
- Liver cirrhosis
- Liver or Peritoneal cancer
- Heart failure
- Tuberculosis
- Pancreatitis

- Conditions that cause blockage of the hepatic vein such as hepatic vein thrombosis; portal hypertension, acute liver failure
- Kwashiorkor (childhood protein-energy malnutrition)

Signs and symptoms
- Progressive abdominal distension resulting in:
  - Early satiety
  - Weight gain
  - Dyspnoea
  - Features of malnutrition
- Signs of underlying disease
  - Enlarged liver
  - Jaundice
  - Erythema
  - Weight loss
  - Spider angioma
  - Jugular venous pressure

Differential diagnosis
- Cirrhosis
- Portal hypertension
- Acute liver failure
- Biliary dysfunction
- Hepatocellular adenoma
- Hepatorenal syndrome
- Nephrotic syndrome
- Viral hepatitis

Complications
- Spontaneous bacterial peritonitis
- Hepatorenal syndrome
- Hyponatremia

Investigations
- Abdominal ultrasound scan
- Diagnostic paracentesis - WBC + differential, biochemistry, microbiology, cytology

Treatment objectives
- Relieve symptoms
- Reduce morbidity
- Prevent complications
- Correct sodium imbalance

Non-pharmacological treatment
- Therapeutic paracentesis - to relieve abdominal pressure from ascites (not more than 4L of ascetic fluid at a go without substituting with IV albumin infusion)
- Low sodium diet - not more than 2000 mg/day in outpatient setting and 500 mg/day in patients on admission
- Avoid overhydration
- TIPS - alternative for patients with medically intractable ascites

Pharmacological treatment
- Treat the underlying conditions
- Diuretics:

Spironolactone oral
25 - 400 mg orally daily

In cases of massive ascites

ADD
Furosemide oral
20-80 mg daily

To prevent variceal bleeding (associated with portal hypertension)
Propranolol oral
40-80 mg orally once daily

Referral

- Refer all patients with ascites especially those that are medically intractable to the specialist

Hepatic Encephalopathy (HE)

HE is a syndrome characterised by neuropsychiatric abnormalities resulting from severe liver disease such as cirrhosis. In hepatic dysfunction, there is inadequate elimination of metabolic products resulting in the accumulation of neurotoxic metabolites. More than 40% of people with cirrhosis develop hepatic encephalopathy

Causes

- Accumulation of neurotoxic metabolites like ammonia
- Renal failure
- Gastrointestinal bleeding
- Infection
- Constipation
- Medications may worsen HE (CNS depressants such as opiates, benzodiazepines, antidepressants, and antipsychotic agents
- Diuretic therapy

Signs and symptoms

Grade	*Symptoms*	*Signs*
Grade 0	Mild decrease in intellectual ability and coordination	– Inability or difficulty to build, assemble, or draw objects. – Increased risk of traffic accidents
Grade 1	Trivial lack of awareness	– Altered performance of addition or subtraction – Shortened attention span – Insomnia, or inversion of sleep pattern
Grade 2	Lethargy or apathy	– Disorientation for time or place
Grade 3	Somnolent but can be aroused	– Gross disorientation – Unable to perform mental tasks – Amnesia – Incoherent speech
Grade 4	Coma	

Differential diagnosis

- Intracranial lesions (haemorrhage, tumour, abscess etc.)
- CNS infections (encephalitis, meningitis)
- Other metabolic encephalopathies (uraemia, hyper/hypoglycaemia etc.)
- Hypertensive encephalopathy
- Alcohol intoxication
- Drug toxicity e.g. sedatives, heavy metals

Investigations

- Liver function tests
- Electrolytes and urea
- Prothrombin time (INR)
- Blood glucose
- Electroencephalography (EEG)
- Full blood count
- Upper GI endoscopy

Treatment objectives

- Recognize and treat precipitating factors
- Reverse neuropsychiatric symptoms
- Minimize nitrogenous substances
- Treat underlying factors

Non-pharmacological treatment

- Reduce protein intake - 1.25-1.5g/kg per day
- Increase carbohydrate intake
- Maintain fluid and electrolyte balance

Pharmacological treatment

Lactulose oral
10-30 mL three time daily orally to achieve 2-3 loose stools per day

Ciprofloxacin oral
500mg two times daily

Vitamin K (Phytonadione) IM
10 mg intramuscularly

Prevention
- Avoid precipitating factors
- Diagnose and treat liver disorders early

Referral
- Specialist referral for severely ill patients
- Specialist referral for all children

Hepatorenal syndrome (HRS)

HRS is rapid deterioration in kidney function in patients with cirrhosis or fulminant liver failure and who have ascites and portal hypertension. At least 40% of patients with cirrhosis and ascites will develop HRS. The risk of death in hepatorenal syndrome is very high.

Causes
Deterioration of condition of patients with cirrhosis, severe alcoholic hepatitis, or liver failure precipitated by:
- Loss of volume
- drainage of ascites
- Forced diuresis
- Excess use of laxatives (e.g. lactulose)

Type 1 HRS entails a rapidly progressive decline in kidney function and is most commonly precipitated by spontaneous bacterial peritonitis (SBP). Median survival of Type 1 is 2 weeks.

Type 2 HRS is associated with ascites. It is characterized by a moderate and stable reduction in the GFR and commonly occurs in patients with relatively preserved hepatic function. The median survival is 3-6 months.

Signs and symptoms
- Oliguria progressing to anuria, with progression of kidney failure
- Oedema and anasarca due to renal water retention

Differential diagnosis
- Prerenal azotaemia
- Drug-induced nephrotoxicity: NSAIMs, aminoglycosides, diuretics
- Renal vascular disease

Investigations
- Renal ultrasound scan
- Serum creatinine > 1.5 mg/dL
- Elevated BUN: creatinine ratio (> 20:1)
- Protein excretion < 500 mg/d
- Hyponatremia with relative sodium deficiency
- Low sodium excretion in urine (< 10 mmol/L)

Treatment objectives
- Establish a precipitating cause of hepatorenal syndrome (HRS)
- Palliative care where there are no possibilities of liver transplant

Non-pharmacological treatment
- Low-salt (not more than 2 g) diet
- Do not restrict protein intake unless patient has severe encephalopathy
- Cessation of alcohol ingestion

Pharmacological treatment
- Correct hypovolemia
- Treat precipitating factors
- Refer for specialised management

Referral

– Refer patients to specialist for dialysis, liver transplant and other treatment

Hepatocellular Carcinoma

Hepatocellular carcinoma (HCC) is a malignant tumour of the liver, which occurs primarily in patients with pre-existing liver cirrhosis or chronic hepatitis. It is the third leading cause of cancer-related deaths worldwide and it has high incidence in Africa due to the high prevalence of Hepatitis B and C infections.

Causes

- Liver cirrhosis (80% of cases)
- Chronic hepatitis B or C virus infection
- Schistosomiasis
- Chronic ingestion of food contaminated with aflatoxin (aflatoxins are considered one of the most potent carcinogens)

Signs and symptoms

- Usually asymptomatic apart from symptoms of the underlying disease
- Advanced stages
    - Weight loss
    - Abdominal pain
    - Hepatomegaly
    - Ascites
    - Jaundice
    - Metastasis

Differential diagnosis

- Metastasis liver disease
- Liver abscess, hydatid cyst
- Intrahepatic cholangiocellular carcinoma
- Hepatic angiosarcoma

Investigations

- Abdominal ultrasound scan
- Triple phase abdominal CT scan
- Alpha fetoprotein
- Liver function tests
- Hepatitis B surface antigen; anti-Hepatitis C virus
- Clotting profile
- Liver biopsy - *if no contraindication*

Treatment

- Liver resection
- Liver transplantation
- Ablative therapies (mostly palliative, but can also be curative) result in shrinking and scarring of the tumour
- Transplantation remains the best option for patients with HCC
- Palliative care for decompensated disease, unresectable, multinodular disease, or metastatic disease

Prevention

- Hepatitis B vaccination for all new-borns and high-risk groups
- Once cirrhosis is established, antiviral therapy is beneficial in preventing cirrhosis progression and decompensation

Referral

- Candidates for liver transplantation should be referred in a timely manner

Spontaneous Bacterial Peritonitis

Suspect in a patient with ascites who develop fever, abdominal pain and vomiting. In some cases, there is no abdominal pain.

Investigations

Abdominal paracentesis for WBC+ differential, Absolute neutrophil count and ascitic fluid culture

Pharmacological treatment

Ceftriaxone IV
1G two times daily for 7-10 days

OR
Cefotaxime IV
2g every 8 hours for 7-10 days.

Hepatic schistosomiasis (see schistosomiasis)

Jaundice

Jaundice is a condition where the skin, mucous membranes and sclera take on a yellowish coloration due to overproduction or under-clearance.

High unconjugated bilirubin (indirect)	*High conjugated bilirubin (direct)*

– Excess red blood cell breakdown
– Large bruises
– Genetic conditions such as Gilbert's syndrome
– New-born jaundice
– Thyroid problems
	– Cirrhosis
	– Viral hepatitis
	– Medications (oestrogens, arsenic, amoxicillin/clavulanate)
	– Blockage of the bile duct
	– Infections
	  ○ Leptospirosis
	  ○ Schistosomiasis
	  ○ Malaria
	  ○ Helminthiasis
	– Gallstones
	– Cancer
	– Pancreatitis

Signs and symptoms

- Yellowish discoloration of the sclera, mucous membranes and skin
- Dark urine
- Pruritus
- Pale, clay-coloured (acholic) stool
- Fat malabsorption (steatorrhea, weight loss)

Test	*Pre-hepatic jaundice*	*Hepatic jaundice*	*Post-hepatic jaundice*
Total bilirubin	Normal or increased	Increased	Increased
Conjugated bilirubin	Normal	Increased	Increased
Unconjugated bilirubin	Normal or increased	Increased	Normal
Urobilinogen	Normal or increased	Decreased	Decreased/negative
Urine colour	Normal	Dark	Dark
Stool colour	Brown	Slightly pale	Pale
Large spleen	Present	Present	Absent

Differential diagnosis

- Pseudojaundice: deposition of carotene in the skin (carotenoderma) consumption of too much carrots, mangoes, oranges, multivitamins, etc.

Complications

- Hyperbilirubinemia due to the unconjugated may cause irreversible neurological damage in neonates leading to kernicterus or death.

Investigations

- Liver function tests
- Hepatitis B surface antigen and anti-Hepatitis C virus
- Full blood count
- Abdominal ultrasound scan
- Urinalysis

Treatment objectives

- Eradicate infections
- Prevent complications
- Avoid hepatotoxic medicines

Pharmacological treatment

- Treat underlying conditions
- Cholestyramine (3-6 g orally every 6 hours) for severe obstructive jaundice to be taken with a fatty meal
- Surgical excision of biliary cysts is the preferred treatment.

Prevention

Monitor new-born closely for jaundice as it may cause irreversible brain damage

Endocrine and metabolic disorders

Diabetes Mellitus

Diabetes mellitus describes a metabolic disorder characterized by chronic hyperglycaemia.

Types and causes

- **Type 1 diabetes**, which has its onset in childhood and adolescence, is the result of an autoimmune response that triggers the destruction of insulin-producing β cells in the pancreas, resulting in an absolute insulin deficiency.
- **Type 2 diabetes**, which usually develops in adulthood, is characterized by insulin resistance and pancreatic β cell dysfunction resulting in relative insulin deficiency
- **Gestational diabetes** occurs when pregnant women without a previous history of diabetes develop hyperglycaemia.

Risk factors

- Obesity, high-calorie diet
- Age
- High waist-to-hip ratio (visceral fat accumulation)
- Physical inactivity
- Hypertension
- Dyslipidaemia
- History of gestational diabetes
- Medicines
- Pancreatic disorders

Signs and symptoms

Types 1

Early presentation

- Rapid onset of severe symptoms are weight loss, thirst and polyuria
- Blood glucose levels are high and ketones are often present in urine
- If treatment is delayed, ketoacidosis (DKA) and death may follow
- Coma is more common in Type 1

Type 2

- There may be few or no symptoms for years before it is diagnosed
- Usually discovered during routine blood glucose screening
- Increased urinary frequency (polyuria), thirst (polydipsia), hunger (polyphagia)
- Unexplained weight loss.
- Numbness in extremities
- Pain in feet (dysesthesias)
- Fatigue
- Blurred vision
- Recurrent or severe infections
- Complications are more common than in Type 1
- Coma is less common in type 2 diabetes

Gestational diabetes

- Increased urinary frequency (polyuria), thirst (polydipsia)
- Difficult to recognize as abnormal since frequency of urination increases during pregnancy
- A larger than normal baby during pregnancy - foetal macrosomia should prompt screening for diabetes

Complications

Microvascular

- Retinopathy leading to blindness
- Nephropathy leading to renal failure
- Neuropathy leading to impotence and diabetic foot disorders which may lead to amputation

Macrovascular

- Cardiovascular diseases such as myocardial ischaemia (which may cause infarction) and strokes
- Insufficiency in blood flow to legs (peripheral vascular disease)

Investigations

- Fasting plasma glucose (FPG) level ≥126 mg/dL (7.0 mMol/L), ***or***
- 2-hour plasma glucose level ≥200 mg/dL (11.1 mMol/L) during a 75-g oral glucose tolerance test (OGTT), ***or***

- A random plasma glucose ≥200 mg/dL (11.1 mmol/L) in a patient with classic symptoms of hyperglycaemia or hyperglycaemic crisis
    - HbA1c level > 6.5%

Screening in Pregnancy

- Test for undiagnosed diabetes at the first prenatal visit in those with risk factors, using standard diagnostic criteria.
- Test for gestational diabetes mellitus at 24-28 weeks of gestation in pregnant women not previously known to have diabetes.
- Test women with gestational diabetes mellitus for persistent diabetes at 4-12 weeks postpartum, using the oral glucose tolerance test and clinically appropriate non-pregnancy diagnostic criteria.
- Women with a history of gestational diabetes mellitus should have lifelong screening for the development of diabetes or pre-diabetes at least every 3 years.

Treatment objectives

- Eliminate symptoms
- Prevent, or at least slow down, the development of complications
- Manage complications when they arise
- Improve quality of life and productivity of affected persons
- Promote self-care practices and empowerment of persons with diabetes

Treatment

Diabetes mellitus (DM) is a condition that requires lifelong management and a multidisciplinary approach. Patient adherence to their medication, self-blood monitoring of glucose, medical nutrition therapy, diabetes self-management education, and psychosocial support plays a big role in the control of DM and prevention of long-term complications.

Physical Examination

- Height, weight, and BMI; growth and pubertal development in children and adolescents
- Blood pressure determination, including orthostatic measurements when indicated
- Fundoscopic examination
- Comprehensive foot examination

Inspection

- Palpation of dorsalis pedis and posterior tibial pulses
- Presence/absence of patellar and Achilles reflexes
- Determination of proprioception, vibration, and monofilament sensation

Non-pharmacological treatment

- Advice on lifestyle modification i.e. increase physical activity, healthy diet, no smoking or alcohol consumption.
- Psychosocial care
- Educate on glycaemic targets

Pharmacological treatment

General WHO guidelines

1. Main stay of treatment for Type 2 diabetes is metformin
2. Give a sulfonylurea to patients with Type 2 diabetes who do not achieve glycaemic control with metformin alone or who have contraindications to metformin.
3. Introduce human insulin treatment to patients with Type 2 diabetes who do not achieve glycaemic control with metformin and/or a sulfonylurea.
4. If insulin is unsuitable, a DPP-4 inhibitor, an SGLT2 inhibitor, or a thiazolidinedione may be added
5. Use human insulin to manage blood glucose in adults with Type 1 diabetes and in adults with Type 2 diabetes for whom insulin is indicated.
6. Consider long-acting insulin analogues to manage blood glucose in adults with Type 1 or Type 2 diabetes who have frequent severe hypoglycaemia with human insulin

Type 1 DM

Patients with Type 1 DM require lifelong insulin therapy. Most require two or more injections of insulin daily, with doses adjusted on the basis of self-monitoring of blood glucose levels

Type	**Example**	**Onset**	**Peak**	**Duration**	**Posology**
Short acting	Regular human insulin	30 minutes	2-5 hours	5-8 hours	3 times daily 30 minutes before meals
Intermediate acting	NPH insulin	1-3 hours	6-12 hours	16-24 hours	1 or 2 times daily before 10 pm at night
Biphasic insulin	Regular human + NPH	30 minutes	2-12 hours	16-24 hours	1 or 2 times daily before 10

	in various proportions e.g. 30/70				pm at night
Long acting	Glargine	3-4 hours	5 hours	24 hours	Given at bed time

Pharmacological treatment

Rapid acting: daily insulin requirement may vary and is usually between 0.5-1 units/kg/day.

Short acting: (regular insulin) also available in a mixed form i.e. 70% **Neutral Protamine Hegedorn (NPH)** insulin and 30% regular human insulin

- Initial dose 0.2-0.4 units/kg/day SC divided every 8 hours or more frequently.
- Maintenance: 0.5-1 unit/kg/day SC divided every 8 hours
- Diabetic ketoacidosis: 0.1 units/kg IV bolus

Intermediate Insulin (e.g. **NPH insulin**): 0.5-1 units/kg/day SC in divided doses.
Long acting insulins (e.g. **Insulin Glargine**): 0.5-1 units/kg/day in divided doses
Ultralong-acting basal insulin usual initial dose (e.g. **Degludac**): 0.2-0.4 units/kg

Type 2 Diabetes Mellitus
Biguanides
Metformin oral
Adult
Initial dose: 500 mg every 12 hours or 850 mg per day with meals.
Increase dose in increments of 500 mg/week
Or 850 mg every 2 weeks on the basis of glycaemic control and tolerability
Maintenance dose: 1500 - 3000 mg/day divided every 8-12 hours with meal

Note:

- Do not exceed 3000 mg/day

PLUS/OR
Sulphonyureas
Glibenclamide oral
Adult:
Initial dose 2.5-5 mg per day
Maintenance dose: 1.25-20 mg per day or every 12 hours
Note:
Do not exceed 20 mg/day. **Not recommended for ≥60 years**

OR
Gliclazide 30 mg controlled release tablets
Adult:
Initial recommended dose is 30 mg orally daily.
Dose titration should be carried out in steps of 30 mg, according to the fasting blood glucose response at intervals of at least 2 weeks.

Note:

- Daily dose should not exceed 120 mg.

Management of T2DM in pregnancy
Insulin is the safest drug for diabetes in pregnancy. Dosages can be administered in an individualized manner based on blood glucose level.

Long term monitoring
Besides assessing diabetes-related complications, clinicians and their patients need to be aware of common co-morbidities that affect people with diabetes and may complicate management.

Referral
Refer patient to a diabetologist in cases where there is resistance to treatment and when complications arise.

Diabetic retinopathy (eye disease)

Diabetic retinopathy is caused by small blood vessel damage to the back layer of the eye, the retina, leading to progressive loss of vision, even blindness.

Symptoms
- Blurred vision
- Other visual symptoms may also be present.

Diagnosis
Regular eye examinations.

Treatment and prevention
- Good metabolic control can delay the onset and progression of diabetic retinopathy.
- Regular eye examinations and timely intervention can prevent or delay blindness

Nephropathy (kidney disease)

It is caused by damage to small blood vessels in the kidneys causing kidney failure, and eventually leads to death. It is the leading cause of dialysis and kidney transplant in developing countries.

Symptoms
- Patients usually have no symptoms in the early stages
- May feel tired, become anaemic, not think clearly, and even develop dangerous electrolyte imbalances in later stages of the disease

Diagnosis
- Urinalysis for protein
- Urea, electrolytes, creatinine; estimation of GFR

Treatment and prevention
- Control of high blood glucose
- Control of high blood pressure
- Give appropriate medication in the early stages of kidney damage
- Restrict dietary protein

Diabetic Neuropathy (nerve disease)

Diabetes causes nerve damage, which can lead to sensory loss, damage to limbs, and impotence in diabetic men. It is the most common complication of diabetes.

Signs and symptoms
- Numbness and paraesthesia in extremities which can lead to patients not recognizing cuts and developing foot infections which when not treated early may lead to amputation
- Pain in extremities
- Impotence, urinary retention and incontinence (autonomic neuropathy), constipation and alternating diarrhoea, postural dizziness

Diagnosis
- Careful examination of feet by patients and health care providers at regular intervals.

Treatment and prevention
- Optimize blood glucose control
- Regular inspection and good care of the foot can prevent amputations

Cardiovascular disease

Hyperglycaemia damages blood vessels through a process called “atherosclerosis”, or clogging of arteries, which can lead to decreased blood flow to:
- Heart muscle (causing a heart attack)
- Brain (leading to stroke),
- Extremities (leading to pain and decreased healing of infections).

Signs and symptoms
- The symptoms of these different conditions are varied: ranging from chest pain to leg pain, to confusion and paralysis.
- Signs may include reduced ankle-brachial index, ischaemic changes on the electrocardiogram.

Diagnosis
- Early detection of other risk factors such as smoking, high blood pressure, high serum cholesterol and obesity is important.

Treatment and prevention
- Control risk factors
- Appropriate blood glucose control can prevent or delay cardiovascular complications.

Hypoglycaemia

Blood glucose decreases to below normal levels in this condition. Symptoms usually occur when the blood glucose is less than 3.0 mMol/L (55 mg/dL)

Causes
- Medications (insulin and sulfonylureas)
- Sepsis
- Kidney failure
- Certain tumours
- Liver disease
- Alcohol intake
- Starvation

Signs and symptoms
The two types: neurogenic and neuroglycopenic
Neurogenic manifestations (due to elevated adrenaline levels):
- Palpitations
- Tremors
- Anxiety
- Sweating
- Hunger
- Paraesthesia

Neuroglycopenic manifestations (due to decrease glucose reaching the brain):
- Irritability
- Confusion
- Fatigue
- Drowsiness
- Seizures
- Loss of consciousness
- Death

Note: The Whipples's triad provides a framework for diagnosis of hypoglycaemia:

- Symptoms of hypoglycaemia
- Low plasma glucose concentration (<2.5 mMol/L)
- Alleviation of hypoglycaemic symptoms after glucose administration

Differential diagnosis
- Other causes for loss of consciousness

Investigations
- Blood glucose level
- Other tests to confirm the cause of hypoglycaemia

Treatment objectives
- Rapid steps to restore blood glucose to within the normal range
- Identify and treat underlying cause(s) of hypoglycaemia.

Pharmacological treatment

If patient is conscious or at home
Observe the 15-15 rule

Take ***15 grams*** of carbohydrate

Glucose tablets

OR
Half cup of any **soft drink,** fruit juice (note: should not be diet soft drink or without sugar)

OR
1 tablespoon of **sugar or honey**

- Check blood glucose after ***15 minutes***
- Repeat these steps until the blood glucose level is at least 70 mg/dL.
- When the blood glucose level becomes normal patient should eat a meal or snack to stabilize the blood glucose level

Dextrose

- IV: 10-25 g (i.e., 20-50 mL of 50% solution or 40-100 mL of 25% solution)
- Oral: 4-20 g as a single dose; may repeat after 15 minutes if self-monitoring of blood glucose shows continued hypoglycaemia

Prevention

- Educate patients on hypoglycaemia: causes, early symptoms and management
- Encourage patients to have regular meals
- Use of identification tags to help with emergency support

Diabetic Ketoacidosis (DKA)

Diabetic ketoacidosis (DKA) is a potentially life-threatening complication of diabetes mellitus, and it is always a medical emergency. It is characterized by ketosis, acidosis, and hyperglycaemia. It is more common in Type 1 diabetes.

Causes

- Mostly with Type 1 diabetes but not totally absent with Type 2
- Poor control of diabetes mellitus
- Management errors resulting in inadequate insulin, such as defective insulin pens, missing doses
- Infections such as pneumonia, influenza, gastroenteritis, urinary tract infection
- Cardiovascular disorders such as stroke, myocardial infarction
- Drug interactions with medicines such as steroids

Signs and symptoms

- Onset of symptoms is usually rapid
- Sweet, acetone smell on the breath
- Vomiting
- Dehydration
- Fever
- Abdominal pain
- Deep, sighing breathing
- Increased urination and thirst
- Weakness
- Confusion
- Occasionally loss of consciousness

Investigations

- Blood glucose level
- Urine for ketones
- Arterial blood gases
- Urea, electrolytes and Creatinine

Treatment objectives

- Replace the fluid losses
- Replace the electrolyte losses and restore acid–base balance
- Replace deficient insulin
- Identify and treat the underlying cause appropriately

Pharmacological treatment

- Use only short-acting **insulin** to correct hyperglycaemia, to achieve a glucose rate of decline of 100 mg/dL/hour.
- Do not let the blood glucose level to fall below 200 mg/dL in the first 4-5 hours of treatment.

Fluid replacement

Isotonic saline solution (0.9% sodium chloride): 1000 mL in the first hour

THEN

Continue fluid replacement according to vital signs, urinary output, and clinical condition
Isotonic saline solution (0.9% sodium chloride):
- 1st 1000 mL in the first 30 minutes to one hour
- 2nd 1000 mL over the next 1 hour
- 3rd 1000 mL over the next 4 hours
- 4th 1000 mL over the next 4 hours
- Subsequently,1000 mL every 6 hours
- Convert to 5% glucose infusion once blood glucose reaches 250mg/dL to prevent hypoglycaemia

Soluble/regular insulin
- 0.1unit/kg IV bolus (give 10-20 units IV or IM immediately)

THEN
- 0.1unit/kg/hr continuous IV infusion
- Decrease infusion rate to 0.05-0.1 unit/kg/hour when blood glucose reaches 250 mg/dL

OR
- Give 5 units IV or IM, every hour until blood ghucose is 11 mMol/L or less
- If serum glucose does not fall by 50 mg/dL in the first hour, check hydration status
- If possible, double the **insulin** every hour until glucose levels fall at the rate of 50-75 mg/dL/hr

Potassium replacement
- Start 2 hours after initiating **insulin** and 0.9% **sodium chloride** infusion
- Check for adequate urine output (should be >30 mL/hour)
- Place 10-20 mmoL of **potassium chloride** in 500 mL of 0.9% **sodium chloride** (if serum potassium is below 5.5 mEq/L)
- Check blood potassium levels twice daily; withhold **potassium chloride** if blood potassium level is > 6 mMol/L

Prevention
- Encourage adherence to prescribed diabetes medication and recommended lifestyle modification e.g. nutrition
- Monitor blood glucose levels regularly and readjust management modalities as required
- Monitor ketone levels during periods of greater risk such as stress, illness, and increased physical activity
- Educate family members on actions to take in case of emergency

Referral
Refer for expert care if:
- There are inadequate resources for managing the patient
- The patient remains comatose or fails to pass adequate amounts of urine despite management.

Hyperosmolar Hyperglycaemic State (HHS)

Hyperosmolar hyperglycaemic state (HHS) is a complication of diabetes mellitus in which high blood glucose results in high osmolarity without significant ketoacidosis. It is more common in type 2 diabetes

Causes

- Mostly Type 2 diabetes
- Insufficient insulin
- Poor kidney function
- Dehydration
- Infections
- Other disorders (e.g. cerebral vascular injury, myocardial infarction, sepsis)
- Certain medications (glucocorticoids, beta-blockers, thiazide diuretics, calcium channel blockers, and phenytoin)

Signs and symptoms
- Onset may develop over days to weeks
- Dehydration
- Weakness
- Leg cramps
- Vision problems
- Altered level of consciousness
- Seizures
- No ketosis or acidosis

Investigations

- Blood glucose
- Serum electrolytes, urea and creatinine
- Serum osmolality

Pharmacological treatment

- Treat as for diabetic ketoacidosis, but note that total insulin requirement is usually lower than for diabetic ketoacidosis.
- Fluid and electrolyte replacement with 0.9% normal saline is the standard of care

Adult:
Initial bolus of 15 to 20 mL/kg
Maintenance infusion rate: 200-250 mL/hour

Note:
- Fluid replacement can reduce serum glucose at a rate of 75-100 mg/hour
- ***Avoid aggressive rehydration in patients with cardiac or renal insufficiency***
- Insulin regimen is similar to that of DKA. However care should be taken to avoid starting insulin at initial stage of treatment in order to prevent rapid decline in serum glucose, with potential risk of cerebral edema
- Potassium replacement should be started when the serum potassium is between 4 to 4.5 mmol/L

Diabetes and HIV/AIDS medications

- Protease inhibitors (PIs) increase insulin resistance and reduce insulin secretion. Patients on Protease Inhibitors may require insulin or an increase in dosage if they were previously on insulin.
- Sulfonylureas may not be effective in the face of severe insulin resistance
- People who are on anti-retroviral therapy need to be screened for diabetes at least once a year, especially if they have the risk factors for cardiovascular disease.

Diabetes and Tuberculosis

- People attending TB clinics should be screened for diabetes
- Diabetics should be screened for TB
- Diabetes may be associated with delayed sputum conversion (>60 days)
- Diabetics have higher:
    - TB treatment failure
    - Recurrence and relapse rates
    - Overall mortality
    - Rates of multi-drug resistant TB
    - Atypical presentation in hyperosmolar hyperglycaemic nonketotic coma or diabetic ketoacidosis

Thyroid Disorders

Hypothyroidism (Myxoedema)

Hypothyroidism is a condition in which the thyroid gland does not produce enough thyroid hormone.

Causes
- Autoimmune disease mainly
- Hashimoto's thyroiditis (antibody-related thyroid gland destruction)
- Thyroidectomy (surgical removal of the thyroid)
- Pituitary lesions or surgery
- Congenital
- Severe iodine deficiency
- Post-therapeutic, especially after radiotherapy, or surgical treatment for hyperthyroidism

Symptoms
- Intolerance to cold environments
- Constipation
- Lethargy
- Weight gain
- Hair loss
- Dry skin
- Hoarse voice
- Memory loss
- Goiter may be present
- Abnormal menstrual periods and sub-fertility (in adult females)
- Poor growth, development and poor school performance in children

Signs
Neonate
- Persistence of neonatal jaundice
- Excessive sleep
- Feeding problems

Children
- Cretinism (mental sub normality, short stature, large tongue, dry skin, sparse hair, protuberant abdomen, umbilical hernia, abnormal facies)

Adult
- Bradycardia (pulse rate <60 per minute)
- Dry coarse skin and hair
- Puffy face
- Dull facial expression
- Periorbital swelling
- Pallor
- Hoarse voice
- Slow reflexes
- Non-pitting oedema
- Dementia
- Goitre may be present

Complications
- Myxoedema coma
- Cretinism in children

Investigations
- Thyroid function tests - free T3, free T4 and, TSH34
- CT scan of the head only if pituitary cause suspected

Treatment objectives
- Establish the cause
- Establish the severity of hypothyroidism
- Restore normal body functions
- Prevent complications

Non-pharmacological treatment
- Surgical intervention for pituitary-related causes as indicated

Pharmacological treatment

Levothyroxine (T4)
Mild hypothyroidism **Adult 18-49 years:**

Initially 50-100 micrograms once daily (orally); adjusted in steps of 25-50 micrograms every 3-4 weeks, according to response.

Maintenance: 100-200 micrograms once daily

Adult 50 years and over:
Initially 25 micrograms once daily, adjusted in steps of 25 micrograms every 4 weeks, according to response.

Severe hyperthyroidism or hyperthyroidism in patients with cardiac disease
Initially 25 micrograms once daily, adjusted in steps of 25 micrograms every 4 weeks, according to response.
Maintenance: 50-200 micrograms once daily.
Note:
Dose should be taken preferably at least 30 minutes before breakfast, caffeine-containing drinks or other medication.

Prevention
- Hypothyroidism may be prevented in a population by adding iodine to commonly used foods, for example, salt iodization

Hyperthyroidism (Thyrotoxicosis)

Hyperthyroidism is the condition that occurs due to excessive production of thyroid hormone by the thyroid gland.

Causes
- Grave's disease (autoimmune, common in females) - the commonest cause
- Multi-nodular goitre
- Neonatal thyrotoxicosis
- Tumours of thyroid gland (adenomas, multinodular toxic goiter)
- Inflammation of the thyroid gland (thyroiditis)
- Iatrogenic causes (side effect of some medications e.g. amiodarone)
- *Struma ovarii* (ovarian teratoma)

Symptoms
- Weight loss despite increased appetite
- Profuse sweating
- Polydipsia and polyuria
- Pruritus
- Heat intolerance
- Tremors
- Irritability and nervousness
- Tachycardia, palpitations or irregular heart beats
- Amenorrhea/ oligomenorrhoea
- Infertility and spontaneous abortions
- Loss of libido, impotence
- Irregular sleep

Signs
- Tremors
- Moist palms
- Hair loss
- Rapid pulse rate (tachycardia) which may be irregular
- Heart failure
- Pigmentation and vitiligo
- Goitre often, but not always present
- Ocular:
    - Proptosis (abnormal protrusion of the eyes)
    - Lid lag
    - Lid retraction
    - Grittiness, excessive lacrimation
    - Exophthalmos
    - Diplopia
    - Papilledema

Investigations
- Thyroid function tests (high T_3, T_4, low TSH)
- Thyroid ultrasound scan
- Biopsy of thyroid gland for cytology/histology

Differential diagnosis
- Anxiety states
- Malabsorption syndrome - weight loss
- Malnutrition - weight loss
- Active tuberculosis -weight loss, cough if in heart failure
- Poorly controlled diabetes mellitus -weight loss, polyphagia
- Tumours of the adrenal gland (pheochromocytoma)
- Other causes of weight loss
- Other causes of protruding eyes

Complications
- Cardiovascular disorders - atrial fibrillation, congestive heart failure
- Osteoporosis
- Ophthalmopathy which can lead to vision loss
- Dermopathy
- Thyroid storm

Treatment objectives
- Achieve normal metabolic rates
- Achieve normal T_3, T_4 and TSH levels
- Prevent complications

Non-pharmacological treatment
- Partial thyroidectomy

Pharmacological treatment

1st line
Carbimazole oral
Adult:
15-40 mg orally daily; continue until the patient becomes euthyroid, usually after 4 to 8 weeks.
Maintenance dose is 5-15 mg daily and therapy usually given for 12-18 months.
Child:
Neonate: initially, 250 micrograms/kg orally every 8 hours until euthyroid, then adjust as necessary.
1 month to 12 years: initially 250 micrograms/kg (maximum 10 mg every 8 hours) until euthyroid, then adjust as necessary
12-18 years: initially 10 mg every 8 hours until euthyroid then adjust as necessary

Pregnancy:
- **Carbimazole** is teratogenic, therefore avoid during the first trimester.
- May commence with **propylthiouracil** during the first trimester and switch to **carbimazole** after the first trimester. Propylthiouracil has more adverse reactions.

If first line treatment fails refer patient to specialist for further management
Symptomatic treatment of symptoms of thyrotoxicosis
- Tachycardia,
- Tremor
- Anxiety

1st line
Propranolol
- Initially: 40 mg orally every 12 hours
- Maintenance: 120-320 mg/day orally in divided doses every 8-12 hours

2nd line
If β-blockers are contraindicated, use non-dihydropyridine calcium channel blockers (e.g. verapamil)

Goitre

Goitre is an enlarged thyroid gland resulting in a swelling in the neck. Most goiters are benign, causing only cosmetic disfigurement. Morbidity or mortality may result from compression of surrounding structures, thyroid cancer, hyperthyroidism, or hypothyroidism.

Classification
- Grade 0: No goitre is palpable or visible.
- Grade 1: palpable goitre, not visible when neck is held in normal position

- Grade 2: a clearly swollen neck (also visible in normal position of the neck) that is consistent with a goitre on palpation

Causes
- Endemic goitre - from iodine deficiency
- Simple goitre - not enough thyroid hormone is produced by the thyroid gland which in turn enlarges to compensate.
- Sporadic goitres e.g. arising from the use of medication like lithium.
- Autoimmune diseases
    - **Graves' disease:** this causes the thyroid gland to produce too much thyroid hormone which causes the gland to swell
    - **Hashimoto's disease**: this causes the thyroid gland to produce too little thyroid hormone. In response, the pituitary gland produces more TSH to stimulate the thyroid which then result in an enlarged gland
- **Thyroid nodules**: solid or fluid-filled lumps, called nodules, can develop in one or both sides of the gland, resulting in overall enlargement of the gland.
- **Thyroid cancer**: certain types of thyroid cancer can cause generalized swelling of the gland. These include infiltrating papillary thyroid cancer, lymphoma, and anaplastic thyroid cancer.
- **Pregnancy:** human chorionic gonadotropin (HCG), produced during pregnancy, may slightly cause the thyroid gland to enlarge. This often resolves on its own once the baby is born.
- **Thyroiditis:** an inflammatory condition that can cause pain and swelling in the thyroid and over- or under-production of thyroxine. Thyroiditis can occur in the postpartum period or as the result of a viral infection.
- Head and neck irradiation for therapeutic purposes increases the risk of developing a goitre.
- A goitre may be associated with hypothyroidism or thyrotoxicosis (hyperthyroidism)

Symptoms
- Swelling in the neck
- Difficulty with swallowing
- In severe cases, difficulty with breathing, possibly with a high pitch sound (stridor).
- Symptoms of hypothyroidism
- Symptoms of hyperthyroidism

Signs
- Irregular or diffuse thyroid swelling
- Bradycardia (pulse rate < 60 per minute) – associated hypothyroidism is likely; look for other signs
- Tachycardia (pulse rate > 90 per minute) – associated thyrotoxicosis is likely; look for other signs

Investigations
- Thyroid function tests with free T3, and T4, which are expected to be high;TSH suppressed.
- Thyroid ultrasound scan
- Radiograph of the neck including thoracic inlet view
- Radioactive iodine scan: this provides a detailed picture following an injection of radioactive iodine.
- Fine-needle aspiration: a biopsy to remove a sample of cell from within the gland if cancer (for example) is suspected

Treatment objectives
- Correct levels of thyroid hormone
- Normalize the metabolic rate
- Normalize serum T3, and T4 and TSH levels
- Prevent complications

Pharmacological treatment
See sections on hypothyroidism and hyperthyroidism

Adrenal Insufficiency

Adrenal insufficiency occurs when the adrenal gland is either destroyed by disease, or atrophies following pituitary failure or chronic corticosteroid use or misuse. Thus the adrenal glands fail to make important hormones such as cortisol and aldosterone (mainly) and adrenaline (during stress). Acute adrenal insufficiency is a medical emergency.
Adrenal insufficiency may be primary, secondary and tertiary
- Primary: also known as Addison's disease. It occurs when the adrenal glands are damaged and making enough cortisol and aldosterone
- Secondary: occurs when the pituitary gland doesn't make enough ACTH and hence not enough cortisol.
- Tertiary: due to hypothalamic disease and a decrease in the release of corticotropin releasing hormone

Causes

- Autoimmune destruction of the adrenal gland
- Sudden cessation of corticosteroid therapy after prolonged use
- Pituitary gland tumours
- Surgical removal or radiation therapy of the pituitary gland
- Congenital adrenal hyperplasia in children
- Cancer
- Fungal infections
- Cytomegalovirus infection (more common in HIV patients)
- Tuberculosis
- Dental procedures

Symptoms
- Chronic, worsening fatigue, muscle weakness, loss of appetite, and weight loss are characteristic of the disease.
- Nausea, vomiting, and diarrhoea occur in about 50 percent of cases.
- Hypoglycaemia and low blood pressure which falls further when standing, causing dizziness or fainting (more severe in children than in adults).
- Dysmenorrhea/amenorrhea in women

Signs
- Skin changes also are common in Addison's disease, with areas of hyperpigmentation. The darkening of the skin is most visible on scars, skin folds; pressure points such as the elbows, knees, knuckles, and toes; lips; and mucous membranes.
- In children: ambiguous genitalia, short stature and failure to thrive
- Dehydration

Investigations
- ACTH stimulation test (most specific)
- Full blood count
- Blood film for malaria parasites
- Urine and blood cultures, if indicated
- Blood urea and electrolytes
- Blood glucose
- Plasma cortisol - morning sample
- Plasma ACTH
- C T scan

Treatment objectives
- Regulate fluid and electrolyte imbalance
- Regulate corticosteroid levels
- Identify the cause
- Prevent complications

Pharmacological treatment

Intravenous fluid
Adult: 0.9% **sodium chloride** in 5% **glucose (dextrose/saline**), IV, 1 litre every 4-6 hours
Child: 0.45% **sodium chloride** in 5% **glucose**, IV, according to total fluid requirement.

Hydrocortisone IV
Adult: 200 mg stat, followed by 100 mg, IV, every 6 hours until condition is stable
Child:
6-12 years:100 mg, IV, every 6 hours
1-5 years: 50 mg, IV, every 6 hours
Up to 1 year: 5 mg, IV, every 6 hours

Maintenance Therapy
For patients with previous or newly diagnosed adrenal or pituitary disease
Prednisolone, oral
Adult: 5mg morning and 2.5 mg evening each day
Child: 140 micrograms/kg in 2 divided doses

OR
Hydrocortisone oral
Adult: 20 mg morning and 10 mg evening each day
Child: 560 micrograms/kg in 2 divided doses
For patients requiring steroids for previously diagnosed medical conditions (e.g. asthma)
Adult and **Child:** restart the previous doses of oral corticosteroids given for the condition.

For patients who abuse corticosteroids
Adult:
Restart oral corticosteroids (or replace topical corticosteroids with)**:**
Prednisolone, oral, 20-40 mg daily, and gradually taper off the dose over several months (e.g. reducing by 2.5 mg per month) and eventually discontinue.

Cushing's Syndrome

This condition, also called hypercortisolism results in signs and symptoms caused by excess free plasma glucocorticoids and is caused by endogenous production or prolonged exposure to exogenous use of glucocorticoid products. It is predominant in women.

Causes
- Glucocorticoids/steroid consumption (most common): oral, injectable and topical
- Pituitary tumour, causing the body to produce too much cortisol (Cushing's disease)
- Oestrogen-based oral contraceptives
- Adrenal tumour
- Prolonged and excessive intake or abuse of corticosteroids

Symptoms
- Weight gain
- Excess body hair and acne
- Easy bruising of skin
- Sleep problems
- Menstrual irregularity and sub-fertility
- Decreased libido and erection problems
- Weakness of the thigh muscles
- Minor injuries take longer to heal
- Anxiety and depression
- Irritability
- Loss of emotional control
- Osteoporosis
- Kidney stone

Signs
- Weight gain especially upper body
- A fat pad in the upper back or base of the neck
- Rounded or 'moon' face
- Excess facial and body hair
- Acne
- Striae (purplish stretch marks)
- Thinning skin that is easy to bruise; bleeding into the skin after venipuncture is common
- Hypertension
- Truncal obesity
- Prominent supraclavicular fat pads
- Increase pigmentation of the skin

Differential diagnosis
- Alcoholism
- Bulimia nervosa
- Depression
- Obesity

Investigations
- Plasma cortisol (commonly elevated in pituitary and adrenal tumours, but low in corticosteroid use or abuse)
- Blood electrolytes (may show low potassium)
- Blood glucose (commonly elevated)
- Abdominal ultrasound scan may show an adrenal tumour
- CT scan (may show evidence of a pituitary or adrenal tumour

Treatment objectives
- Achieve normal plasma cortisol level
- Correct electrolyte imbalance
- Achieve normal blood pressure
- Correct plasma glucose
- Prevent complications

Non-pharmacological treatment
- Pituitary or adrenal surgery if tumours in the respective glands have been diagnosed.

Pharmacological treatment
- Treatment depends on identifying the cause through specialized investigations.
- Manage hypertension and diabetes

Prevention
- Avoid high dose and long-term use of corticosteroids as much as possible

Obesity

Obesity is a complex disorder involving an excessive amount of body fat.

Classification

BMI in kg/m²	*Weight status*
Below 18.5	Under weight
18.5-24.9	Normal (healthy weight)
25.0-29.0	Over weight
30.0-34.9	Type 1 obesity
35.0-39.9	Type 2 obesity
Above 40	Type 3 or morbid obesity

WHO designations

Classification	*Designation*	*BMI kg/m²*
Grade 1	Overweight	25-29.9
Grade 2	Obesity	30-39.9
Grade 3	Severe or morbid obesity	≥40 kg/m²

BMI does not differentiate between body fat and muscle mass. Some authorities advocate a definition of obesity based on percentage of body fat, as follows:
- Men: Percentage of body fat greater than 25%, with 21-25% being borderline
- Women: Percentage of body fat great than 33%, with 31-33% being borderline

Causes
- Excess calorie intake
- Genetics
- Sedentary lifestyle

Symptoms
There are no specific symptoms associated with obesity
- The main symptom is a complaint of being too fat or concern expressed by relatives

Signs
- There are no specific physical signs associated with obesity other than excess body weight or fat.

Co-morbidities
- Greater disposition to respiratory diseases
- Malignancies e.g. prostrate, colon, breast cancers
- Depression due to stigmatization
- Cardiovascular disorders such as coronary artery disease, essential hypertension, left ventricular hypertrophy, stroke, pregnancy-related hypertension
- Increased surgical risk and postoperative complications
- Gall bladder disease, fatty liver infiltration, and reflux oesophagitis
- Type 2 diabetes mellitus
- Anovulation, early puberty, infertility, hyperandrogenism and polycystic ovaries
- Hypogonadotropic hypogonadism in men
- Intretrigo (bacterial and/or fungal), hirsutism, and increased risk for cellulitis and carbuncles
- Venous varicosities, lower extremity venous and/or lymphatic oedema
- Reduced mobility and difficulty maintaining personal hygiene

Investigations
- Fasting lipid panel

- Liver function studies
- Thyroid function tests
- Fasting glucose and haemoglobin A1c (HbA1c)

Treatment objectives

Comprehensive lifestyle management (i.e., diet, physical activity, behaviour modification)

- Achieve a loss of 10% of the initial body weight within 6 months, at a rate of 2-4 kg per month

OR

- Attain the ideal BMI and/or abdominal girth
- Sustain the weight loss achieved
-

Non-pharmacological treatment

- Weight reducing diet, preferably under the supervision of a dietician
- Regular physical activity comprising 30 minutes brisk walking, or equivalent activity, for a minimum of 3 days per week
- Motivate patient to adhere to all management strategies
- Appropriate management of any associated disorders

Dyslipidaemias

Dyslipidaemia is a medical condition that refers to abnormal level of blood lipids.

Classification

The most common forms of dyslipidaemia involve:

- High levels of low-density lipoproteins (LDL) also known as **bad cholesterol**;
- Low levels of high-density lipoproteins (HDL), or **good cholesterol**
- High levels of triglycerides.
- High total cholesterol levels

Causes

- High dietary intake of saturated fats (animal fat)
- Lack of physical activity
- Diabetes mellitus, especially if poorly controlled
- Obesity, especially excess weight around the waist
- Metabolic syndrome
- Hereditary factors
- Primary hypothyroidism
- Nephrotic syndrome
- Drugs-Thiazides, B-blockers, Corticosteroids

Signs and symptoms

Symptoms

- Usually none
- Abdominal pain due to pancreatitis may be associated with elevated triglycerides

Signs

- Usually none
- Occasionally
    - Whitish ring around the cornea
    - Yellowish skin eruptions around the eyes (xanthelasma)
    - Whitish blood sample (lipidaemic blood).

Complications

- Coronary heart diseases (CAD)
- Peripheral artery diseases

Investigations

- Total cholesterol (TC): does not require a fasting blood sample; may be requested alone as a screening test.
- A full blood lipid assessment, including TC, HDL cholesterol and triglycerides (TG), is best carried out on a fasting blood sample (the result of LDL cholesterol is often calculated from the results of the 3 other tests).

Treatment objectives

- Normalize the blood lipid profile to recommended target levels
- Reduce the risk of cardiovascular events and cardiovascular-related deaths
- Reduce the risk of cerebrovascular events and cerebrovascular-related deaths

Non-pharmacological treatment

- Dietary measures: a low calorie, low saturated (animal) fat , high polyunsaturated (plant) fat diet is recommended, under the supervision of a dietician.
- Weight reduction in patients who are overweight or obese.
- Reduction in alcohol consumption, where this is excessive.
- Regular physical activity, or exercise tailored to the individual patient.

Pharmacological treatment

Priorities for pharmacotherapy for those with highest risk:

- Pre-existing CHD
- Diabetes
- Stroke
- Transient ischaemic attacks
- Peripheral artery disease

Atorvastatin oral
Adult: 10-20 mg daily (usually at night)

Referral

All patients who remain outside the target values despite adequate dietary and exercise therapy and who require medications should be referred to the appropriate specialist.

Hypercalcaemia

Hypercalcemia can result when too much calcium enters the extracellular fluid or when there is insufficient calcium excretion from the kidneys.

Causes

- Malignancy
- Hyperparathyroidism
- Medications (e.g. thiazide diuretics, excess calcium supplements)
- Paget's disease
- Adrenal insufficiency

Classification	*Total calcium*	*Ionized calcium*
Mild	10.5-11.9 (2.5-3 mmol/L)	5.6-8 mg/dL (1.4-2 mmol/L)
Moderate	12-13.9 mg/dL (3-3.5 mmol/L)	8-10 mg/dL (2-2.5 mmol/L)
Hypercalcaemic crisis	14-16 mg/dL (3.5-4 mmol/L)	10-12 mg/dL (2.5-3 mmol/L)

Signs and symptoms

Rapid rising calcium levels

- Mild or no symptoms
- Recurring kidney or biliary stones

Sudden-onset

- Kidney or biliary stones (calcium oxalate/phosphate stones)
- Abdominal pain, nausea and vomiting
- Polyuria and dehydration
- Bone pain
- Confusion
- Depression
- Somnolence progressing to coma (hypercalcaemic crisis)
- Weakness

Differential diagnosis

- Hyperkalaemia
- Hypermagnesemia
- Hypernatremia
- Hyperparathyroidism
- Hyperphosphatemia

Complications

- Hypercalcaemic crisis which is a life-threatening condition

Investigations
- Full blood count: suspect malignancy if there is anaemia
- Erythrocyte sedimentation rate: non-specific indicator of general health
- Urea, electrolytes, creatinine: hypercalcaemia may occur in a setting of dehydration or renal failure
- Liver function test: may be deranged with malignant diseases
- Serum calcium level: should be interpreted with serum albumin (correction required if albumin is deranged)
- Alkaline phosphatase (ALP) and serum phosphate:
    - Primary hyperparathyroidism- low phosphate and normal ALP
    - Malignancy and bone metastasis - increased ALP
- Thyroid Stimulating Hormone, free thyroxine: hyperthyroidism may be associated with mild to moderate hypercalcaemia
- Prolactin levels: hypercalcaemia is usually the first indication of Multiple Endocrine Neoplasia (MEN) 1 (patients may be asymptomatic)
- Vitamin D levels: if deficiency is uncorrected, dangerous hypocalcaemia may occur after parathyroid surgery
- Chest radiograph: may show malignancy or sarcoidosis
- Liver ultrasound scan: may show evidence of metastatic disease

Treatment objectives
Treatment depends on the severity of symptoms and the underlying cause
- Achieve appropriate volume repletion in emergency situations

Pharmacological treatment
Mild and moderate
- Encourage adequate oral hydration
- Reduce dietary intake of calcium
- Avoid thiazide diuretics, lithium and high calcium diet

Severe

IV hydration with 0.9% (**isotonic saline**):

4 litres over 24

- In patients who may not tolerate aggressive fluid resuscitation discuss with a nephrologist to consider dialysis
- Urgently treat underlying conditions e.g. surgery for parathyroid disease
- Consider bisphosphonate infusion (after initial investigations) if initial measures to control calcium levels fail.

Referral
- Refer all severe cases for specialist care

Hypocalcaemia

Hypocalcaemia is defined as a total serum calcium concentration < 8.8 mg/dL (< 2.20 mmol/L) in the presence of normal plasma protein concentrations or as a serum ionized calcium concentration < 4.7 mg/dL (< 1.17 mmol/L).

Causes
- Hypoparathyroidism
- Vitamin D deficiency
- Pseudohypoparathyroidism
- Hyperphosphatemia
- Acute necrotizing pancreatitis
- Medications such
    - Calcium channel blocker overdose
    - Loop diuretics (increase renal calcium excretion)
    - Glucocorticoids

    - Calcitonin
- Hypomagnesemia

Signs and symptoms
- Petechiae
- Oral, perioral and acral paraesthesia
- Muscle spasm
- Latent tetany
    - *Trousseau sign* of latent tetany (eliciting carpal spasm by inflating the blood pressure cuff and maintaining the cuff pressure above systolic for 3 minutes)
    - *Chvostek's sign* (tapping of the inferior portion of the cheek bone will produce facial spasms)
- Seizures
- Life-threatening complications
    - Laryngospasm
    - Cardiac arrhythmias
- Abdominal cramping
- Diarrhoea

Differential diagnosis
- Hypoparathyroidism
- Vitamin D deficiency
- Chronic kidney disease
- Pseudohypoparathyroidism
- Malabsorption
- Alcoholism

Complications
- Cardiac arrest

Investigations
- Full blood count: indicator of general health and nutritional status
- Serum calcium, phosphate, alkaline phosphatase
- Serum albumin levels: required to interpret serum calcium levels
- Urea, electrolytes, creatinine
- Liver function tests
- Parathyroid hormone levels
- Electrocardiography to exclude conduction defects: changes in severe hypocalcaemia may mimic acute myocardial infarction

Treatment objectives
- Correct calcium levels
- Reduce morbidity
- Prevent complications
- Treat underlying conditions

Non-pharmacological treatment
- For patients taking loop diuretics, change to thiazide diuretics
- Increase dietary calcium to greater than 1 g/day in chronic hypocalcaemia, caused by vitamin D deficiency
- Lower dietary calcium intake to 400-800 mg/day to prevent hyperphosphatemia in patients with hypocalcaemia and chronic renal failure

Pharmacological treatment

Treatment	*Indication*
1–2 g **calcium gluconate** (IV) in 50 mL of 5% **dextrose** infused over 10–20 mins	Tetany, seizures, prolonged QT interval, acute decrease in serum calcium < 7.5mg/dL
Calcium oral 1-3 g/day in divided doses	Mild neuromuscular irritability, as supplementation to IV calcium therapy
Magnesium supplementation	If caused by hypomagnesemia
Vitamin D supplementation oral **Calcitriol** Initially: 0.25 micrograms orally daily; titrate by 0.25 micrograms every 2-4 weeks Maintenance: 0.5-2 micrograms orally daily	Caused by hypoparathyroidism or Vitamin D deficiency

Referral
- In situations of laryngospasm cardiac arrhythmias, refer for specialist care

Osteomalacia/Rickets

Osteomalacia is a disorder of mineralization of the osteoid while rickets is a disorder of mineralization of cartilaginous growth plates. Since adults have fused growth plates, they are only affected by osteomalacia. However, since the growth plates of children are open, both disorders can occur in them simultaneously.

Causes
- Vitamin D deficiency due to low exposure to UV radiation, low dietary or supplemental intake, low amounts of Vitamin D in breast milk
- Renal tubular acidosis
- Malnutrition during pregnancy
- Malabsorption syndrome
- Hypophosphatemia
- Chronic kidney failure
- Tumour-induced osteomalacia
- Anticonvulsants (e.g. phenytoin, carbamazepine, phenobarbital)
- Coeliac disease
- Liver cirrhosis
- Chronic pancreatitis

Signs and symptoms
- Bowed legs
- Stunted growth
- Bone pain
- Large forehead
- Trouble sleeping

Differential diagnosis
- Fanconi syndrome
- Scurvy
- Lowe syndrome
- Osteomalacia:
    - Malignancy
    - Osteoporosis
    - Paget disease of the bone
- Rickets
    - Malignancy
    - Dwarfism
    - Osteogenesis imperfecta
    - Child abuse/neglect

Complications
- Increased risk of fractures

Investigations
- Serum levels of:
    - Calcium (reduced)
    - Phosphate (reduced)
    - Alkaline Phosphatase (elevated)
    - Parathyroid hormone (elevated)
- Bone radiographs

Treatment objectives
Treat underlying causes

Non-pharmacological treatment
Discontinue loop diuretics as they cause loss of calcium. If patient is on loop diuretics, switch to thiazide diuretics that are calcium sparing.

Pharmacological treatment

Rickets:

Cholecalciferol (Vitamin D) can be given in a single-day dose of 15,000 micrograms (600,000 units), divided into 4 or 6 oral doses

Osteomalacia

Cholecalciferol (Vitamin D) - initiated with high doses of 25,000 units/day for 6 months, followed by maintenance dose of 400–800 units/day.

Note*:*

Provide adequate supplemental **calcium**, 1500 mg/day

Caution

Patients receiving cardiac glycosides (digoxin and digitoxin) **should never** be given IV calcium: it can provoke ventricular fibrillation!

Prevention

- Give vitamin D supplements for exclusively-breastfed babies and to adults who are deficient in Vitamin D
- Ensure that diet is rich in Vitamin D e.g. fatty fish (salmon, mackerel, sardines, tuna), fish oils, egg yolks; cereals, bread.

Gynaecology

Pelvic Inflammatory Disease (PID)

This denotes a spectrum of conditions resulting from infection (usually ascending from the vagina) occurring in the uterus, ovary, and fallopian tubes leading to salpingitis, endometritis, pelvic peritonitis or the formation of tubal ovarian abscess.

Risk factors

- Age: peak incidence between 15-25 years
- Multiple sex partners
- Use of intrauterine contraceptives
- Previous episode of PID

- History of STIs in the patient or her partner
- History of abortion
- Postpartum endometritis
- Presence of bacterial vaginosis
- Unprotected sex

Causes

Often due to multiple pathogens:

- *Neisseria gonorrhoea*
- Chlamydia trachomatis
- Mycoplasma
- Gardnerella
- Bacteroides
- Gram-negative bacilli, e.g. *Escherichia coli*

Signs and symptoms

- Pain in lower abdomen (usually <2 weeks) with dysuria and fever
- Vaginal discharge: could be offensive and mixed with pus
- Painful sexual intercourse (dyspareunia)
- Cervical motion tenderness: vaginal examination will produce tenderness when the cervix is moved and abnormal uterine bleeding
- Vaginal itching

If severe

- Swellings may be palpable if there is pus in the tubes or pelvic abscess
- Signs of peritonitis (rebound tenderness)

Differential diagnosis

- Ectopic pregnancy, threated abortion
- Ovulation pain
- Acute appendicitis
- Complicated or twisted ovarian cyst
- Cancer of the cervix
- Endometriosis
- Urinary tract infections
- Renal disorders (e.g. nephrolithiasis)
- Pelvic adhesions
- Lower lobe pneumonia

Complications

- Infertility
- Ectopic pregnancy
- Chronic pelvic pain
- Pelvic abscess
- Septicaemia
- Recurrence (about 25%)

Investigations

- Speculum examination
- Pregnancy test
- Cervical and high vaginal swabs: for microscopy, culture and sensitivity
- Ultrasound (if available) for detection of tubo-ovarian masses, free fluid, peritonitis
- Full blood count
- Electrolytes and Urea
- Blood culture, if complicated with sepsis
- Urinalysis

Treatment objectives

- Eradicate the infecting organism(s)
- Achieve adequate hydration
- Prevent complications

Pharmacological treatment

Outpatient treatment
Ceftriaxone 500 mg IM STAT

PLUS
Clotrimazole 500mg pessaries OR Nystatin pessaries 500mg
Doxycycline oral
100 mg, every 12 hours for 14 days

PLUS
Metronidazole oral
400 mg, 2 times daily for 14 days

In pregnancy, use
Erythromycin oral
500 mg, every 6 hours for 14 days **instead** of **doxycycline**
Treat sexual partner/s as for urethral discharge syndrome to avoid re-infection

If severe or not improving after 7 days
Ceftriaxone IV
1 g daily

PLUS
Metronidazole IV
500 mg, every 8 hours until clinical improvement, then continue oral regimen as above

PLUS
Gentamicin IV
6 mg/kg daily.

Note
Subsequently, the patient should continue therapy with

Doxycycline oral
100mg every 12 hours for 14 days

PLUS
Metronidazole oral
400mg every 8 hours for 10-14 days

Prevention
- Encourage the use of barrier contraceptive with/without spermicides
- Avoid multiple sex partners
- Contact tracing to break the chain of infection and prevent recurrence
- Prompt diagnosis and treatment to prevent long term complications

Referral
- Refer all cases with generalized peritonitis, reputed/well formed tubo-ovarian complex, cervical motion tenderness and septicaemia to gynaecologist

Abnormal Uterine Bleeding

Any vaginal bleeding which varies from the normal regular menstruation pattern.

Causes
- Hormonal abnormalities (ovulatory dysfunction)
- Abortion
- Ectopic pregnancy
- Uterine diseases (fibroids, polyps etc.)
- Cancers (cervical, uterine, rarely vaginal)
- Infections (STIs)
- Coagulation disorders
- Iatrogenic (IUD, hormonal contraceptives)

Signs and symptoms

- Abnormal menstrual pattern
- Continuous or intermittent bleeding which can be heavy bleeding

Differential diagnosis

- Hypothyroidism
- Decompensated liver cirrhosis
- Coagulation disorders

Complications

- Severe anaemia
- Hypotension
- Shock
- Death

Investigations

- Pregnancy test to exclude pregnancy
- Haemoglobin level
- Vaginal speculum examination (for cervical and vaginal abnormalities e.g. cervical cancer)
- Pelvic ultrasound scan
- Hormonal Profile
-

Treatment objectives

- Control bleeding episode(s)
- Reduce menstrual blood loss in subsequent cycles

Pharmacological treatment

The treatment will depend on the causative factor:

General measures:

Ferrous sulphate and folic acid equivalent to 60 mg iron + 0.4mg folic acid, daily

AND
Mefenamic acid oral
250 mg every 8 – 12 hours for 5 days

OR
Ibuprofen oral
400 mg every 6 – 8 hours for 5 days

OR
Tranexamic acid oral
500 mg every 6–8 hours as required

Combined oral contraceptives

- Useful for anovulatory bleeding, might have benefit for ovulatory bleeding

Medroxyprogesterone acetate 5–10 mg, daily for 10–14 days initially and repeated for 10 days each month thereafter

Referral

- Refer for specialist assessment if patient has a lesion (e.g. ulcer, growth) in vagina/cervix
- Bleeding in postmenopausal women

Postpartum Haemorrhage (PPH)

PPH is blood loss of 500ml or more following delivery and severe PPH is blood loss of 1000ml or more. Most cases of morbidity and mortality due to PPH occur in the first 24 hours following delivery.

Such blood loss within 24 hours after delivery is Primary PPH, whereas excessive bleeding from the birth canal between 24 hours and 12 weeks postnatally is secondary PPH.

Risk Factors

- Increasing parity
- Multifetal Gestation
- Antepartum haemorrhage
- Augmented Labour
- Prolonged 2nd stage of Labour
- Chorioamnioritis
- Foetal Macrosomia
- Polyhydramnios
- Maternal Anaemia
- Maternal Obesity
- Preeclampsia
- Primiparity
- Placenta Accreta
- Retained Placenta
- Instrumental Delivery

Causes
- Uterine Atony
- Trauma- (uterine rupture, lacerations and tears, haematomas, inversive placenta)
- Retained Tissue (placenta or faetus)
- Placenta Praevia
- Placenta Accreta
- Placental Abruption
- Uterine Inversion
- Maternal Coagulopathy (Thrombocytopenia, Disseminated Intravascular Coagulation, Hereditary Bleeding Disorders e.g. von Willebrand's)
- Severe Preeclampsia
- Sepsis
- Intrauterine Foetal Death
- Amniotic Fluid Embolism

Signs and Symptoms
- Heavy uncontrolled vaginal bleeding
- Palpitation
- Tachycardia
- Tachypnoea
- Hypotension
- Unconsciousness
- Symptoms of circulatory shock

Differential Diagnosis
- Endometritis
- Wound breakdown
- Genital tract manipulation
- Non-genital sources of bleeding

Complications
- Anaemia
- Anterior pituitary ischaemia
- Dilutional coagulopathy
- Fatigue
- Myocardial ischaemia
- Orthostatic hypotension
- Postpartum depression
- Death

Investigations
- Thorough physical examination of the uterus and birth canal
- Complete blood count (CBC)
- Coagulation studies
- Electrolytes
- Blood urea nitrogen and creatinine
- Type and crossmatch
- Liver function test
- Lactate

Prevention
The most effective strategy to prevent PPH is active management of the third stage of labour for all women during childbirth. This management includes:

- Administration of a uterotonic soon after the delivery of the anterior shoulder
- Clamping of the cord following the observation of uterine contraction (at around 3 minutes);
- Delivery of the placenta by controlled cord traction followed by uterine massage

Pharmacological Treatment

Oxytocin
It is a synthetic uterotonic agent which stimulates the smooth muscle of the uterus, more powerfully towards the end of pregnancy, during labour, and immediately postpartum. At these times, the oxytocin receptors in the myometrium are increased, and oxytocin elicits rhythmic contractions in upper segment of uterus, similar in frequency, force and duration to those observed during labour.

Dosage form: 10 iu/mi, 5iu/ml solutions for injection

Dose: 10 units after delivery of placenta. Add 10-40 units; not exceeding 40 units to 1000 ml of non-hydrating IV solution and infuse at necessary rate to control uterine atony.

Side Effects

- Sinus bradycardia
- Neonatal seizure
- Neonatal jaundice
- Uteroplacenta hypoperfusion
- Fetal hypoxia
- Perinatal hepatic necrosis
- Fetal hypercapnia

Ergometrine

Ergometrine Injection is used in the active management of the third stage of labour and in the treatment of post-partum haemorrhage. Ergometrine Injection may be given by intramuscular or intravenous injection, and produces sustained tonic uterine contraction in both upper and lower uterine segments. Unlike oxytocin, ergometrine has an effect on the non-pregnant uterus.
Ergometrine inhibits prolactin secretion and in turn can reduce lactation. Uterine stimulation occurs within 7 minutes of intramuscular injection and almost immediately following intravenous injection. The sustained uterine contractions produced by ergometrine are effective in controlling uterine haemorrhage.

Dosage form: Ergometrine Solution for Injection BP 0.05% w/v. 500 micrograms of Ergometrine in 1ml.

Dose: 200 mcg to 500 mcg given IM following expulsion of placenta or when bleeding occurs
250 mcg to 500 mcg given IV in emergency cases

Side Effects

- Headache
- Dizziness
- Tinnitus
- Hypertension
- Vasoconstriction
- Dyspnoea
- Pulmonary oedema
- Nausea
- Vomiting
- Abdominal pain
- Skin rashes

Contraindications

- Hypersensitivity to Ergometrine
- Pregnancy and labour (induction of labour, first stage labour and second stage labour prior to the delivery of the anterior shoulder) due to the risk of uterine hypertonus and associated foetal complications
- Primary or secondary uterine inertia.
- Severe hypertension, pre-eclampsia, eclampsia.
- Severe cardiac disorders.
- Severe hepatic or renal impairment.
- Occlusive vascular disease e.g. Raynaud's disease / phenomenon

- Sepsis

Note: Ergometrine may give rise to widespread vasoconstriction and rarely acute pulmonary oedema. In breech presentations and other abnormal presentations, Ergometrine Injection, should not be given until after delivery of the child, and in multiple births not until the last child has been delivered. Ergometrine derivatives are excreted in breast milk and can also suppress lactation, so repeated use should be avoided.

Misoprostol

Dosage Form: 100 mcg, 200 mcg capsules

Dose: 600 mcg orally within 1 minute after delivery for prophylaxis
800 mcg orally once for treatment

Caution should be taken if prophylaxis dose has already be given and use should be restricted where Oxytocin is not available.

Side Effects

- Diarrhoea
- Abdominal pain
- Headache
- Chest pain
- Anaemia
- Nausea
- Flatulence
- Anaphylaxis
- Cardiac dysrymia
- Myocardial infaction
- Hearing loss
- Rupture of uterus
- Thromboembolic disorders

Carbetocin

Carbetocin is a long-acting synthetic octapeptide analogue of oxytocin with agonist properties. It is indicated for the prevention of uterine atony and excessive bleeding following delivery of the infant by caesarean section or vaginal delivery. It must be administered after delivery of the infant and in the context of other measures to prevent PPH and associated morbidity, including uterine massage, detection and correction of coagulopathies. Other uterotonic agents should be administered if additional treatment is required to reduce excessive postpartum bleeding and increase uterine tone.

Dosage form: 100 mcg/ml injection. Carbetocin is a white, fluffy lyophilized powder, soluble in water, ethanol, methanol and acetic acid. Carbetocin is insoluble in ether and petroleum ether.

Dose:
Caesarean Section: A single dose of 100 micrograms (1 mL) of carbetocin injection should be administered intravenously as a bolus injection, slowly over 1 minute after delivery of the infant. Carbetocin can be administered either before or after delivery of the placenta.

Vaginal Delivery: A single dose of 100 micrograms (1 mL) of carbetocin injection should be administered after delivery of the infant for the active management of the third stage of labour as an intramuscular injection or intravenously as a bolus injection slowly over 1 minute.

Side Effects

- Headache
- Tremor
- Anaemia
- Dizziness
- Chest Pain
- Hypertension
- Flushing
- Nausea
- Pruritus
- Hypotension
- Abdominal pain
- Dypsnoea
- Nausea

- Vomiting
- Back pain
- Metallic taste

Contraindications

- Because of its long duration of action relative to oxytocin, uterine contractions produced by carbetocin cannot be stopped by simply discontinuing the medication. Therefore, carbetocin should not be administered prior to delivery of the infant for any reason, including elective or medical induction of labour.
- Inappropriate use of carbetocin during pregnancy could theoretically mimic the symptoms of oxytocin overdosage, including hyperstimulation of the uterus with strong (hypertonic) or prolonged (tetanic) contractions, tumultuous labour, uterine rupture, cervical and vaginal lacerations, postpartum haemorrhage, utero-placental hypoperfusion and variable deceleration of foetal heart, foetal hypoxia, hypercapnia, or death.
- Carbetocin should not be used in patients with a history of hypersensitivity to oxytocin or carbetocin.
- Carbetocin should not be used in patients with cardiovascular disease, especially coronary artery disease, valvular heart disease, cardiomyopathy and heart failure.
- Carbetocin is not intended for use in children.

Tranexamic Acid

For use in women in high–bleeding risk situations in conjunction with standard prophylactic uterotonics (eg, oxytocin), or for continued bleeding despite oxytocin; used in conjunction with other therapies/procedures. Tranexamic Acid forms a reversible complex that displaces plasminogen from fibrin resulting in inhibition of fibrinolysis; it also inhibits the proteolytic activity of plasmin.

Dosage Form:
Intravenous Solution, 1000 mg/10 mL (10 mL) in NaCl 0.7% (100 mL)
Oral Tablet: Generic: 650 mg

Dose (for PPH): May be administered by direct IV injection at a maximum rate of 100 mg/minute
IV: 1g over 10 to 20 minutes given within 3 hours of vaginal birth or cesarean delivery. If bleeding continues after 30 minutes, may repeat the dose in conjunction with thorough re-evaluation for cause of continued or recurrent bleeding.

Side Effects

- Abdominal pain (oral)
- Headache
- Back pain
- Musculoskeletal pain
- Nasal signs and symptoms (including sinus symptoms)
- Anaemia
- Fatigue
- Arthralgia
- Muscle cramps and spasms
  Less Common side effects
- Cerebral thrombosis
- Deep vein thrombosis
- Hypotension (with rapid IV injection)
- Pulmonary embolism
- Allergic dermatitis
- Allergic skin reaction
- Diarrhea
- Nausea, vomiting
- Ureteral obstruction
- Hypersensitivity (anaphylaxis, hypersensitivity reaction, nonimmune anaphylaxis, severe hypersensitivity reaction)
- Dizziness
- Seizure
- Ophthalmic (chromatopsia, conjunctivitis (ligneous), retinal artery occlusion, retinal vein occlusion, visual disturbance)
- Renal cortical necrosis

Contraindications

- Hypersensitivity to tranexamic acid or any component of the formulation

- Active intravascular clotting
- Active thromboembolic disease
- Subarachnoid haemorrhage

Note: Tranexamic acid is present in breast milk, therefore it is suggested to administer the maternal dose immediately after breastfeeding to minimize infant exposure and monitor the infant for adverse events. The decision to breastfeed during therapy should consider the risk of infant exposure, the benefits of breastfeeding to the infant, and the benefits of treatment to the mother.

Menopause and Perimenopausal Syndrome

Menopause is the cessation of menstruation and usually occurs at the age of 45-55 years. Perimenopause is the time around menopause and can last a few years until the menopause has set in

Causes

- Surgical removal of ovaries
- Natural decline of reproductive hormones
- Hysterectomy
- Chemotherapy and radiation therapy
- Primary ovarian insufficiency

Signs and symptoms

- Hot flushes – sudden increase in body heat, which can be mild or intense
- Night sweats, palpitations, headaches, insomnia, tiredness
- Irregular menstruation
- Vaginal atrophy and dryness, loss of libido, painful intercourse
- Bladder irritability, incontinence, UTIs
- Weight gain
- Skin changes: dryness, thinning, loss of head hair, increase or loss of body hair)
- Mood and emotional changes (e.g. depression, irritability, short temperedness, weepiness)
- Lack of concentration, failing memory
- Osteoporosis, denture problem

Complications

- Cardiovascular diseases
- Osteoporosis
- Urinary incontinence
- Sexual function – vaginal dryness from decreased moisture production and loss of elasticity can cause discomfort and bleeding during sexual intercourse

Differential diagnosis

- Pregnancy
- Polycystic ovary syndrome
- Hyperthyroidism
- Hypothyroidism

Investigations

- Thyroid function test
- Lipid profile test
- Kidney and liver function test to rule out conditions such as ovarian failure
- Exclude pregnancy

Non-pharmacological treatment

- Life style modifications – following a healthy diet plan
- Screen for cardiovascular disease and urine incontinence
- Explain process of menopause to the patient and reassure her it is normal

Pharmacological treatment

Hormone replacement treatment
Tibolone tabs

2.5 mg daily

Fluoxetine oral
20 mg daily

OR
Gabapentin Oral

300mg 12 – 24 hours daily

PLUS
Vitamin D supplement

Referral
- Urgently refer any menopausal woman with vaginal bleeding for further assessment

Infertility

Inability to conceive after a year of regular sexual intercourse without contraception

Causes
- Ovulation disorders – polycystic ovary syndrome
- Uterine or cervical abnormalities- polyps in the uterus
- Inflammation of fallopian tube (salpingitis)
- Endometriosis
- Primary ovarian insufficiency

Risk factor
- Age – infertility starts after age 37 years
- Tobacco use
- Alcohol use
- Previous history of STI

Signs and symptoms
- Pain during sex (dyspareunia)
- Hormonal changes
- Obesity
- No pregnancy

Complications
- Depression
- Stress

Investigations
- Partner semen analysis
- Prolactin level
- Mid-luteal (day 21) progesterone assay: > 30 nmol/L suggests adequate ovulation.
- Laparoscopy and/or hysterosalpingography ~~(specialist supervision required).~~
- VDRL tests
- Urine analysis and microscopic examination
- Cervical mucus examination
- Abdominal pelvic USS-to look for polycystic ovaries

Non-pharmacological treatment
- Life style modification
- Weight reduction in obese clients
- Educate the couple on the importance of having sexual intercourse during the fertile window

Pharmacological treatment

Treat the underlying disease

For induction of ovulation:
Clomiphene, oral, 50 mg daily on days 5–9 of the cycle. Specialist only.
Monitor the progress of ovulation.

Polycystic Ovarian Syndrome (PCOS)
Metformin 500mg every 8 hours (sometimes used during PCOS treatment, alone or along with fertility drugs)

Hyperprolactinemia
Bromocriptine 2.5–5mg once per day until the prolactin level is within the normal range

Referral

- Refer all patients with infertility to a gynaecologist

Endometriosis

The presence and proliferation of endometrial tissue outside the uterine cavity, usually within the pelvis.

Causes

- Retrograde menstruation
- Surgical scar implantation – endometrial cells may attach to surgical incision after C-section

Signs and symptoms

- Dysmenorrhea
- Dyspareunia
- Chronic pelvic pain
- Excessive bleeding – occasionally
- Infertility
- Fatigue
- Constipation

Complications

- Infertility
- Ovarian cancers

Differential diagnosis

- Appendicitis
- UTI and cystitis
- Ectopic pregnancy
- Ovarian cysts
- Pelvic inflammatory disease

Diagnosis

- Abdomino-pelvic ultrasound scan
- Laparoscopy

Pharmacological treatment

For pain:
Ibuprofen oral

400mg every 8 hours with meal

PLUS
Combined oral contraceptive for 6 months

OR
Medroxyprogesterone acetate oral

30mg daily for at least 3 months

Note

- The recurrence of symptoms is common following cessation of treatment.

Referral

- Women with infertility
- No response to treatment after 3 months.

Amenorrhoea

Primary amenorrhea: no menstruation by 16 years of age in the presence of secondary sexual characteristics.
Secondary amenorrhea: amenorrhea for at least 3 months in women with previous normal menses.

Causes of primary amenorrhea

- Not known (idiopathic)
- Hypothalamic causes
- Chromosomal causes: Turner's syndrome, Androgen Insensitivity Syndrome, congenital adrenal hyperplasia
- Congenital causes

Causes of secondary amenorrhea

- Pelvic inflammatory disease
- Endometriosis
- Uterine fibroids

Signs and symptoms

- History of hot flushes
- Change in body weight (obesity or sudden weight loss)
- Galactorrhoea
- Headaches, visual disturbances
- Other features, depending on primary cause(s)

Differential diagnosis

Secondary amenorrhoea

- Hypothalmic disorders
- Pituitary disorders: hypothyroidism, hyperprolactinaemia
- Ovarian: polycystic ovarian syndrome, premature ovarian failure
- Iatrogenic: chemotherapy or radiotherapy
- Uterine: pregnancy, cervical stenosis, Asherman's syndrome

Complications

- Infertility
- Osteoporosis

Investigations

- Body mass index.
- Urine pregnancy test.
- Pelvic ultrasound.
- Serum for TSH, FSH, LH, prolactin.
- FSH > 15 units/L in a woman < 40 years of age suggests premature ovarian failure.
- LH/FSH ratio of > 2:1 suggests polycystic ovarian syndrome

Pharmacological treatment

- For treatment of hyperprolactinemia, hypo- or hyperthyroidism.
- Progestin challenge test: If no cause for secondary amenorrhea is found:

Medroxyprogesterone acetate 10 mg oral, daily for 10 days.

Note
Anticipate a withdrawal bleed 5–7 days following conclusion of treatment laparoscopy

Referral

- All cases of primary amenorrhea
- Secondary amenorrhea not responding to medroxyprogesterone acetate

- Polycystic ovarian syndrome and premature ovarian failure, for further evaluation.

Hirsutism and virilisation

Hirsutism refers to terminal hair growth in amounts that are socially undesirable, typically following a male pattern of distribution.
Virilization refers to the development of male secondary sexual characteristics in a woman.

Causes
- Polycystic ovary syndrome
- Cushing syndrome
- Medications – danazol and fluoxetine
- Congenital adrenal hyperplasia

Signs and symptoms
- Deepening voice
- Balding
- Acne
- Decreased breast size
- Increased muscle mass

Differential diagnosis
- Congenital adrenal hyperplasia
- Cushing syndrome

Complications
- Infertility

Investigations/evaluation
- History – family and menstrual history
- BMI
- Blood pressure

Referral
- Refer to a tertiary hospital for investigation and management

Progestogen-Only Pill (POP)

Are pills that contain very low doses of a progestin like the natural hormone progesterone in a woman's body. Since these pills do not contain oestrogen, they are safe to use throughout breastfeeding, and by women who cannot use methods with oestrogen. An example is Levonorgestrel

Indications
- Breastfeeding clients after 6 weeks postpartum (non-breastfeeding clients can start POPs 21 days after birth)
- Women who cannot take COC but prefer to use pills
- Women >40 years

Contraindications
- Breast or genital malignancy (known or suspected)
- Pregnancy (known or suspected)
- Breast cancer >5 years ago, and it has not recurred
- Severe liver disease, infection, or tumor
- Taking barbiturates, carbamazepine, phenytoin, topiramate, rifampicin, rifabutin, or ritonavir or ritonavir-boosted protease inhibitors
    - ***Use a backup contraceptive method as these medications reduce the effectiveness of POPs***
- Systemic lupus erythematous with positive (or unknown) antiphospholipid antibodies
- Undiagnosed vaginal bleeding

Injectable Progestogen-Only Contraceptive

A slowly absorbed depot IM injection or subcutaneous injection, which provides contraceptive protection for 3 months (e.g. medroxyprogesterone acetate)

Indications

- Fertile women requiring long-term contraception
- Breastfeeding postpartum women
- Known/suspected HIV positive women who need an effective FP method
- Women with sickle-cell disease
- Women who cannot use COC due to oestrogen content
- Women who do not want more children but do not (yet) want voluntary surgical contraception
- Women awaiting surgical contraception

Contraindications

- As for POP above

Complications and warning signs

- Headaches
- Heavy vaginal bleeding
- Severe abdominal pain
- Excessive weight gain

Instructions for administration

Medroxyprogesterone acetate depot injection

- Give 150 mg deep IM into deltoid or buttock muscle
- Do not rub the area as this increases absorption and shortens depot effect

Medroxyprogesterone acetate depot injection

- Inject 104 mg in the fatty tissue (subcutaneous) at the front of the thigh, the back of the upper arm, or the abdomen
- This can be administered at community level

If given after day 1–7 of menstrual cycle
Advise to client:

- Abstain from sex or use a back-up FP method, e.g., condoms, for the first 7 days after injection
- Return for the next dose on a specific date 12 weeks after the injection (if client returns >2-4 weeks later than the date advised, rule out pregnancy before giving the next dose)
- Advise patients to return to the hospital if they experience severe side effects

Progestogen-Only Sub-Dermal Implant

This is a contraceptive implant which is a small flexible plastic rod that's placed under the skin of the woman's upper arm. It provides contraceptive protection for 3–5 years depending on the type of implant. For example: etonogestrel: 3 years; levonorgestrel: 5 years; 2-rod levonorgestrel implant : >4 years; .

Indications

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

Contraindications

- As for Progestogen-Only Pills

Note

The implants are safe for use during breastfeeding but are not suitable for women who have:

- Arterial disease or a history of heart disease or stroke, liver disease, breast cancer
- Unexplained bleeding in between periods or after sex
- Might be pregnant or who do not desire alterations in their menstrual cycles

Advice by the health care provider to patients

The implant would be inserted sub-dermally under the skin of the upper arm following recommended procedures
Clients should return:

- After 2 weeks - to examine implant site
- After 3 months - or first routine follow-up
- Annually until implant removed - for routine follow up

Intrauterine Device (IUD)

An IUD is a small T-shaped plastic and copper device which is a reversible long-term family planning (FP) method effective for up to 10 years. IUDs can be inserted as soon as 6 weeks postpartum: sometimes called a "coil" or "copper coil".
Can also be inserted within 48 after a vaginal delivery or during caesarean section in clients meeting the eligibility criteria (PPIUCD)

Types

- Non hormonal e.g. Copper T380A
- Hormonal*:* levonorgestrel-releasing intrauterine system (progesterone loaded)

Indications

- Women desiring long-term contraception
- Breastfeeding mothers
- When hormonal FP methods are contraindicated

Contraindications

- Pregnancy (known or suspected)
- PID or history of PID in the 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, terminal AIDS
- Known or suspected cancer of pelvic organs
- Severe anaemia or heavy menstrual bleeding

Complications and warning signs

- Lower abdominal pain and PID
- Foul-smelling vaginal discharge
- Missed period
- Displaced IUD/missing strings
- Prolonged vaginal bleeding

Instructions before administration

- Insert the IUD closely following recommended procedures; explain each step to the client
- Carefully explain possible side-effects and what to do if they arise

Advice to clients:

- Abstain from sex for 7 days after insertion
- Avoid vaginal douching
- Should not have more than 1 sexual partner
- Check each sanitary pad before disposal to ensure the IUD has not been expelled: if this happens, advise to use an alternative family planning method and return to the clinic
- Learn how to check that the IUD is still in place after each menstruation
- Report to the clinic promptly if: period is late or pregnancy is suspected, or if there is abdominal pain during intercourse; exposure to STI, feeling unwell with chills/fever; shorter/longer/missing strings; feeling hard part of IUD in vagina or at cervix
- Use condoms if any risk of STIs, including HIV
- Recommend a follow-up visit after 3-6 weeks

Emergency contraceptive pills

Emergency contraception can be used to prevent unwanted pregnancy after unprotected sex or contraceptive method failure. Methods available include Emergency Contraceptive Pills and IUDs. Emergency contraceptive methods do not cause abortion.

Regular Emergency Contraceptive Pill users should be counselled to use routine contraceptive methods

- The ECP contains a special dose of progestin (**levonorgestrel** - LNG): may come as one pill (1.5 mg) or two pills (0.75 mg). Examples are: *Ulipristal Acetate (UPA), levonorgestrel*
- The dose (1.5 mg) should be taken as soon as possible within 72 hours, but can be taken up to five days after unprotected sex, or in case of contraceptive method failure, e.g., condom burst, failure to take regular FP methods, or in cases of rape.

Note:

- ECPs are NOT regular contraceptive pills and should not be used as a family planning method

Indications

- All women and adolescents at risk of becoming pregnant after unprotected sex

Advice to patients

- Should be taken as soon as possible after unprotected sex where pregnancy is not desired
- Can prevent pregnancy if taken anytime within 5 days after unprotected sex (decreasing efficacy over this 5-day window)
- Safe and suitable for all women at risk of an unplanned pregnancy
- Women on ARVs have to take double dose (levonorgestrel 3 mg

Note

- Warn clients against regular or frequent use of emergency contraceptive. Advise them to consider using other long-term methods

Voluntary Surgical Contraception (VSC) for Men: Vasectomy

This permanent family planning 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 specialty in this area. There is need to dispel the myths of impotence following vasectomy.

Indications

Fully aware, counselled clients who have voluntarily signed the consent form

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

Instructions

- 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
    - The procedure is not immediately effective and that the client will need to use a condom for at least 15 ejaculations after the operation (or 3 months)
- After the operation, advise client:
    - On wound care
    - To return for routine follow-up after 7 days or earlier if there is fever, excessive swelling, pus, or tenderness at the site of operation
    - To continue using condoms or other contraceptive devices for 3 months following the procedure
    - To use condoms if there is any risk of HIV/STIs

Tubal Ligation

This permanent FP operation can be carried out under local or general anaesthesia to cut and tie the two fallopian tubes. It is only available at centres with specially trained service providers.

Indications

- As for vasectomy (above) but for women

Instructions to client

- Ensure client understands how the method works and that it is permanent, irreversible, and highly and immediately effective
- Explain to client that:
    - There may be some discomfort/pain over the small wound for a few days

Advise client

- On wound care
- To use condoms if there is any risk of exposure to STIs/HIV
- To return after 7 days for routine follow-up or earlier if there is fever, excessive swelling, pus, or tenderness at the site of operation

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 barriers methods, e.g., condoms, cervical caps

Guidance on correct use of the method is only available at centres with specially trained service providers.

Instructions to patients

- Ensure client understands how the method works
- Explain how to distinguish the different types of mucus
- Show client how to complete the CMM chart, which can be used together with the moon beads
- Carry out a practice/trial period of at least 3 cycles
- Confirm that the chart is correctly filled
- Advice client to:
    - Always use condoms as well as CMM if there is any risk of exposure to STIs/HIV
    - Return on a specific follow-up date after one menstrual cycle

Lactational Amenorrhea 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. LAM requires 3 conditions which must all be met:

- The mother's monthly bleeding has not returned
- The baby is fully or nearly fully breastfed; and is fed often, day and night on demand
- The baby is less than 6 months old

Instructions to patients

- Ensure client understands how the method works

Explain to client that:

- She must breastfeed her child on demand on both breasts at least 10-12 times during day and night (including at least once nightly in the first months)
- Daytime feedings should be no more than 4 hours apart, and night-time feedings no more than 6 hours apart
- She must not give the child any solid foods or other liquids apart from breast milk
- LAM will no longer be an effective FP method IF:
    - The baby does not feed regularly on demand
    - Menstruation resumes: she will then need to use another FP method

Advise the client to:

- Use condoms as well as LAM if there is any risk of exposure to STIs/HIV
- Return after 3 months for routine follow-up, or earlier if she has any problem, or if she wants to change to another FP method

Oncology

Breast Cancer

Breast cancer occurs when some breast cells begin to grow abnormally. These cells divide more rapidly than healthy cells and continue to accumulate, forming a lump or mass. Cells may spread (metastasize) to lymph nodes or to other parts of the body.

Signs and symptoms

- Hard lump with ill-defined edges
- Nipple distortion or ulceration
- Axillary lymph nodes
- Peau d'orange appearance
- Painless lump, nipple discharge
- Change in size of the breast, ulceration

Investigations

- Ultrasound-guided FNAC or core biopsy
- Chest radiograph

- Abdomino-pelvic ultrasound scan
- Mammogram

Treatment objectives
- Restore normal breast tissues
- Halt progression of the disease
- Improve the quality of life of the patient

Non-pharmacological treatment
- Counselling and psycho-social support
- Nutritional support

Pharmacological treatment
- Chemotherapy/hormonal therapy for early and locally advanced breast cancer
- Surgery followed by chemotherapy or hormonal therapy if oestrogen receptors positive ± radiotherapy

1st line Treatment
Epirubicin (farmorubicin) IV infusion
85 mg/m^2 in 500 mL of 0.9% saline by IV infusion to run for 2-4 hours, 3 weekly for 12-18 weeks

Note:
Ensure the following before administration:
- ECG
- Echocardiography
- WBC >3,000/mL,
- PCV >30%
- Platelet count>100,000/mL

AND
Cyclophosphamide IV infusion
100 mg/m^2 in 500 mL of 0.9% saline by IV infusion over 2-4 hours 3 weekly for 12-18 weeks

Note:
Ensure the following before administration:
- Normal urea and creatinine levels
- Normal urinary output

THEN
Tamoxifen oral
20 mg daily for 2 years

Caution:
- Tamoxifen increases the risk of endometrial cancer and uterine sarcoma, which are treatable.
- Watch out for early signs e.g. abnormal vaginal bleeding

For early breast cancer in post-menopausal women
Anastrozole oral
1mg daily for 2 years

OR
For post-menopausal women with early stage endocrine-sensitive breast cancer
Exemestane oral
25 mg daily for 2 years

2nd Line Treatment
Adults
Docetaxel IV infusion
80 mg/m2 in 500 mL of 0.9% saline by IV infusion over 2-4 hours, 3 weekly for 9-18 weeks

Caution:
- Watch out for fluid retention and heart failure

THEN
Tamoxifen oral
20 mg daily for 2 years

Caution:
- Tamoxifen increases the risk of endometrial cancer and uterine sarcoma, which are treatable.
- Watch out for early signs e.g. abnormal vaginal bleeding

For early breast cancer in post-menopausal women
Anastrozole oral
1mg daily for 2 years

OR
For post-menopausal women with early stage endocrine-sensitive breast cancer
Exemestane oral
25 mg daily for 2 years

HER 2 positive breast cancer
Trastuzumab IV infusion
2-4 mg/kg in 500 mL of 0.9% saline by IV infusion over 2-4 hours weekly. Increase dose to 6 mg/kg as treatment progresses.

Caution:
- **Trastuzumab** may cause severe hypersensitivity reactions, usually during the infusion, but may occur afterwards. Watch patient closely, interrupt infusion and institute appropriate therapy if reactions occur,

Referral
- Refer all patients with breast cancer for specialist care

Metastatic Breast Cancer

Metastatic breast cancer is also classified as Stage 4 breast cancer. The cancer has spread to other parts of the body. This usually includes the lungs, liver, bones or brain etc.

Signs and symptoms
- Chest pain, tachypnoea, dyspnea , dull percussion notes, SPO2 <95%
- Jaundice, abdominal distension,
- Spine tenderness, gibbus, neurological deficits
- Deformed breast with ulceration, multiple matted axillary nodes
- Satellite lesions, cancer en cuirasse - a rare form of cutaneous metastasis
- Seizures
- Bone pains, limb weakness

Investigations
- Final Needle Aspiration Cytology (FNAC) or core biopsy
- Chest radiograph
- Abdominal ultrasound scan
- Radionuclide bone scan or skeletal survey (radiograph of long bones)
- Brain CT scan if intracranial metastasis is suspected

Treatment objectives
- Alleviate pain
- Treat metastatic complications
- Improve the quality of life of patients

Non-pharmacological treatment
- Counselling and psychosocial support
- Religious support
- Nutritional support

Pharmacological treatment

Oestrogen receptor positive breast cancer in pre-menopausal women
1st Line Treatment
Adult:
Tamoxifen oral
20 mg daily

Caution:
- Tamoxifen increases the risk of endometrial cancer and uterine sarcoma, which are treatable.
- Watch out for early signs e.g. abnormal vaginal bleeding

Oestrogen receptor positive breast cancer in postmenopausal women
Tamoxifen oral
20 mg daily
Caution:
- Tamoxifen increases the risk of endometrial cancer and uterine sarcoma, which are treatable.
- Watch out for early signs e.g. abnormal vaginal bleeding

OR
Anastrozole oral
1mg daily
For early breast cancer in post-menopausal women

OR
Exemestane oral
25 mg daily
For post-menopausal women with early stage endocrine-sensitive breast cancer

AND/OR
Docetaxel IV
100 mg/m^2 in 500 mL of 0.9% saline by IV infusion over 2-4 hours 3 weekly

Caution:
- Ensure that pre-chemotherapy investigation results are within normal limits
- Watch out for fluid retention

OR
2nd Line Treatment
Capecitabine oral:
1.25 mg/m^2 2 times daily for 14 days; repeat subsequent courses after a 7-day interval

Note:
- Dose adjustment is based on response.
- Monitor adverse effects closely

Oestrogen Receptor Negative breast cancer
1st Line Treatment

Docetaxel IV infusion
100 mg/m^2 in 500 mL of 0.9% saline by IV infusion over 2-4 hours every 3 weeks

Note:
- Watch out for fluid retention

2nd Line Treatment
Capecitabine oral
1.25mg/m^2 for 14 days repeat courses after 7 days

Note:
- Dose adjustment should be based on response.
- Caution in patients with diabetes mellitus, women who are breastfeeding
- Start with lower doses in patients with renal impairment

HER 2 positive breast cancer

Trastuzumab IV
2-4 mg/kg in 500 mL of 0,9% saline IV over 2-4 hours weekly

Note:
- Increase dose to 6 mg/kg as treatment progresses.

Caution:
- **Trastuzumab** may cause severe hypersensitivity reactions, usually during the infusion, but may occur afterwards.
- Watch patient closely, interrupt infusion and institute appropriate therapy if reactions occur, bone stabilizing agents in metastatic breast cancer

Zolidronic acid IV

4 mg to be administered IV over 15 minutes every 3-4 weeks

Note:
- Contraindicated in persons with creatinine clearance <35 mL/min because of the risk of renal failure.
- Care is required to ensure that patients are well hydrated as dehydration may precipitate renal failure
- Contraindicated in women of child bearing age.
- Treat hypocalcaemia with **calcium** and **Vitamin D** before commencing therapy with **Zolindronic** acid

Calcium oral
500 mg daily

AND
Vitamin D oral
400 units daily

Referral
- All patients with metastatic breast cancer should be referred for specialist care

Prostate Cancer

Prostate cancer is marked by an uncontrolled (malignant) growth of cells in the prostate gland. It affects aging men usually above the age of 70 years. It is a slow growing cancer and is asymptomatic in the early stages hence most patients present with locally advanced or metastatic disease at presentation.

Signs and symptoms
- Hard enlarged nodular prostate
- Back pain, spine tenderness, gibbus
- Neurologic deficits, difficulty in walking, paralysis
- Distended bladder, difficulty in passing urine, frequency, nocturia, urgency; haematospermia
- Abdominal distension, jaundice, pallor, generalized body weakness

Investigations
- Prostate specific antigen (PSA)
- Prostate biopsy and histology
- Ultrasound scan of kidneys, ureters, bladder and pelvis
- Chest radiograph
- Radionuclide bone scan

Treatment objectives
- Halt the progression of disease
- Alleviate patient's symptoms
- Improve the quality of life of patients

Non-pharmacological treatment
- Counselling and psychosocial support
- Nutritional support
- Surgical treatment or radiotherapy for loco-regional control

Pharmacological treatment

Early and locally advanced prostate cancer

1st Line Treatment
Bicalutamide oral
50 mg daily for early cancer or 150 mg daily for locally advanced disease

Note:
- Monitor liver function tests regularly for the 1st 4 months. Hot flushes, back pain, peripheral oedema are side effects

OR
Flutamide oral
250 mg three times daily

Side effects:
- Decreased libido
- Impotence
- Diarrhoea
- Vomiting
- Hot flushes

AND/OR
Goserelin SC
3.6 mg monthly
10.8 mg 3 monthly

Note:
- For high risk patients with locally advanced disease, combination therapy with **bicalutamide** may delay progression of disease, but not overall survival.

OR
2nd Line Treatment
Diethylstilbesterol oral 2.5 mg daily

Note:
- Ensure prophylaxis for thromboembolism

OR
Cypoterone acetate oral/IM
200 mg-300 mg daily in divided doses

Special notes:
- Weight gain
- Depression
- Hot flashes
- Rash
- Weakening of bones

Referral
- Refer all patients with prostate cancer to a specialist

Metastatic Prostate Cancer

This refers to spread of prostate cancer to the bones or lymph nodes. Other common sites include the liver or lungs. The brain and other organs are eare sites .

Signs and symptoms
- Hard enlarged nodular prostate
- Back pain, spine tenderness, gibbus
- Neurologic deficits, difficulty in walking, paralysis
- Distended bladder, difficulty in passing urine, frequency, nocturia, urgency; haematospermia
- Abdominal distension, jaundice, pallor, generalized body weakness

Investigations
- Prostate specific antigen (PSA)
- Prostate biopsy and histology
- Ultrasound scan of kidneys, ureters, bladder and pelvis
- Chest radiograph
- Radionuclide bone scan

Treatment objectives
- Alleviate patient's symptoms
- Improve the quality of life of patients
- Slow the rate of cancer growth
- Shrink the tumour

Non-pharmacological treatment
- Counselling and psychosocial support
- Nutritional support

- Surgical treatment or radiotherapy for loco-regional control

Pharmacological treatment

Early and locally advanced prostate cancer

1st Line Treatment

Bicalutamide oral
50 mg daily for early stage or 150mg daily for locally advanced disease

Note:
- Monitor liver function tests regularly for the 1st 4 months. Hot flushes, back pain, peripheral oedema are side effects

OR
Flutamide oral
250 mg TDS

Side effects:
- Decreased libido
- Impotence
- Diarrhoea
- Vomiting
- Hot flushes

AND/ OR
Goserelin SC 3.6 mg monthly10.8 mg 3 monthly

Note:
- For high risk patients with locally advanced disease, combination therapy with **bicalutamide** may delay progression of disease, but not overall survival.

OR

2nd Line Treatment

Diethylstilboestrol Oral
2.5 mg daily

Note:
- Ensure adequate prophylaxis to prevent thromboembolic complications

OR
Cypoterone acetate oral/IM
200 mg-300 mg daily in divided doses

Side effects:
- Weight gain
- Depression
- Hot flashes
- Rash
- Weakening of bones

Chemotherapy in Metastatic Prostate Cancer

Docetaxel IV
100 mg/m2 in 500 mL of 0.9% saline IV over 2-4 hours 3 weekly

Note:
- Ensure that pre-chemotherapy investigations results are within normal
- limits: PCV>30%, WBC> 3,000/mL PLT>100,000/ml. Watch out for fluid retention
- Bone stabilizing agents in metastatic prostate cancer

Zolidronic acid IV
4 mg to be administered over 15 minutes every 3-4 weeks

Note:
- Contraindicated in persons with creatinine clearance <35 mL/min because of the risk of renal failure.
- Care is required to ensure that patients are well hydrated as dehydration may precipitate renal failure
- Contraindicated in women of child bearing age.
- Treat hypocalcaemia with **calcium** and **Vitamin D** before commencing therapy with **Zolindronic** acid:

Calcium oral
500 mg daily

AND
Vitamin D oral
400 units daily

Referral
- Patients should be immediately refer to a specialist

Burkitt's Lymphoma

This is a very fast growing tumour. It occurs mainly in children.

Cause
Epstein Barr virus (EBV)

Signs and symptoms
- Jaw mass/swelling, dental anarchy, lymphadenopathy
- Loss of appetite, weight loss, pallor, cachecxia
- Unexplained fever, fatigue, night sweat
- Abdominal mass
-

Investigations
- Fine needle aspiration and cytology (FNAC)
- Chest radiograph
- CT abdomen
- Full blood count
- Urea, electrolytes, creatinine
- Liver function tests
- HIV testing

Treatment objectives
- Achieve loco-regional control of the disease
- Correct jaw deformities
- Halt the progression of the disease
- Improve the quality of life of the patients

Non-pharmacological treatment
- Counselling and psycho-social support
- Nutritional support

Pharmacological *treatment*

Chemotherapy
1st line Chemotherapy

Cyclophosphamide IV
800 mg/m2 IV on day 1 followed by 200 mg/m2 on days 2-5

AND
Doxorubicin IV
40 mg/m2 on day 1
AND

Vincristine IV
1.5 mg/m2 IV on day 1 and 8 in cycle 1 and day 1, 8 and 15 in cycle 3

AND
Methotrexate IV
1200 mg/m2 IV over 1 hour on day 10; then 240 mg/m2 for the next 23 hours.

Leucovorin rescue at 200 mg/m2 begins at 36 hours

AND
Cytrabine 70 mg (patients older than age 3 years) intrathecally on days 1 and 3

AND
Methotraxate 12 mg (patient older than age 3 years) intrathecally on day 15

Note:
- Ensure that patient is well hydrated, watch out for tumour lysis syndrome.

2nd Line Treatment / IVAC
Ifosfamide IV
1500 mg/m2 IV on days 1-5

AND
Etoposide IV
60 mg/m2 IV from days 1-5

AND
Cytrabine IV
2g/m2 IV every 12 hours on days 1-2

AND
Methotrexate Intrathecal
12 mg (patients over 3 years of age) on day 5

Note:
- Watch out for tumour lysis syndrome

Referral
- Refer patients with this condition to a specialist

Colon and Rectal Cancer

This is the development of abnormal growth cells from the colon or rectum. Adenocarcinomas are the most common.

Signs and symptoms
- Change in bowel habit
- Weight loss, pallor, jaundice,
- Constipation, with passage of pellet like stool
- Obstipation with distended abdomen
- Passage of blood in the stool
- Mass in the abdomen or pelvis
- Mass in the rectum on digital rectal examination
- Blummer's shelf, Sister Joseph's node, Virchow's node - indicative of metastasis

Investigations
- Colonoscopy and biopsy
- Abdomino-pelvic USS
- CT scan of the abdomen
- Chest radiograph
- Full blood count
- Urea, electrolytes, creatinine
- Carcinoembryonic antigen (CEA)

Treatment objectives
- Achieve loco-regional control of the disease
- Hlt the progression of the disease
- Improve the quality of life of the patients

Non-pharmacological treatment
- Counselling and psycho-social support
- Nutritional support
- Surgery to remove the tumour
- Radiotherapy in cases of rectal cancer

Pharmacological treatment

Chemotherapy

This may precede or follow surgery or radiotherapy

1st line Treatment

Oxaliplatin IV

85 mg/m2 in 250 mL of 5% dextrose by IV infusion to run for 2-4 hours 3 weekly for 12-18 weeks

Note:

Ensure the following prior to therapy:

- ECG and echocardiography
- WBC >3,000/mL, PCV>30% and PLT>100,000/mL
- Liver function tests
- Renal function test

AND

Leucovorin IV

200 mg/m2 in 250 mL of 5% dextrose over 2-4 hours

AND

5-Flourouracil IV

400 mg/m2 IV bolus followed by 600 mg/m2 in 500 ml of 5% **dextrose** over 24 hours

Notes:

- Watch out for neutropenia, Stomatitis, painful paraesthesia, diarrhoea.
- Monitor response to treatment by regular estimation of CEA levels .
- Repeat treatment every 14 days for 4 -6 cycles

2nd line treatment/XELOX regimen

Oxaliplatin IV

85 mg/m2 in 250 mL of **5% dextrose** over 2-4 hrs on day 1

Repeat cycle every 3 weeks

AND

Capecitabine oral

1000 mg/m2 from day 1-14, then rest for seven days

Note:

- Dose adjustment based on response. Caution in patient with DM, breastfeeding patients. Start with lower doses in renal impairment patients

Referral

- Refer all patients with this condition to a specialist

Diseases of the Musculoskeletal System

These are diseases or conditions affecting the muscles, tendons, nerves, bones and joints.

Osteomyelitis

Infection of bone by pus-forming bacteria, mainly affecting older children and adults.

Causes

- Most commonly S. aureus, following infection elsewhere in the body.
- Less common organisms include:
  - Streptococci
  - *E. coli*
  - Proteus
  - Pseudomonas aeruginosa
  - Haemophilus *influenzae* in children.
- Streptococcus and Salmonella are common causes in sickle cell disease

Risk factors:

- Sickle cell disease
- Tuberculosis
- Trauma/Open fractures
- Vascular insufficiency
- Use of illicit drugs
- Sepsis

Signs and symptoms

Acute osteomyelitis

- Onset is usually over several days
- Fever, usually high but may be absent, especially in neonates
- Severe pain at the site of infection
- Tenderness and differential warmth at the site of infection
- Swelling at the surrounding tissues and joint

Chronic osteomyelitis
- May present with pain
- Localized erythema
- Swelling, sometimes in association with a draining sinus tract

Differential diagnosis
- Infection of joints
- Injury (trauma) to a limb; fracture (children)
- Bone cancer (osteosarcoma)
- Pyomyositis (bacterial infection of muscle)
- Cellulitis
- Sickle-cell disease (sickling crisis)

Complications
- Pathological fractures
- Chronic osteomyelitis

Investigations
- Total and differential WBC
- Erythrocyte sedimentation rate (ESR); C-reactive proteins (CRP)
- Urinalysis, urine culture and sensitivity
- Blood culture and sensitivity
- Pus culture and sensitivity
- Plain radiograph of affected limb

Treatment Objectives
- Relieve pain
- Reduce swelling
- Reduce fever
- Eradicate infection
- Prevent complications

Non-pharmacological treatment
- Immobilize the affected limb, splint
- Tepid sponging
- Surgery to drain subperiosteal and soft tissue abscesses

Pharmacological treatment

Pain and fever relief:

Adult:

Paracetamol oral
500mg, three to four times a day
Ibuprofen oral
400mg, three times a day

Child:

Paracetamol, oral suspension
125mg/5ml, three to four times a day
Ibuprofen oral suspension
200mg/5ml, three times a day

Note:

Ibuprofen should not be given to children less than three months

Acute osteomyelitis (empirical treatment while awaiting microbial sensitivity report)

Adult:

Cloxacillin IV
500 mg every 6 hours for 2 weeks. Continue orally for at least 4 weeks (but up to 3 months)

OR
Clindamycin oral
600mg every 8 hours

Child:

Cloxacillin oral
50 mg/kg every 6 hours

OR
Clindamycin oral
3-6mg/kg every 6 hours

Osteomyelitis in patient with sickle cell

Adult:
Ampicillin IV
2 g, every 6 hours for 5-12 weeks

PLUS
Cloxacillin IV
1–2 g every 6 hours for 6-12 weeks

PLUS
Chloramphenicol IV
500 mg every 6 hours if salmonella is suspected for 2 – 3 weeks

Child:
Cloxacillin, IV
6 – 12 years: 250mg every 6 hours
***1 – 5 years*:** 125mg every 6 hours
***< 1 year*:** 62.5mg every 6 hours

Cloxacillin Powder for oral liquid: 125 mg (as sodium salt)/5 mL

Chronic Osteomyelitis

Surgery is treatment of choice. Antibiotics are not generally recommended

Referral

Refer patients with the following problems to an orthopaedic surgeon:
- Patients not responding to treatment (persistent fever and pain after 2 days)
- Fluctuant abscess that requires drainage
- Complications e.g. pathological fracture, chronic osteomyelitis

Tuberculosis of the Spine (Pott's Disease)

Tuberculous spondylitis (Pott's disease) is a classic presentation of extrapulmonary tuberculosis. It is associated with significant morbidity and can lead to severe functional impairment.

Cause

- Mycobacterium *tuberculosis*

Signs and symptoms

Most common in young adults
- Localized pain, which increases in severity over weeks to months, sometimes in association with muscle spasm and rigidity
- Constitutional symptoms such as fever and weight loss are present in < 40% of cases; night sweats and malaise
- With the progression and spreading of the disease, anterior collapse of affected vertebrae leads to visible deformity (angular kyphosis or gibbus), and risk of cord compression:
- Weakness of legs (paraplegia)
- Visceral dysfunction

Differential diagnosis

- Staphylococcal spondylitis
- Brucellosis
- Metastatic lesion
- Sarcoidosis
- Septic arthritis
- Vertebral osteomyelitis

Complications

- Kyphosis

- Paraplegia
- Cold abscess
- Spinal deformity
- Secondary infection
- Fatality

Investigations
- Plain radiograph of the spine: disc space narrowing, paravertebral shadow, single/multiple vertebral involvement, destruction lesions of 2 or more vertebrae without new bone formation, destruction of vertebral end-plates
- Blood: raised ESR, WBC within normal limits
- Microbiology studies: AFB using blood tissue or abscess samples.

Management/treatment objectives
- Eradicate infection
- Identify and remove causative agent
- Recover/maintain neurological function
- Correct or prevent spinal deformity and possible sequalae
- Relieve pain

Non- pharmacological management
- Rest the spine
- Fit a spinal corset or plaster jacket for pain relief
- Surgical intervention is warranted for patients in the following circumstances:
    - Patients with spinal disease and advanced neurological deficits
    - Patients with spinal disease and worsening neurological deficits, progressing while on appropriate therapy
    - Patients with spinal disease and kyphosis >40 degrees at the time of presentation
    - Patients with chest wall cold abscess

Pharmacological management/treatment
- TB treatment as per guidelines

Rheumatoid Arthritis

This is a chronic inflammatory autoimmune multisystem disease of an unknown aetiology, with symmetrical involvement of the peripheral joints that cause joint destruction and may affect other organs. It is characterized by periods of remission, and exacerbations that usually begins in early adult life and affects females more frequently.

Causes
- Unknown origin, probably autoimmune

Signs and symptoms
- Stiffness and pain in the joints (usually >3, symmetrical, worse in the morning)
- Joints are swollen, warm, inflamed, and sensitive to touch
- Fingers are most affected (metacarpophalangeal, or proximal interphalangeal), but all small and medium size joints can be affected (rarely hips and spine)
- Extra articular manifestations: mild fever, weakness, lethargy, anorexia, weight loss, rheumatoid nodules (20%) at extensor surface like forearm below joint
- It is a CHRONIC disease with flare-up, remission, and exacerbations
- In advanced cases, joint deformities may occur
- Anaemia and hepatosplenomegaly

Differential diagnosis
- Osteoarthritis
- Reactive arthritis
- Systemic Lupus Erythematosus
- Polyarticular gout
- Fibromyalgia syndrome
- Hepatitis B

Complications
- Chronic pain
- Joint instability and deformity
- Pulmonary, cardiac and ocular involvement
- Malignancies e.g. lymphoma

Investigations
- Blood: Full blood count, ESR, rheumatoid factor

- Radiographs of affected joints
- Synovial fluid analysis

Management objectives
- Reduce pain and disability
- Preserve joint function
- Prevent joint damage and deformity
- Limit joint damage
- Maintain or improve quality of life of patient

Non-pharmacological treatment
- Health Education
- Physiotherapy: improve mobility, increase muscle power, Reduce pain and disability
- Occupational therapy: improve independent living and quality of life
- Weight loss

Pharmacological treatment

For pain and inflammation in acute flare
Ibuprofen oral
Adult:
400 – 800mg every 8 hours
Child:
1-3months and bodyweight > 5kg: 5mg/kg, orally 3 – 4 times daily
3 months-1 year and bodyweight > 5kg: 50mg, 3 – 4 times daily
1-4 years: 100mg every 6-8 hours daily
4-7 years: 150mg every 8 hours
7-10 years: 200mg every 8 hours
10-12 years: 300mg every 8 hours

OR
Diclofenac oral
Adults
50 mg every 8 hours
Children:
14 – 18 years: 75mg – 100mg daily, 2 -3 divided doses

OR
Indomethacin oral
Adults:
50 mg every 8 hours

Note:
- Long term treatment is not advised because of toxicity, and because NSAIDS do not modify the progression of disease
- Consider adding gastroprotection with **omeprazole 20 mg once daily**

For severe acute inflammation
Administer NSAIDs and refer for specialist care

Prevention
- Quit smoking
- Avoid excess alcohol intake

Gouty Arthritis

An inflammatory monoarticular arthritic disorder due to deposition of uric acid crystals in tissues and joints. Affects mostly men above 30 years, while women are usually not affected until after menopause.

Causes
- Altered urate metabolism with deposition of urate salts in the joint and other tissues in advanced cases

Signs and symptoms
Acute gout
- Inflamed joint - warmth, redness and swelling

- Sudden severe pain (often at night)
- Mostly attacks the big toe at the metatarsophalangeal joint (podagra), may occasionally start in other joints

Chronic gout

- Repetitive acute attacks are followed by progressive cartilage and bone erosion
- Deposition of tophi in soft tissue, e.g., ear cartilage, bursae, and tendon sheaths
- Stiffness in the joint

Complications

- Joint-destruction if untreated
- Renal failure
- Septic arthritis

Differential diagnosis

- Joint infection
- Osteoarthritis
- Rheumatoid arthritis
- Trauma
- Pseudo gout

Investigations

- Joint aspiration and synovial joint analysis
- Radiograph of the affected joint(s)
- Blood: serum uric acid (elevated, but may be normal)

Treatment objectives

- Relieve pain and inflammation
- Prevent future gouty attacks that could lead to permanent joint damage.
- Prevent deposition of uric acid in soft tissues

Non- Pharmacological treatment

- Rest and topical ice application for acute attacks
- Avoidance of risk factors that can trigger acute attacks
- Dietary interventions that may reduce gout attack frequency

Pharmacological treatment

Acute Gout

Ibuprofen oral

400 mg orally every 8 hours

OR

Diclofenac oral

50mg every 8 hours

OR

Naproxen oral

250-500 mg every 12 hours

If NSAIDS contraindicated

Prednisolone oral
40 mg once daily for 5 days

OR

Methylprednisolone intra-articular
4-80mg (depending on patient's size) intra-articularly; may be repeated at intervals of 7-35 days

OR

Colchicine oral
0.5-1 mg initially followed by 0.5 mg every 2-3 hours until relief of pain

Note:

- Do **NOT** repeat the course within 3 days

Chronic Gout

Allopurinol oral

100-300 mg once daily

OR
Probenecid oral

250mg orally twice daily for1week

Then 500mg twice daily -Increase up to 3g/day

Note:
- Reduce dose in renal or hepatic impairment
- DO NOT use **allopurinol** to treat asymptomatic hyperuricemia

Prevention
- Drink plenty of fluids
- Prevent/treat obesity
- Avoid alcohol and drugs that can elevate serum uric acid
- Dietary changes - avoid excess purine rich food (e.g. shellfish, meats, liver)

Referral
- Where there is no improvement in initial treatment urgent referral for specialist care is required

Osteoarthritis

A degenerative joint disease with damage to articular cartilage. It is the commonest form of joint disease. The pathological changes in osteoarthritis are irreversible.

Causes
- Unknown cause, but suggestive of genetic, biochemical and metabolic

Risk factors
- Previous injury
- Overweight
- Age greater than 60 years

Signs and symptoms
- Joint pain
- Morning stiffness of short duration or after periods of inactivity
- Creakiness while walking
- Joint crepitus on examination
- Joint effusion
- Loss of function and deformity

Differential diagnosis
- Gouty arthritis
- Rheumatoid arthritis
- Bursitis
- Psoriatic arthritis

Complications
- Joint deformity
- Septic arthritis

Investigations
- Normal blood count and ESR
- Radiographs of the affected joint(s)

Treatment objectives
- Reduce/relief pain
- Enhance mobility
- Prevent deformity
- Minimize progression

Non-pharmacological treatment
- Weight reduction
- Encourage activity and regular exercise
- Use of appropriate foot wear and walking aids
- Physical and occupational rehabilitation

Pharmacological treatment

Adult:
Paracetamol oral
500 mg-1 g, orally every 8 hours

In acute exacerbation, or severe pain
Use NSAIDs orally or local application

Adults
Ibuprofen oral
400-800mg orally every 8 hours

OR
Naproxen oral
500mg orally every 12 hours

OR
Diclofenac sodium oral
75-150mg orally in 2-3 divided doses daily

OR
Diclofenac gel
7% gel, apply on the affected part up to 3 – 4 times daily

Anti-depressants for night pain
Adult
Amitriptyline 25-75mg orally daily in divided doses or as a single dose at bedtime
Glucosamine/chondroitin (triple strength i.e.750/600 mg) one tablet orally every 12 hours

Indications for surgery
- Intractable pain
- Deformity
- Disability

Prevention
- Encourage weight reduction
- Encourage regular exercise
- Ensure early treatment

Referral
- For long term management of severe cases, refer to rheumatologists and/orthopaedic specialists

Juvenile Rheumatoid Arthritis

Juvenile rheumatoid arthritis is an autoimmune non-infective inflammatory joint disease that is common in children and adolescents.
Juvenile rheumatoid arthritis in children may present in one of three forms:
- Systemic onset arthritis (Still's disease)
- Polyarticular onset arthritis
- Rheumatoid factor negative arthritis
- Rheumatoid factor positive arthritis
- Oligoarthritis - mainly found in ankles, wrists, and knee. Can affect the eyes- uveitis, iridocyclitis, or iritis

Cause
- The exact cause is not known (idiopathic) although being associated to genetics, certain infections, and environmental triggers

Signs and symptoms
- Fever
- Maculo-papular rash especially on the torso
- Lymphadenopathy is common
- Arthritis involving multiple joints
- Joint pain in the morning and improves in the afternoon
- Joint swelling and pain may also be noted
- A young child may feel irritable or tired and not want to play
- Joints are inflamed and warm
- Malaise

Differential diagnosis
- Septic arthritis
- Reactive arthritis
- Trauma
- Haematological diseases - leukaemia, Haemophilia
- Juvenile psoriatic arthritis
- Juvenile ankylosing spondylitis
- System lupus erythematosus (SLE)

Complications
- Uveitis
- Failure of growth and bone development

Investigations
A good medical history and physical are key to diagnosis
- FBC and differentials
- ESR
- Radiographs of affected joints

Treatment objectives
- Relieve inflammation
- Control pain
- Improve quality of life
- Prevent deformities and growth retardation

Non- pharmacological treatment
- Physiotherapy to maintain full joint movement
- Occupational therapy to maintain independent living
- Psychotherapy
- Stress reduction
- Massage
- Surgery where applicable

Pharmacological treatment

Ibuprofen, oral**,**

Adult:
400 mg every 8 hours

Child: 7Kg
10 mg / kg every 6-8 hours

OR
Diclofenac gel 1%

Apply every 12 hours

Prevention (secondary and tertiary)
- Ensure a treatment plan to ease symptoms
- Maintain full movement in affected joints
- Identify, treat and prevent complications

Referral
- All suspected cases should be referred to a paediatrician/paediatric surgeon.

Septic Arthritis

This is acute inflammation of joints, usually big joints, following bacterial infection. It is also known as infectious or bacterial arthritis.

Two forms: gonococcal and non-gonococcal septic arthritis

Non-Gonococcal Arthritis

Causes
- Staphylococcus aureus in majority of cases
- Streptococcus pyogenes and pneumococci
- Haemophilus influenzae in infants
- Salmonella in sickle cell disease

Signs and symptoms
- Joint pain and stiffness
- Fever and chills
- Fatigue and generalized weakness
- Redness of the skin around the joint.
- Joint inflammation: swelling, effusion, warmth, tenderness and limitation of movement

Differential diagnosis
- Gonococcal arthritis
- Gout and pseudogout
- Rheumatic fever
- Rheumatic arthritis
- Viral arthritis
- Osteoarthritis
- Clotting disorders

Complications
- Dysfunctional joints
- Osteomyelitis
- Sepsis
- Osteonecrosis
- Fatality

Investigations
- FBC
- ESR
- Radiograph of affected joints
- Sickling /Hb electrophoresis
- Aspiration of joint effusion (fluid is turbid with polymorphs) for Gram stain, microscopy, culture and sensitivity
- Blood culture
- Urethral swab

Treatment objectives
- Relieve pain
- Treat infection
- Prevent joint damage

Non-pharmacological treatment
- Rest affected joint e.g. splinting or traction during acute phase
- Therapeutic joint aspiration

Pharmacological treatment

Cloxacillin IV
Adult:
500 mg intravenously every 6 hours for up to 2 weeks
Child:
5-12 years: 250 mg every 6 hours
1-5years: 125 mg every 6 hours

<1 year: 62.5 mg every 6 hours

OR

Flucloxacillin oral
Adult:
500 mg, PO, every 6 hours
Child:
5-12 years: 250 mg every 6 hours
1-5 years: 125 mg every 6 hours
<1 year: 62.5 mg every 6 hours

OR

Clindamycin IV/oral

Adults
150-300 mg orally or intravenously every 6-8 hours
Child:
3-6 mg/kg orally or intravenously every 6 hours

In children with sickle cell disease and suspected Salmonella infection,

ADD
Ciprofloxacin oral
10 mg/kg every 12 hours

Paracetamol oral
Adults
500 mg-1g every 6-8 hours
Child
10mg/kg every 6-8 hours

OR

Ibuprofen oral
Adults
400 mg every 8 hours
Child
10 mg/kg every 8 hours

Referral
Refer patients with large effusions to specialist for joint aspiration.

Gonococcal Arthritis

In gonococcal arthritis, joint involvement may be asymmetrical and polyarticular. The symptoms and signs are similar to those of non-gonococcal arthritis. Additional features include rash (macular, vesicular or pustular) tenosynovitis and urethral discharge.

Causes
- Neisseria *gonorrhoeae*

Differential diagnosis
- Rheumatic fever
- Hepatitis B and C
- Lyme disease
- Meningococcaemia
- Septic arthritis
- Syphilis

Complications

- Pelvic inflammatory disease
- Infertility in men and women
- Complications during pregnancy
- Increased risk of HIV/AIDS and other STIs

Investigations
- Culture of urethral discharge, skin or genital lesions

Treatment Objectives
- Relieve pain
- Treat infection
- Prevent joint damage

Non-pharmacological treatment
- Rest the affected joint e.g. by splinting or traction during the acute phase
- Therapeutic joint aspiration

Pharmacological treatment

Adult:
Ciprofloxacin oral
500 mg orally every 12 hours for 14-21 days

OR
Ceftriaxone IM, IV,
1g every 24 hours

Plus
Azithromycin
1g as a single dose

OR
Cefotaxime IV
1 g every 8 hours

PLUS
Azithromycin oral
1g as a single dose

Child:
Cefotaxime IV
50 - 75 mg/kg every 12 hours

Neonates
Cefotaxime IV
25 mg/kg every 12 hours

Note
- Because of high prevalence of co-existent chlamydia infection concomitant therapy with oral **Doxycycline** 100 mg every 12 hours should be provided for 10-14 days.

Prevention
- Patient education – promoting the use of sexual barriers, condoms
- Identification of high-risk sexual practices

Systemic Lupus Erythematosus (SLE)

A chronic, multi systemic auto-immune inflammatory disease that affects virtually any organ in the body. It is common in women of child bearing age and it is characterized by remissions and flares.

Causes
- Autoimmune

Signs and symptoms
Onset usually preceded by constitutional symptoms:

- Fever, marked weight loss, loss of appetite, aches and pains all over the body, severe fatigue, headache, malaise, hair loss

Typical characteristics:
- Musculoskeletal: joint pain and swelling
- Pulmonary: pleurisy, pleural effusion, pneumonitis
- Cardiac: pericarditis, endocarditis, myocarditis
- Renal: glomerulonephritis, nephritic syndrome, renal failure
- Neurologic: seizures, psychosis, peripheral neuropathy, transverse myelitis
- Cutaneous: photosensitive skin eruptions (butterfly rash on the nose bridge and cheeks), discoid lesions, alopecia
- Others: eye involvement, recurrent abortions

Differential diagnosis
- Rheumatoid arthritis
- Typhoid fever
- Malaria
- Hepatitis
- Fibromyalgia syndrome
- Scleroderma
- Mixed connective tissue disease
- Benign hypermobility syndrome
- Drug-induced SLE

Complications
- Opportunistic infections
- Avascular necrosis
- Premature atherosclerotic disease
- Myocardial infarction

Investigations
- FBC
- ESR
- LE cells
- Anti-DNA antibodies
- Antinuclear antibodies (ANA)
- BUE, Creatinine
- Urinalysis
- Radiographs of affected joints
- Echocardiography

Treatment objectives
- Reduce pain
- Improve mobility
- Prevent solid organ (e.g. kidney and brain) involvement

Non-pharmacological treatment
- Ensure patient education
- Physiotherapy
- Occupational therapy
- Adequate nutrition
- Exercise to prevent contractures
- Adequate rest
- Avoidance of exposure to sunlight in photosensitive patients

Pharmacological treatment

Ibuprofen oral
400mg every 8 hours

PLUS
Prednisolone oral
0.5mg-1mg/kg daily

OR
Methotrexate oral
7.5 – 15mg every week

OR
Azathioprine oral
2.3mg/kg daily

Referral
- **Refer all patients for specialist care**

Back Pain

Defined as any pain of the back, at any site between the neck and the buttocks. Low back pain is the commonest, affecting the lower portion of the spine. Most cases result from mechanical causes and usually last less than six weeks.

Causes
- Spondylosis
- Intra-spinal abscess
- Tumours (primary or secondary)
- Osteoporosis
- Osteomyelitis
- Trauma
- Pregnancy
- Congenital abnormalities
- Muscular strain
- Spinal degeneration and injury
- Improper lifting
- lack of regular exercise

Signs and symptoms
- Pallor
- Localized pain in the dorsal spine
- Muscle ache
- Shooting or stabbing pain
- Pain that radiates down the leg
- Back pain and stiffness in the lower back, as well as muscle spasms
- Poor movement

Differential diagnosis
- Pancreatic or gall bladder
- Referred pain from intestinal or stomach disorders
- Retro-peritoneal tumours
- Alcoholic gastritis
- Aortic aneurysms
- Tumours or inflammation of the pleura, pericardium
- Metastatic bone disease
- Pelvic inflammatory disease

Complications
- Complications of underlying cause(s) or pressure effects on the spinal cord and nerve roots

Investigations
- Full Blood Count; ESR
- C-Reactive Protein
- Calcium, phosphate, alkaline phosphatase levels
- Radiograph of the lumbosacral spine
- CT Scan

Treatment objectives
- Relieve pain
- Relieve muscle spasm if present
- Identify underlying cause(s) and manage appropriately
- Prevent complications

Non-pharmacological treatment
- Improve Posture
- Exercise

- Weight reduction in the obese
- Bed rest on a firm (orthopaedic) mattress
- Warm compresses to affected area
- Apply RICE protocol (rest, ice, compression, and elevation) within the first 48 hours.
- Complementary and alternative therapies (such as massage, mind-body interventions)

Pharmacological treatment

Mild Pain

Ibuprofen oral
400 mg every 8 hours preferably in 2 divided doses

Paracetamol oral
500 mg two times daily

Severe Pain

Diclofenac IM
75 mg every 12 hours by deep intramuscular injection

OR
Diclofenac oral (slow release)
75mg every 12 hours

OR
Diclofenac rectal or oral
50 mg every 8 hours

Prevention

- Back strengthening and stretching exercises at least 2 days a week.
- Encourage better posturing: stand and sit up straight
- Avoidance of heavy lifting
- Achieve ideal body weight

Referral

- Refer patients not responding to initial treatment or who have systemic symptoms to a rheumatologist and/orthopaedic specialist.

Neurologic diseases

Dizziness

Dizziness is a sensation of feeling weak or unstable, spinning around and loosing balance. It is also frequently used to describe the light-headedness that is felt in panic and anxiety attacks.

Causes

- Anaemia
- Arrhythmias
- Severe dehydration
- Transient ischaemic attack
- Fever
- Vertigo
- Ménière's disease
- Motion sickness
- Medications e.g. antihypertensives, sedatives, antidepressants etc.
- Hypoglycaemia
- Brain disease e.g. stroke, dementia, migraine etc.
- Alcohol overdose
- Autonomic neuropathy (especially in diabetic patients)

Signs and symptoms

- Light headedness
- Nausea and vomiting
- Unsteadiness or loss of balance
- A false sense of motion or spinning
- Other symptoms, depending on the cause(s) of dizziness

Differential diagnosis

- Migraine-induced vestibulopathy
- Parkinson disease
- Epilepsy
- Benign positional vertigo
- Labyrinthine disorders
- Warning symptoms of posterior circulation stroke
- Brain tumour (acoustic neuroma)

Complications of dizziness

- Injury from falling
- Risk of accidents if dizziness occurs while driving
- Other complications depending on the cause(s) of dizziness

Investigations

- Full blood count and differentials
- Thyroid function test

- Random blood glucose
- Radiograph of sinuses
- Electrocardiography
- Echocardiography
- Doppler ultrasound scan of carotid arteries

Treatment objective/management
- Identify possible causes
- Manage symptoms
- Prevent recurrence

Non- pharmacological treatment
- Maximize cerebral blood flow by placing patients in the supine position.
- Enhance airway flow.
- Loosen tight clothing
- Stop medicines that may cause dizziness

Pharmacological treatment
- Treat various causes

Symptomatic treatment of dizziness from vestibular disease:
Prochlorperazine, 5 mg three times daily; increased gradually to a maximum of 30 mg in three divided doses daily; reduce dose after several weeks to 5-10 mg daily

Prevention
- Identify and avoid precipitating factors.

Referral
- If the patient does not improve refer for specialist care

Headache

Headache is defined as a pain arising from the head or upper neck of the body which can be symptomatic of a distinct pathologic process or idiopathic. The types of headache are migraine, tension, cluster and secondary headaches.

Causes
Primary headache
- Migraine headache - inflammation of blood vessels in the brain due to rapid serotonin release.
- Tension Headaches – these may be related to stress.

Secondary headache
- Systemic illness including infections
- Trauma
- Brain tumours
- Brain haemorrhage
- Severe hypertension
- Dental diseases
- Sinusitis

Signs and symptoms
- Usually no signs for primary headaches.
- Signs for secondary headaches depend on the underlying cause(s).

Migraine
- Photophobia and phonophobia (don't like light and noise during headaches)
- Pain usually severe and throbbing. May be one sided (unilateral).
- Usually last for several hours or even days.
- Nausea and/or vomiting

Tension type headaches

- Pain not very severe.
- Usually tightening (not throbbing)
- No nausea or vomiting.
- No photophobia or phonophobia
- May be underlying stress.

Investigations

- Full blood count
- Blood electrolytes, urea and creatinine
- CT scan of brain
- MRI of brain
- Sinus X-ray

Differential diagnosis

- Meningitis
- Hysteria
- Refractive error
- Cervical spondylosis
- Brain tumour
- Haemorrhagic stroke

Treatment objectives

- Relieve pain
- Improve quality of life
- Identify and remove triggers
- Manage symptoms and reduce pressure
- Prevent recurrence

Non-pharmacological treatment

- Identify and eliminate factors that trigger headache
- Relaxation techniques
- Massage muscle at the back of the head, neck and shoulder to relieve tightness
- Psychotherapy

Pharmacological treatment

Tension type headaches
Symptomatic treatment

Paracetamol oral
Adult:
500 mg - 1 g every 6-8 hours

Child:
6-12 years: 250-500 mg every 6-8 hours
1-5 years: 120-250 mg every 6-8 hours
3 months-1 year: 60-120 mg every 6-8 hours

OR NSAIMs for tension headaches and migraines
Ibuprofen, oral,
Adult:
200-400 mg every 12 hours

Prophylaxis for migraine
Propranolol, oral,
40-80 mg daily

OR
Prophylaxis for migraine and tension type headaches
Amitriptyline, oral,
10-25 mg nocte

Prevention
- Counsel to avoid medications overuse
- Advise on getting enough sleep
- Encourage regular exercise
- Counsel on stress reduction techniques
- Advise on reducing caffeine

Referral
Refer to specialist if:

- The patient has headaches that are not responding to treatment
- The headaches are associated with neurological signs such as weakness in the limbs, droopy eyelids, neck stiffness.

Epilepsy

Is a condition characterized by at least two recurrent unprovoked seizures resulting from abnormal excessive electrical discharge of brain cells.

Causes
- Hereditary (runs in the family)
- Congenital (born with the tendency to seizures)
- Idiopathic epilepsy (when there's no obvious cause)
- Cerebral malaria.
- Infections e.g. meningitis, TB, HIV, abscesses in the brain.
- Stroke
- Tumor or malformations of the brain
- Traumatic head injury.
- Alcohol
- Dementia

Signs and symptoms
A classical attack of generalised seizures has three phases:

- Aura: warning symptoms before seizures e.g. dizziness, abnormal smell, discomfort in the stomach, etc.
- Seizure itself: Sometimes referred to as ictus
    - Stiffness and convulsion, fall, frothing in the mouth
    - Tongue biting
    - Incontinence
    - Loss of consciousness
- After seizure (post-ictal):
    - Headaches
    - Drowsiness
    - Body pains
    - Confusion

Clinical Types
- Focal: shaking of one or more limbs on the same side, turning of the head to one side
- Generalized tonic/clonic (grand mal): shaking of all 4 limbs
- Absence seizures (petit mal): Brief absences but no limb shaking and no falls. Last a few seconds only. Occurs mainly in children
- Myoclonic: sudden contraction of limbs like an electric shock. Very brief.
- Atonic: sudden falls due to relaxation of all muscles. No shaking.

Differential diagnosis
- Syncope
- Hypoglycaemia
- Hypocalcaemia
- Conversion disorder, hyperventilation and panic attacks

Complications
- Status epilepticus
- Cardiac arrhythmias
- Renal failure from myoglobinuria
- Cerebral hypoxia/anoxia resulting in brain damage and sudden death

Investigations
- Random blood glucose
- Blood urea, electrolytes and creatinine
- Brain CT scan; MRI
- Electroencephalography

Treatment objectives
- Eliminate or significantly reduce seizures.
- Treat underlying causes if identified

First aid measures
- Remove harmful objects from vicinity of patient; protect patient from harm
- Loosen clothes, especially around the neck so that the patient does not choke.
- DO NOT place anything like a spoon or hard object in the mouth of the patient
- Ensure the airway is clear; remove any secretions or vomitus from the mouth or nose.
- Place the patient in a semi-prone position after the seizure to prevent choking.
- Stay with the patient until the patient recovers consciousness.

Pharmacological treatment

Phenobarbitone oral

Adult:
Begin with 60 mg orally at night; increase by 30 mg if necessary to a maximum of 180 mg orally at night

Child:
30 - 60 mg orally at night

Note:

- Phenobarbitone is a broad-spectrum anticonvulsant and can be used for most seizure types but NOT absence seizures.

OR

Phenytoin oral

Adult:
200mg at night and increasing to 300mg if necessary

Child:
5 mg/kg/day orally in 2 or 3 equally divided doses, with subsequent dosage individualized to a maximum of 300 mg orally daily

Note:
Discontinue if a rash develops and consider another medication

OR

For patients not responding to phenobarbitone and phenytoin and patients with temporal lobe epilepsy

Carbamazepine oral

Adult:
200mg twice a day and increase by one tablet at a time to a maximum of 600mg twice daily

Note:
- Not recommended in pregnancy

Child:
10-20mg/kg daily in divided doses

Note:
- Discontinue if a rash develops and consider another medication

OR
Sodium valproate oral
- Useful for children with absence seizures
- AVOID in young women who may become pregnant (risk of foetal damage)

Adult:
Initial dose of 200mg twice a day and increase by one tablet at a time up to a maximum of 2G per day.

Child over 20kg:
Initial dose of 200 mg 2 times daily irrespective of weight; increase the dose progressively if necessary, until the optimal dose has been reached (usually 10 to 15 mg/kg 2 times daily).

Levetiracetam oral
Initial dose of 250mg twice daily and increase gradually to up to 1gram two times daily if necessary

Note:
- It is useful for most types of epilepsy but NOT absence seizures.
- Useful for pregnant women.

Management of Status Epilepticus

Status epilepticus (SE) is a common, life-threatening neurologic disorder characterized by series of seizures without the patient regaining consciousness between seizure attacks.

- Maintain airway
- Insert an IV line and an infusion of normal saline (0.9% sodium chloride)
- Give diazepam IV

Adult:
up to 10mg slowly intravenously (IV).

Child:
give 5mg or less.
- If patient continues to fit repeat diazepam IV after 15 minutes
- If seizures continue DO NOT REPEAT VALIUM!!!
- Give instead phenobarbitone IV by slow injection over 15 minutes.

Adult:
Initial dose is 10mg/kg.
Maintenance dose is 100 - 200mg may be given daily for the next few days

Child:
15mg/kg.
Maintenance dose is 2.5mg/kg

- Once patient is conscious give oral phenobarbitone should be given up to 120mg daily.
- Other aspects of patient management should be addressed. These are feeding either by naso-gastric tube or by intravenous feeding, correction of hypoglycaemia if present and continued maintenance of airway.

Note:
- Phenytoin infusion can be given but has to be done under ECG control as serious irregular heart rate may occur so it is NOT recommended if ECG monitoring is not available

Peculiar issues in women with epilepsy include:

- Seizures may be more frequent before or during menstrual periods
- Some epilepsy medications e.g. phenobarbitone, phenytoin, carbamazepine will affect the effectiveness of oral contraceptive pills. Contraceptive pills are metabolized by anticonvulsants, thus women will need higher doses of contraceptive pills - e.g. 2 pills instead of one daily

Special considerations in pregnant women with epilepsy:
- Anticonvulsants are teratogenic
- Sodium valproate has the highest risk of congenital malformation compared with others
- Risk of teratogenesis is dose-dependent
- Lamotrigine causes the least damage.
- DO NOT STOP epilepsy medication when a woman becomes pregnant.
- Upward adjustment of the dose of drugs like lamotrigine may be required
- Some medications e.g. phenobarbitone, carbamazepine and phenytoin may decrease serum levels of Vitamin K, increasing the risk of bleeding during or after delivery. Therefore, give Vitamin K to the mother from 36 weeks (8 months) gestation until delivery:
  Preferably Vitamin K tablets 10 mg orally once daily
  Or
  Vitamin K injection 10 mg IM once weekly
- As soon as the baby is born, give Vitamin K 0.5 -1 mg of by intramuscular injection
- Do not confuse epilepsy in pregnancy with eclampsia.
  In eclampsia, other signs such as high blood pressure, protein in the urine and leg oedema should be present.
  It is important to ask every pregnant woman if they suffer from epilepsy during antenatal care.
- If seizures occur during delivery give diazepam intravenously, NOT magnesium sulphate unless the patient has other signs of eclampsia.
- After delivery, epilepsy medication may need to be adjusted again to pre-pregnancy levels.
- Mothers with epilepsy who are breast feeding should attend their babies on the floor in case they have an attack of seizures, to prevent injury to the baby.

Febrile convulsions

Note:
- Febrile Convulsions are NOT EPILEPSY!

Management
- Tepid water sponging
- Antipyretic - Paracetamol Syrup
- Diazepam: by rectum as solution,

Child:
>10 kg: 0.5 mg/kg (maximum 10 mg), with dose repeated if necessary (Alternative treatment), by slow intravenous injection, 0.2 to 0.3 mg/kg (or 1 mg per year of age)

Referral:

- Refer patients to a hospital specialist if seizures are obstinate or refractory to treatment or if general anaesthesia and ventilatory support is required.

Meningitis

Meningitis is an inflammation of the membranes surrounding the brain and spinal cord.

Causes
- Viral infection (common)
- Bacterial infections (streptococcus, pneumococcus, meningococcus, listeria)
- Tuberculosis
- Fungal infection e.g. Cryptococcus neoformans
- Protozoa e.g. Toxoplasma in HIV-AIDS

Signs and symptoms
Triad of symptoms

- Headache
- Fever
- Neck stiffness

Other symptoms
- Impaired consciousness
- Rash
- Convulsions
- Photophobia

Differential diagnosis
- Subarachnoid haemorrhage
- Tetanus
- Brain abscess
- Cerebral malaria

Complications
- Cranial nerve palsies
- Cerebral infraction
- Empyema
- Stroke
- Multiple seizures
- Ataxia
- Syndrome of Inappropriate Anti-Diuretic Hormone (SIADH) secretion

Investigations
- Full blood count
- Blood film for malaria parasite
- HIV screening
- Mantoux test, if TB is suspected
- Chest radiograph to exclude TB, and in cases of pneumococcal meningitis.
- Lumbar puncture to examine the CSF.
    - High neutrophils in CSF suggest bacterial infection
    - High lymphocytes suggest viral or TB meningitis
    - Low sugar in CSF could be bacterial or TB but not viral meningitis
    - High protein in CSF in most types of meningitis
    - CSF pressure may be high.
    - CSF should also be examined and cultured for bacteria
- Blood culture and sensitivity

Treatment objectives
- Eradicate the infecting organism
- Reduce intracranial pressure
- Manage CNS and systemic complications
- Correct metabolic derangements
- To prevent spread to contact

Non-pharmacological treatment
- Counsel on, and encourage good nutritional habit
- Urgently inform local and other relevant authorities if epidemic meningitis is suspected
- Reduce fever with tepid sponging or using water at room temperature (i.e. around 32.2oC- 35oC).
- Keep airways clear

Pharmacological treatment

Adult:
- Antibiotics should be given for a minimum of 14 days.
- Empirical antibiotic treatment should be intravenous, initially for a minimum of 7 days, and should be started without delay.
- This may be changed to oral therapy with significant clinical improvement.
- Ceftriaxone may be administered for all types of bacterial meningitis before culture results are available.

Ceftriaxone, 2 g IV every 6 hours for 7 days or more.

THEN
Amoxicillin/clavulanic acid oral
1 g orally every 6 hours for remainder of treatment course

For pneumococcal meningitis

Benzyl penicillin IV
4 mega (million) units by slow intravenous injection every 6 hours

THEN

Chloramphenicol oral
500 mg orally every 6 hours for remainder of treatment course

Child:

- All antibiotic treatment should be by the intravenous route for a minimum of 10 days in children, and should be started without delay.

Benzyl penicillin IV
0.2 mega (million) units/kg body weight IV every 6 hours

PLUS
Chloramphenicol oral
25 mg/kg body weight IV every 6 hours

Alternatively, for all types of bacterial meningitis,
Ceftriaxone IV
50-60 mg/kg body weight intravenously once daily for 7 days

Tuberculous meningitis
4 fixed dose combinations (FDC) RHZE for 2 months (rifampicin, isoniazid, pyrazinamide and ethambutol)

FOLLOWED BY
2 FDC (rifampicin and isoniazid) for 7-10 months depending on the age of the patients.

Adult:
4 FDC (RHZE 150/75/400/275 mg)
2 FDC (RH 150/75 mg)

Child:
3 FDC plus Ethambutol 100 mg (RHZ 75/50/150 mg)
2 FDC (RH 75/50mg)

PLUS
Prednisolone 2-4 mg/kg/day

Prophylaxis for meningococcal meningitis
Prophylactic treatment is recommended for patients 2 days prior to discharge and also for their close contacts

Ciprofloxacin, oral
Adult: 500 mg as a single dose
(Avoid in pregnancy)
Child:
5-12 years 250 mg as a single

OR
Ceftriaxone IM

Adult: 250 mg as a single dose by deep IM injection
Child:
Under 12 years 125 mg as a single dose by deep IM injection

Prevention

Encourage the following vaccinations which are the most effective way to prevent meningitis of certain aetiologies:

- Meningococcal vaccines (N. meningitidis)
- Pneumococcal vaccines (S. pneumoniae)
- Hib vaccines (H. influenzae B)

Encourage healthy habits:

- Careful, regular hand washing with soap and water to prevent the spread of germs.
- Cessation or avoidance of cigarette smoking, and persons who smoke
- Avoid close contact with ill persons

Referral

Patient with meningitis not responding to treatment should be referred for specialist care.

Parkinsonism

Parkinsonism is a syndrome characterized by tremor, rigidity, bradykinesia and postural disturbances, due to primary degeneration or damage to the basal ganglia that result from dopamine deficiency. The idiopathic variety is called Parkinson's Disease.

Causes

- Drugs:
  - Antipsychotics e.g. phenothiazines
  - Centrally-acting antihypertensives e.g. alpha methyl dopa, reserpine
- Infections:
  - Encephalitis
  - Typhoid fever
- Vascular diseases:
  - Arteriosclerosis
- Neurotoxins:
  - Carbon monoxide
  - Manganese
  - Cyanide
  - Heroin analogues
- Head trauma
- Tumours
- Metabolic diseases (Wilson's disease)
- Idiopathic: Parkinson's disease

Signs and symptoms

- Shuffling gait with flexed posturing
- Postural instability with tendency to fall
- Non-intentional (resting) tremor (pill-rolling)
- Muscle rigidity (cogwheel type)
- Bradykinesia - slow voluntary movement with reduced arm swing
- Mask-like (expressionless) facies
- Dysarthria; dysphagia
- Micrographia
- Autonomic dysfunction - orthostatic hypotension, constipation, excessive sweating, excessive salivation, oily skin and urinary incontinence
- Personality and mood changes e.g. apathy
- Variable cognitive impairment
- Functional impairment and dependency on others

Differential diagnosis

- Thyrotoxicosis
- Benign essential tremor
- Dementia e.g. from Alzheimer's disease
- Depression
- Normal pressure hydrocephalus

Complications
- Dementia
- Recurrent falls resulting in injury
- Depression

Investigations
Diagnosis is clinical: good patient history and physical examination
- Brain CT scan to exclude other possible differentials

Treatment objectives
- Relieve symptoms
- Delay disease progression
- Promote mobility
- Prevent falls

Non-pharmacological treatment
- Physiotherapy for postural adjustments
- Occupational therapy to promote functional independence

Pharmacological treatment

Levodopa/carbidopa 50 mg orally every 6 - 8 hours, increased by 100 mg once or twice weekly depending on response. For drug induced parkinsonism Biperiden oral 2 mg orally 3 to 4 times a day; the dose may be titrated up to a maximum of 16 mg per 24 hours

Prevention
- Timely and appropriate treatment to prevent or reduce complications

Referral
- Refer all suspected patients for specialist evaluation

Syncope

Syncope is the transient loss of consciousness and postural tone as a result of acute decrease in cerebral blood flow. Syncope is the transient loss of consciousness and postural tone as a result of acute reduction in cerebral blood flow. It is characterized by rapid recovery of consciousness, usually without resuscitation

Causes
- Vaso-vagal attack (most common)
- Abrupt changes in posture
- Carotid sinus pressure
- Standing for long time
- Severe emotional disturbance
- Arrhythmias (especially complete heart block)
- Hypertrophic cardiomyopathy
- Myocardial infarction
- Atrial myxoma
- Aortic stenosis
- Dissecting aneurysm
- Pulmonary embolism
- Vertebro-basilar insufficiency
- Subclavian steal syndrome

Clinical feature
- Sudden loss of consciousness
- Cold extremities
- Hypotension
- Cyanosis
- Irregular pulse
- Fainting induced by pressure on the neck, coughing or micturition.

Differential diagnosis
- Epilepsy
- Stroke
- Myocardial infarction
- Hysteria
- Aortic dissection

Complications
- Cerebral hypoxia/anoxia resulting in brain damage
- Stroke
- Sudden death

Investigations
- Electrocardiography
- Echocardiography
- Brain CT scan; MRI
- Doppler ultrasound scan of the carotid arteries
- Random blood glucose

Treatment objectives
- Prevent recurrence
- Identify and treat underlying causes
- Improve patient quality of life

Non-pharmacological treatment

Give advice on safety measures to patients who are at risk, or who have history of syncope. For example:

- Orthostatic (standing) training: elastic compression stockings may be used; patients should contract leg muscles before and while standing; rise to standing slowly and in stages
- Patients may have to stop driving if there is a risk of having syncopal attacks while driving.
- Encourage liberal fluid intake to avoid dehydration
- Medication reviews to identify and exclude culprit medications

Pharmacological treatment
Treat underlying causes.

Prevention
Patients who experience syncope should:
- Avoid prolonged standing
- Drink fluids liberally to avoid dehydration
- Anti-platelet therapy with acetylsalicylic acid

Referral
Refer to a cardiologist or neurologist depending on the symptoms.

Stroke

Stroke is a medical condition caused by the interruption of the blood supply to the brain usually because a blood vessel bursts or is blocked by a clot. This cuts off the supply of oxygen and nutrients, causing damage to the brain tissue

Types
- Ischaemic stroke: due to blockage of a blood vessel in the brain
- Haemorrhagic stroke: due to bleeding in the brain from a ruptured blood vessel within the brain tissue.
- Subarachnoid haemorrhage: bleeding of a vessel outside the brain tissue in the sub-arachnoid space.

Risk factors:
- Hypertension
- Diabetes
- Hypercholesterolaemia (high lipid levels)

- Irregular pulse (atrial fibrillation) which can cause clots in the heart that can travel to the brain to obstruct a blood vessel.
- Family history
- Smoking
- Alcohol

Signs and symptoms
- Weakness of one side of the body including the face
- Numbness on one side of the body
- Loss or abnormality of speech
- Severe headache and/or neck pain and stiffness if due to subarachnoid haemorrhage
- Impaired or complete loss of consciousness in some patients
- Seizures - usually in haemorrhagic strokes
- Weakness of limbs on one side of the body including the face
- Initial flaccidity, but spasticity and exaggerated reflexes occur later on the side affected.
- Loss of one-half of visual field
- Loss of sensation of one-half of body
- Extensor plantar response
- Alteration of speech (dysarthria/dysphasia)
- Neck stiffness (in subarachnoid hemorrhage)

Investigations

- FBC to check for anemia or 'thick blood' (polycythemia)
- Blood sugar
- Sickling test
- Fasting lipids
- ECG if available to rule out irregular pulse (atrial fibrillation), coexisting ischemic heart disease and left ventricular hypertrophy suggestive of established hypertension.
- CT scan or MRI of the head to rule out haemorrhagic stroke and locate site of stroke.
- Echocardiogram to rule out cardiac source of embolism.
- Carotid Doppler to look for obstruction of blood flow in the neck vessels supplying the brain

Treatment objectives
- To prevent further brain damage
- To protect patients from the dangers of unconsciousness and immobility
- To treat the underlying cause if possible
- To institute measures to improve functional recovery
- To support and rehabilitate patients who survive with residual disability
- To prevent recurrence of cerebrovascular lesions

Non-pharmacological treatment
- Frequently monitor patient's vital and neurologic signs.
- Establish adequate airway in unconscious patients.
- Place patient in the lateral position with suctioning where necessary.
- Turn patient regularly to prevent pressure sores.
- Maintain adequate hydration
- Insert nasogastric tube for feeding and medications in unconscious patients or those with swallowing difficulties.
- Insert urethral/condom catheter to keep patient clean and dry.
- Early physiotherapy as soon as practicable

Pharmacological treatment

Hemorrhagic strokes

- No active treatment
- Antihypertensive medications to reduce blood pressure. This can be done more quickly than in ischemic strokes.

Ischemic strokes

- Reduce blood pressure gradually over several days.
- Give antiplatelet medicines
- Give lipid lowering medicines

Antiplatelet medicines

Acetylsalicylic acid (aspirin) oral
Start with 300mg daily for 2 weeks then reduce to 75mg daily thereafter

For patients who cannot tolerate aspirin
Clopidogrel oral
75 mg daily

Lipid lowering medicines
Atorvastatin oral
10-40mg daily

Referral
- Refer patients with worsening symptoms and signs for specialist evaluation

Psychiatric Illnesses

The Acutely Disturbed Patient

The acutely disturbed patient has concurrent disturbances of consciousness and attention, perception, thinking, memory, psychomotor behaviour, emotion, and the sleep-wake schedule. The degree of severity ranges from mild to very severe, and the duration is variable.

Causes

Acute (Functional) Psychiatric Disorders

- Mania or hypomania
- Schizophrenia and like states
- Other psychotic disorders
- Agitated depression
- Acute psychosis

Acute (Organic)

- Toxic psychosis secondary to drug intoxication (amphetamines, cocaine, marijuana, heroin etc.)
- Abnormal reaction to alcoholic Intoxication
- Acute Alcoholic Withdrawal Syndrome (delirium tremens)

Infective causes, e.g. typhoid, malaria, meningitis, HIV, encephalitis, hepatitis

Acute Metabolic Disorders

- Hypoglycaemia
- Thyroid disease
- Porphyria

Others

- Head trauma
- Subdural hematoma

Signs and symptoms

- Sleeplessness
- Restlessness - agitated or even combative patient
- Talking excessively and loudly, or low toned, reduced speech, even mute in some cases
- Disinhibited behaviour or speech
- Hearing or seeing “imaginary” people or objects.
- Expression of fear, undue suspicion, inappropriate guilt or bizarre beliefs
- Destructiveness Signs (See relevant sections for signs of specific disorders)
- Elated, irritable, angry or depressed mood
- Physical aggression, agitation or restlessness
- Lack of insight
- Pressured or retarded speech
- Hyperactivity or reduced motor activity
- Disinhibition - social and sexual
- Delusions of grandeur, guilt or paranoia
- Auditory hallucinations
- Visual hallucinations (especially in toxic, infectious and withdrawal states)
- Fever (infective conditions)
- Drowsiness, altered consciousness (mainly in alcohol withdrawal)
- Disorientation and confusion (mainly in alcohol withdrawal)
- Sweating
- Tremors (mainly in alcohol withdrawal)

Differential diagnosis

- Psychiatric disorders
- Sepsis
- Substances misuse(intoxication withdrawal)
- Serotonin syndrome
- Neuroleptic malignant syndrome

- Anticholinergic syndrome
- Head injury hypoglycaemia
- hypoxia

Complications
- May progress to chronic psychosis
- Increase mortality

Investigations
- Usually, none required
- Urine toxicology screen (for substances like amphetamines, cocaine, heroin, cannabis)
- Full blood count
- Rapid diagnostic tests for malaria parasites (when there is fever and infection is suspected)
- Random blood sugar
- Blood culture

Treatment objectives
- Rapid tranquillisation - to calm down the patient as quickly as possible using the safest drugs available, without necessarily inducing sleep
- Treat underlying cause

Non-pharmacological treatment
- Restrain patient when necessary without causing injury
- Talk to the patient in a firm but reassuring manner
- Avoid long periods of silence especially in paranoid patents
- Remove and store away any offensive objects on or around the patient.

Pharmacological treatment

Lorazepam IV/IM

Adult:

2-4 mg stat. Repeat once after 10 minutes if necessary.

Child:

> 12 years: 500 microgram-2 mg (maximum 4 mg)

< 12 years: 500 microgram-1 mg (maximum 2 mg)

OR

Haloperidol IM

Adult:

2-5 mg stat. may repeat in 4-8 hours (maximum 20 mg per day)

Child:

13-18 years: 2-5 mg every 4-8 hours as required

6-12 years: 1-3 mg every 4-8 hours as required (maximum 0.15 mg/kg per day)

< 5 years: not recommended

Note

- Treatment should be switched to the oral route as soon as possible

THEN

Haloperidol oral

Adult: 3-5 mg every 8-12 hours (maximum 30 mg per day)

Child:

> 12 years: 3-5 mg every 8-12 hours as required (maximum 30 mg per day)

3-12 years: (15-40 kg); 0.25-0.5 mg per day (maximum 0.5 mg per day)

< 3 years: not recommended

OR

Chlorpromazine IM (for very agitated patients)

Adult:

50-150 mg stat. repeat after 30-40 minutes if necessary

Child:

12-18 years: 25-50 mg every 6-8 hours

6-12 years: 500 microgram/kg every 6-8 hours (maximum 75 mg per day)

1-6 years: 500 microgram/kg every 6-8 hours (maximum 40 mg per day)

Caution

- **Never give chlorpromazine intravenously!** It may lead to severe hypotension.

OR

Diazepam IV

Adult:
10 mg slowly over 2-3 minutes (approximately 2.5 mg every 30 seconds)

Child:

200-300 microgram/kg slowly over 2-3 minutes.

This may be repeated after 10 minutes if necessary, maximum 10 mg)

OR

Diazepam rectal
Child:
> 12 years: 0.2 mg /kg

6-12 years: 0.3 mg/kg

2-6 years: 0.5 mg/kg

1 month-2 years: 2.5 mg

Neonate: 1.25-2.5 mg. This may be repeated after 10 minutes (maximum 10 mg)

Note:

- If a rectal formulation is not immediately available, draw up the injectable form directly into a syringe and administer it into the rectum (after removing the needle).
- Diazepam IV must be administered with care if the cause of the acute disturbance is thought to be organic.

Prevention
- Early diagnosis and treatment of the underlying cause

Referral
- Refer all acutely disturbed patients for specialist care

Depression

Depression is a mood disorder, characterised by persistently depressed mood or loss of interest in activities, causing significant impairment in daily life. Most typical of the major psychiatric disorders. It is more common in females than men by a ratio of 2:1.

Causes

- Genetic
- Familial
- Environmental
- Psychosocial factors
- Endocrine disorders, e.g. hypothyroidism, Cushing's syndrome

Signs and symptoms

- Depressed mood, often reported as feeling 'out of sorts'
- Loss of interest or lack of pleasure in things previously of interest
- Significant weight loss or weight gain as a result of insomnia, or from sleeping too much
- Psychomotor agitation or retardation
- Fatigue or loss of energy
- Feelings of worthlessness or excessive guilt
- Impaired thinking
    - Poor concentration
    - Indecisiveness
    - Worrying
- Multiple bodily complaints
- Suicidal ideas or thoughts of death
- Hallucinations or delusions of morbid themes in severe cases

In children:

- Truancy or refusal to go to school
- Poor school performance
- Bedwetting in a previously 'dry' child
- Odd behaviour, aggression or defiance
- Irritability
- Appetite changes
- Some of the 'adult' symptoms listed above

Differential diagnosis

- Thyroid dysfunction (hypothyroidism)
- Adrenal dysfunction (Addison's disease)
- Parkinson's disease, stroke, dementia
- Anxiety disorder
- Normal grief reaction

Complications

- Worsening of comorbid physical illness
- Suicide
- Recurrence (in 50% of cases or more)

Investigations

- Full blood count (FBC)
- Blood urea, electrolytes and creatinine
- Fasting blood glucose
- Thyroid function tests and serum cortisol levels if indicated
- Administer a standardised depression scale such as the PHQ (patient health questionnaire 9 item scale)

Treatment objectives

- Reduce symptoms
- Prevent disruption to everyday life at home, work or school
- Prevent suicide

Non-pharmacological treatment

- Counselling
- Psychotherapy, specifically Cognitive Behaviour Therapy (CBT)
- Electroconvulsive therapy

Pharmacological treatment

1st Line Treatment

Fluoxetine oral
Adult:
20 mg once daily for 2-4 weeks
THEN
Increase if necessary to a maximum of 80 mg
Child:
***8-18 years*:** 10 mg once daily for 1- 2 weeks
THEN
Increase if necessary, to a maximum of 20 mg once daily.
< 8 years: not recommended

Caution
- Use with caution in children with epilepsy. Stop if a seizure occurs.

2nd line Treatment
Tricyclic antidepressants (TCAs)

Imipramine oral
Adult:
25-50 mg once daily (early evening),
THEN
Increase by 25 mg every 3-5 days up to max. of 150 mg.
Child:
Not recommended

OR
Amitriptyline oral
Adult: 25-50 mg once daily (early evening),
THEN
Increase by 25 mg every 3-5 days up to a max. of 150 mg.
Child:
> 16 years: 5-15 mg every 12 hours
< 16 years: not recommended

Management of patients with depression requiring night sedation

Lorazepam oral
Adult: 2-3 mg every 8-12 hours, to a maximum of 10 mg daily
Child: 2-18 years; 0.05 mg/kg every 8 hours, to a maximum of 2 mg daily

OR
Diazepam oral
Adult:
5-10 mg every 6-12 hours
Child:
12-18 years: 10 mg every 12 hours;
5-12 years: 5 mg every 12 hours

Prevention
Provide education and training in stress management skills
Promote useful social support networks

Referral

Referral to a psychiatrist is required for patients with:

- Atypical or unusual symptoms
- Hysterical or phobic features
- Failure to respond to adequate antidepressant treatment within two months
- Children suspected to suffer from depression.
- Patients requiring Cognitive Behaviour Therapy should be referred to a psychologist.

Schizophrenia

This is a severe psychotic disorder characterised by hallucinations, delusions, disorganised thinking, speech or behaviour, and social withdrawal. Schizophrenic patients are at high risk for suicide.

Causes

- Largely unknown

Possible associations:

- Bio-genetic (associated with dopamine and serotonin receptors)
- Bio-psycho-social determinants; genetic predisposition coupled with stress (economic, disruptive family environments, etc.)
- Congenital disabilities in the brain associated, possible viral infections, etc.
- Environmental triggers
- Illicit drugs (marijuana, amphetamines etc.)

Signs and symptoms

'Positive' Symptoms

- Hallucinations (e.g. hearing voices)
- Delusions (stated beliefs which cannot be substantiated)
- Incoherent speech or illogicality
- Odd or disorganised behaviour
- The patient believes outside forces control his or her thoughts

'Negative' Symptoms

- Poverty of speech or content of speech (few words or with little substance)
- Apathy
- Reduced social contact or withdrawal
- Flat affect (showing little facial expressive responses)
- Delusions
    - Maybe persecutory, such as undue suspicion, or bizarre, like being controlled or being made to feel emotions or sensations
    - Grandiose delusions may also occur but without the elevated mood seen in manic patients
- Hallucinations
    - Commonly auditory (but may involve any of the other senses)
    - Auditory hallucinations of multiple voices commenting on patents' actions, arguing about the patent are almost diagnostic
- Motor disorders like posturing, excitement or stupor may occur but are not essential for diagnosis

Differential diagnosis

- Alcohol and drug intoxication or withdrawal
- Organic delirium, dementia, mood disorders
- Epilepsy, especially of temporal lobe origin
- Drug effect, e.g. amphetamine intoxication

Complications

- Chronicity
- Suicide
- Increased physical morbidity
- Increased mortality

Investigations

- Usually, none required for diagnosis
- Tests to rule out organic causes of psychosis
- Baseline full blood count, blood glucose, lipids, liver and kidney function tests, for purposes of guiding treatment
- For Olanzapine and Risperidone, ensure that fasting blood glucose, lipid profiles, liver and kidney function tests are carried out at least twice a year.

Treatment objectives

- Abolish symptoms
- Restore functioning to the maximum level possible
- Reduce the chances of recurrence
- Monitor blood glucose, lipid profiles, liver and kidney, function at least twice a year for patents on olanzapine and risperidone

Non-pharmacological treatment

- Supportive psychotherapy
- Rehabilitation
- Family therapy
- Psychoeducation about cause, course, treatment, side effects and relapse prevention
- Behaviour therapy, e.g. social skills training, progressive muscle relaxation, coping skills, etc.

Pharmacological treatment

1st Line Treatment

Management of acute attacks

Chlorpromazine IM
Adult:
25-50 mg every 6-8 hours, adjusting to a maximum of 400 mg daily
Child:
12-18 years: 25-50 mg every 6-8 hours, adjusting to a maximum of 400 mg daily
6-12 years: 500 microgram/kg every 6-8 hours to a maximum of 75 mg daily
1-6 years: 500 microgram/kg every 6-8 hours to a maximum of 40 mg daily

OR
Chlorpromazine oral
Adult:
25 mg every 8 hours or 75 mg at night. Then adjust according to response to 75-300 mg daily

Child:
> 12 years: 25 mg, every 8 hours or 75 mg at night. Then adjust according to response to a maximum of 75-300 mg daily
6-12 years: 10 mg, every 8 hours. Then adjust according to response to a maximum of 75 mg daily
1-6 years: 500 microgram/kg every 4-6 hours. Then adjust according to response to a maximum of 40 mg daily

OR
Haloperidol IM
Adult:
2-5 mg stat. Then repeat every 4-8 hours according to response, to a maximum of 20 mg daily
Child:
6-12years: 1-3 mg every 4-8 hours as required
< 6 years: Not recommended

OR
Haloperidol oral
Adult:
0.5-5 mg every 8-12 hours daily. Then 5-10 mg every 8-12 hours (maximum of 30 mg)
Child:
> 12 years: 0.5-5 mg every 8-12 hours daily. Then 5-10 mg every 8-12 hours (maximum 30 mg)
3-12 years or body weight: 15-40 kg; 0.25-0.5 mg daily. Then increase by 0.5 mg daily every 5-7 days
< 3 years: Not recommended

Maintenance
Risperidone oral
Adult:
1-4 mg every 12-24 hours (start at a low dose and adjust daily according to the patient response)

OR
Chlorpromazine oral
Adult:
25 mg every 8 hours or 75 mg at night, adjust to a maximum of 200 mg every 8 hours
Child:
12-18 years: 25 mg every 8 hours or 75 mg at night, adjust to a maximum of 200mg every 8 hours
< 12 years: Not recommended

OR
Haloperidol oral
Adult: 1-3 mg every 8 hours, adjusted to a maximum of a daily dose of 20 mg
Child:
12-18 years: 1-3 mg every 8hours, adjusted to a maximum of a daily dose of 20 mg
3-12 years: 500 micrograms every 12 hours, adjust up to a maximum of 5 mg every 12 hours

Maintenance treatment for patients with recurrent or chronic illness (depot preparations)
Fluphenazine decanoate IM
Adult:
25 mg monthly
Child: Not recommended

Adjunct treatment for management or prevention of antipsychotic drug side effects

Biperiden oral
Adult:
1 mg every 12 hours, then adjust to 2 mg every 8 hours up to 4 mg every 8 hours.
Child: Not recommended

OR
Biperiden slow IV/IM
Adult:
2.5-5 mg adjust to a maximum of 20 mg in 24 hours

OR
Diazepam oral
Adult:
5-10 mg every 6-12 hours
Child:
12 -18 years 10 mg every 12 hours
5 - 12 years 5 mg every 12 hours

OR
Diazepam IV
Adult:
5-10 mg slowly over 2-3 minutes (approximately 2.5 mg every 30 seconds)
Child:
200-300 microgram/kg slowly over 2-3 minutes. This may be repeated 10 minutes

OR
Promethazine hydrochloride oral or IM
Adult:
12.5-25 mg initially, may repeat dose if symptoms persist after 6 hours
Child:
> 6 years: 6.25-12.5 mg Then Repeat dose after 6 hours
< 6 years: Not recommended

Prevention
- Early detection and treatment
- Adherence to treatment of current mental illness, e.g. depression, bipolar etc.

Referral
- Refer all patients to a psychiatrist after an acute episode if treatment was initiated without a psychiatrist's supervision.
- Refer all patients with recurrent episodes and those whose symptoms cannot be controlled to a psychiatrist for further drug treatment or electroconvulsive therapy.

Bipolar Disorder

Bipolar disorder is a form of mood disorder in which patients experience mood swings between the two extremes of depression and mania. Bipolar disorder is referred to in older literature as manic-depressive illness. It is experienced by about 1% of the adult population at some point in their lifetime.

Causes

- Largely unknown
- Possible associations:
    - Tendency to run in families
    - Genetic factors

Signs and symptoms

Depressive phase:
- Low mood
- Impaired appetite and sleep
- Ideas of worthlessness or hopelessness
- Suicidal ideation

Manic or hypomanic phase:
- Persistently elevated mood: euphoria, expansiveness, feeling 'high' or irritable
- Overactive
- Talking fast and excessively
- Grandiose claims
- Reduced sleep
- Reckless spending and being overly generous
- Sexual and social disinhibition
- Auditory hallucinations, in severe cases (patients may hear voices, often reinforcing their grandiose beliefs)
- Undue suspicion (paranoia) may exist
- Impaired judgment

Differential diagnosis

- Organic mental states, e.g. drug or alcohol intoxication
- Delirium
- Chronic psychosis

Complications

- Social and personal consequences of inappropriate behaviour (e.g. unplanned pregnancy, sexually transmitted infections, etc.)
- Suicide
- Increased risk of morbidity (reduce life expectancy due to trauma, accidents etc.)
- Increased mortality

Investigations

- Usually no specific investigations
- Rarely, thyrotoxicosis may mimic mania and must be excluded

Treatment objectives

- Treat symptoms of mania or depression, whichever is present with current episode
- Reduce the level of activity in mania to a manageable state
- Elevate mood to a normal state in depression
- Abolish psychotic symptoms (delusions and hallucinations), if present

Non-pharmacological treatment

- Psychoeducation
- Psychotherapy
- Electroconvulsive therapy (ECT)

Pharmacological treatment

Management of the manic patient

Risperidone oral
Adult:
1-4 mg every 12-24 hours, to a maximum of 8 mg daily
Child:
>12 years: 500 microgram stat. Then adjust daily in steps of 500 micrograms - 1 mg daily to a maximum of 6 mg daily
< 12 years: Not recommended

OR
Carbamazepine oral
Adult:
200-800 mg every 12 hours (controlled release preferable)

Child:
< 18 years: Not recommended

Management of significantly aggressive patient *(See section on 'The Acutely Disturbed Patient').*

Management of the depressive phase
Lamotrigine oral
Adult:
25 mg daily for 2 weeks. Then increase by 25 mg every 2 weeks to a maximum of 200 mg daily as required
Child:
< 18 years: Not recommended

AND
Lorazepam oral
Adult:
2-3 mg every 8-12 hours, maximum 10 mg daily
Child:
2-18 years: 0.05 mg/kg every 8 hours, maximum 2 mg daily

OR
Diazepam oral
Adult:
5-10 mg every 6-12 hours
Child:
12-18 years: 10 mg every 12 hours
5-12 years: 5 mg every 12 hours

Caution
The benzodiazepines are withdrawn as soon as the patient is calm, but this should be done by slowly tapering the dose.

Maintenance management after control of the acute phase
Lithium oral
Adult:
200-600 mg every 6-8 hours (maximum 2400 mg daily)
Child:
12-18 years: 200-600 mg every 8 hours (maximum 2400 mg daily)
6-12 years: 5-20 mg /kg every 8 hours
< 6 years: Not recommended

Caution
Lithium levels should be monitored 12 hours after the dose, twice-weekly until the condition stabilises, then once every month.

OR
Sodium valproate oral
Adult:
250-750 mg every 12 hours (controlled release preferable)
Child:
< 18 years: Not recommended

OR
Carbamazepine oral
Adult:
200-800 mg every 12 hours (controlled release preferable)
Child:
< 18 years: Not recommended

Prevention
- No primary preventive measures are delineated
- Adherence to therapy with mood stabilisers until discontinuation is considered prudent (this is individually determined)

Referral

Refer all patients suffering a first episode, not responding to treatment after one month and all children to a psychiatrist.

Alcohol Withdrawal Syndrome

This occurs following sudden withdrawal from alcohol. Symptoms often manifest 12 to 18 hours after the last drink but may occur earlier and are worse between 24 to 48 hours after onset.

Causes

Abrupt cessation or significant reduction in alcohol intake in an individual with heavy drinking over many months or years.

	Minor Withdrawal	**Alcoholic Hallucinosis**	**Alcoholic Seizures**
Onset	12 to 18 hours after last drink but may be earlier. Peaks between 24-48 hours	12-24 hours after cessation of drinking and generally stops within 48 hours	7-36 hours after the last drink but may be earlier
Symptoms	Tremors Headaches Insomnia Mild Anxiety Nausea Vomiting Sweating	Sensation of objects crawling on the body. "Seeing" objects not present. "Hearing" noises or voices nobody else can hear	sudden generalised seizures in a chronic alcoholic
Signs	Tachycardia Raised blood pressure	Vivid hallucinations occur in clear consciousness. Pulse, blood pressure and respiration are within normal limits	Generalised seizures

Differential diagnosis

- Abuse of other psychoactive substances
- Depression, chronic psychosis (often co-existing!)

Complications

- Seizures
- Delirium tremens
- Wernicke-korsakoff syndrome
- Neuropsychiatric disturbances
- Cardiovascular complications
- Protracted withdrawal syndrome

Treatment objectives

- Stabilise pulse and blood pressure
- Prevent dehydration
- Treat presenting conditions like malaria etc.
- Relieve pain, tremors and seizures
- Stop hallucinations

Non-pharmacological treatment

- Encourage rest in a quiet place
- Physical restraints may be required temporarily for very agitated patients
- Encourage intake of fluids as can be tolerated to prevent dehydration

Pharmacological treatment

1st Line Treatment
Haloperidol oral/IM

Adult:
5 mg every 8 hours as required until hallucinations cease.
Child:
Refer to specialist

Prevention
- Provide health education on the dangers of alcohol abuse
- Reduce access to alcohol

Referral
- Refer all patients with alcohol withdrawal syndromes to a psychologist or psychiatrist.
- Also, refer all children to a paediatrician.

Alcoholic Delirium Tremens

This is the most dramatic withdrawal syndrome. It usually starts 2-3 days after drinking stops. On average, the syndrome lasts 3 days but may continue for much longer.

Causes
- Sudden withdrawal of alcohol from a long-term chronic user of alcohol

Signs and symptoms
- Restlessness
- Tremors of hands, whole limbs or body
- Sweating
- Confusion
- Inappropriate behaviour
- Unintelligible speech
- Misidentification
- Seeing or talking to imaginary objects
- Psychomotor agitation or retardation
- Vomiting
- Disorientation
- Intermittent visual, tactile or auditory hallucinations or illusions (visual hallucinations are frequently of small objects or frightening 'animals' on walls etc.)
- Fever > 38°C.
- Pulse > 100 beats/minute, blood pressure > 160/100 mmHg

Differential diagnosis
- Dementia
- Acute (idiopathic) psychotic disorders
- Sepsis
- Stroke
- Meningitis
- Encephalitis

Complications
- Usually transient but may be associated with increased morbidity (e.g. from falls) and mortality
- Seizures
- Disorientation
- Altered mental status

Investigations
- Full blood count
- Liver function tests
- Screen for malaria and common infections

Treatment objectives
- Relieve agitation and calm patient
- Correct fluid and electrolyte imbalance

- Prevent complications like seizures, development of amnesia and encephalopathy
- Prevent or manage heart complications if present

Non-pharmacological treatment
- Seclusion of the patient
- Application of restraints as necessary
- Psychotherapy and psycho-education

Pharmacological treatment

For control of seizures:

Lorazepam IV, IM or oral
Adult:
Days 1 to 3: 2-4 mg once daily
Days 4 and 5: 1-2 mg once daily

OR
Diazepam IV,
Administer slowly-over 2-3 minutes, approximately 2.5 mg every 30 seconds)
Adult:
Day 1: 10-20 mg every 6 hours
Day 2: 10-20 mg every 8 hours
Day 3: 10-20 mg every 12 hours
Day 4: 5-10 mg every 8 hours
Day 5: 5-10 mg every 12 hours, then stop

Caution
It is best to give benzodiazepines as needed rather than on a fixed-dose schedule.
Withhold if the patent is asleep or has slurred speech, ataxia, nystagmus or over sedated.

OR
Chlordiazepoxide oral
Adult:
50-100 mg every 4 hours as required (max. 300 mg)

AND
Thiamine oral, IM or IV
Adult:
100 mg daily for 3 days (before any IV glucose load)

AND
Folic acid oral
Adult:
1 mg daily as needed

AND
Dextrose saline (5% glucose in 0.9% saline) IV
Adult:
As necessary

For patients with seizures not controlled by benzodiazepines alone:

Lorazepam IV, IM or oral
Adult:
Days 1 to 3: 2-4 mg once daily
Days 4 and 5: 1-2 mg once daily

OR
Diazepam, IV, (administer slowly-over 2-3 minutes, approximately 2.5 mg every 30 seconds)
Adult:
Day 1: 10-20 mg every 6 hours
Day 2: 10-20 mg every 8 hours
Day 3: 10-20 mg every 12 hours
Day 4: 5-10 mg every 8 hours
Day 5: 5-10 mg every 12 hours then stop

AND
Phenobarbitone, slow IV or IM,
Adult:
0.5-1.5 mg/kg every 12 hours

Prevention

- Early diagnosis and treatment of the underlying cause
- Care with the use of drugs (especially anticholinergic medications) in the elderly

Referral

- Refer patients to a psychiatrist if:
- Symptoms are difficult to control within 3 days
- Patients remain agitated despite being given over 20 mg diazepam within 4 hours
- Refer patients to a psychiatrist or clinical psychologist for consideration of other treatment options to assist long-term abstinence and rehabilitation after the acute phase is over.

Substance Use Disorder

This is the abuse of substances such as marijuana, benzodiazepines, heroin, cocaine etc. It is prevalent in many communities around the country.

Causes

- Social factors
- Psychological factors: curiosity (need for novelty-seeking)
- Peer pressure (e.g. family members, friends)
- Lack of coping skills (e.g. with life's difficulties, aids to coping in times of trouble)
- Addiction
- Tolerance (increased requirement of substance to maintain the same feeling)
- Withdrawal effects (unpleasant effects lead to a return to drug use)

Signs and symptoms

Cannabis withdrawal

- Insomnia
- Shakiness
- Irritability
- Restlessness
- Anxiety
- Anger
- Onset: within 24 hours of drug use
- Duration: 1-2 weeks

Benzodiazepine withdrawal

- Anxiety
- Headache
- Insomnia
- Muscle aching and twitching
- Perceptual changes
- Feelings of unreality
- Depersonalisation
- Seizures
- Onset: 1-10 days (depending on the half-life of the drug)
- Duration: 3-6 weeks (may be longer)

Opioid withdrawal

- Anxiety
- Craving
- Muscular aches and twitching
- Muscle and bone aches
- Muscle cramps and sustained contractions
- Sleep disturbance
- Sweating
- Hot and cold flushes
- Piloerection
- Yawning

- Lacrimation and rhinorrhoea
- Abdominal cramps
- Nausea, vomiting and diarrhoea
- Palpitations
- Elevated pulse and blood pressure
- Dilated pupils
- Onset: 6-24 hours (may be later with longer-acting opioids)
- Duration: peaks 2-4 days, ceases 5-10 days (more prolonged for longer-acting opioids)

Psycho-stimulant withdrawal

- Crash: fatigue, flat affect, increased sleep, reduced cravings
- Withdrawal: fluctuating mood and energy levels, cravings, disturbed sleep, poor concentration
- Extinction: persistence of withdrawal features, gradually subsiding
  Onset: 6-12 hours (cocaine); 12-24 hours (amphetamines)
  Duration: several weeks for withdrawal phase, then months for extinction

Differential diagnosis

- ADHD
- Anxiety
- Depression
- Hypothyroidism
- Bipolar disorder
- Schizophrenia
- Metabolic disorders

Complications

- Depression
- Cancer (e.g. mouth and stomach cancer)
- Lack of concentration and memory loss
- Infection with HIV or hepatitis B or C due to needle use.
- Cardiovascular disorders

Investigations

- Toxicology screen for suspected substances

<u>Screening of patients suspected of substance abuse</u>

Physical appearance

- Sweating, tremor, agitation, problem with coordination, gait. Rate these appearances and reassess them at regular intervals to monitor the progress of symptoms.
- If symptoms are increasing in severity, notify a senior staff member, or if available, a doctor

Suicide risk assessment

- To determine the level of risk at a given time and to provide appropriate clinical care and management.
- Possible suicidal behaviour includes thinking about suicide, harming oneself or attempting suicide.

Screening questions of suicide risk

- Have things been so bad lately that you have thought you would rather not be here?
- Have you had any thoughts of harming yourself?
- Are you thinking of suicide?
- Do you have any plans to commit suicide?
- Have you ever tried to harm yourself?
- Have you made any current plans?
- Do you have access to anything with which to hurt yourself?

Mental state examination to determine

- The need for other psychological therapies
- Concomitant psychiatric conditions which place the patient or others at risk
- The patient's capacity for informed consent and active participation in treatment planning

Assessment of psychosocial factors affecting withdrawal

Ask the patient about:

- Reasons for presenting for withdrawal management at this time
- Past experiences, current knowledge and fears of withdrawal
- Perceived ability to cope with withdrawal and its treatment.

- Family supports and social networks available for withdrawal treatment:
- Potential barriers to successful withdrawal care of children
  Assess possible neglect or physical or sexual abuse of children or exposure to such harm from others and intervene to protect as soon as possible or refer to the appropriate agency
- Drug use of cohabitants
- Current legal issues
- Financial problems
- Work commitments

Treatment objectives
- Provide supportive care (information, stress reduction, reassurance)
- Teach coping skills (relaxation techniques, dietary guidelines, methods to reduce the craving for the substance, sleep disturbance management)
- Manage difficult behaviour (anxiety, agitation, panic and aggression)
- Manage confusion, disorientation and hallucinations
- To plan an organised discharge, follow up and after-care to prevent relapse

Non-pharmacological treatment
- Cognitive behaviour therapy
- Stress management to reduce craving

Pharmacological treatment

A. Management of withdrawal symptoms - cannabis
Requires no medical intervention

B. Management of withdrawal symptoms - stimulants
Requires observation but does not require a specific intervention

C. Management of withdrawal symptoms - benzodiazepines
Substitute with an equivalent dose of benzodiazepine for a few days, then taper of dose over 2-3 weeks

D. Management of withdrawal symptoms - opiates
Oral rehydration fluids or IV fluids may be required
Long-acting benzodiazepines, e.g. diazepam, to control insomnia and muscle cramps (see drug doses under appropriate sections)
Anti-emetics, e.g. promethazine etc., for nausea and vomiting (see drug doses under appropriate sections)
Methadone, buprenorphine and clonidine may be used (where available), with caution, to reduce the severity of symptoms.
NSAIDs, e.g. ibuprofen, diclofenac etc., for pain relief (see drug doses under appropriate sections)

Prevention
- Health education on the dangers of drug use
- Employment
- Recreational opportunities
- Encourage social and cultural values
- Attempt to reduce the availability of drugs of abuse in communities

Referral
- Refer for specialist psychiatrist/clinical psychologist care and management if:
  - Withdrawal symptoms are particularly distressful and do not respond to treatment
  - There are repeated relapses
- Refer to a clinical psychologist for cognitive behaviour therapy.

Generalised Anxiety Disorders

Causes
- Multiple negative life experiences
- Environmental factors
- Personality trait
- Genetic predisposition

Signs and symptoms
- Restlessness
- Sweating
- Tachycardia
- Tremors
- Excessive anxiety and worry occurring on most days, for at least 6 months

- Anxiety or worry associated with at least 3 of the following:
  - Muscle tension (often reported as pain in various parts like neck, trunk or headaches)
  - Crawling and burning sensation around the body
  - Restlessness or feeling on edge
  - Being easily fatigued
  - Difficulty concentrating or mind going blank
  - Irritability
  - Sleep disturbance (difficulty falling asleep or frequent wakening)
  - Palpitations

Differential diagnosis
Consider organic conditions, e.g. hyperthyroidism, hypoglycaemia, pheochromocytoma

Complications
- Chronicity
- Comorbid depression
- Medical morbidity (e.g. hypertension)

Investigations
Diagnosis is clinical
- Tests to exclude probable Differential diagnosis such as hyperthyroidism, pheochromocytoma, cardiac arrhythmias etc.

Treatment objectives
- Achieve remission of symptoms
- Prevent relapse

Non-pharmacological treatment
- Reassurance about the absence of physical disease once they are ruled out
- Teach relaxation methods
- Encourage regular physical exercise if possible
- Encourage healthy social activities
- Cognitive behaviour therapy

Pharmacological treatment
For anxiety with somatic complaints

1st Line Treatment
Fluoxetine oral
Adult:
10 mg daily. The increase up to 60 mg daily if necessary
Child:
7-18 years: 10 mg daily. Then increase to 20 mg after 1-2 weeks if necessary

OR
Amitriptyline oral
Adult:
25-50 mg daily (as a single evening dose)
Child:
> 12 years: 10 mg daily (as a single evening dose), maximum 20 mg
OR
Imipramine oral
Adult:
25-50 mg daily (as a single evening dose)
Child:
Not recommended for this indication

For anxiety with prominent somatic complaints
Propranolol oral
Adult:
10-80 mg every 12 hours.

Additional treatment for anxiety with significant distress
Diazepam oral
Adult:

2-5 mg every 12 hours for 2 weeks and gradually tailed off over the next 2 weeks. (Do not give for more than one month continuously)
Child:
1-12 years: 1.25-5 mg every 6 hours as needed

Prevention
- Good personality development
- Stress management
- Avoid psychoactive substances

Referral
- Refer to a clinical psychologist for cognitive behaviour therapy and other non-pharmacological treatment modalities.
- Refer to a psychiatrist in severe cases not responsive to drug treatment.

Panic Disorders

A panic disorder is characterised by episodic attacks of extreme fear, mostly unrelated to specific objects or situations. It is also associated with multiple somatic and cognitive symptoms with each attack beginning abruptly and lasting for about 5 - 30 minutes.

Causes
- Largely unknown
- Misinterpretation of normal internal body stimuli (e.g. a quickened heartbeat interpreted as a heart attack or severe illness etc.)
- Misinterpretation of external stimuli (crowds, enclosed spaces such as moving vehicles, lifts, etc.) as signalling danger
- Contributing factors:
    - Stress
    - Genetic predisposition

Signs and symptoms
- Tachycardia
- Sweating
- Fear of dying or going 'crazy.'
- Palpitations, pounding heart or rapid heart rate
- Trembling or shaking
- Sensation of shortness of breath
- Feeling of choking
- Chest pain or discomfort
- Feeling dizzy, unsteady or faint
- Numbness or tingling sensations
- Chills or hot flushes
- Derealisation (feeling of unreality) or depersonalisation (feeling detached from oneself)
- Nausea or abdominal distress

Differential diagnosis
- Other causes of intense fear (phobias, obsessive-compulsive disorders, etc.)
- Medical causes (e.g. hyperthyroid states, episodic hypoglycemia, etc.)
- Seizure disorders

Complications
- Depression
- Phobia
- Suicide

Investigations

Diagnosis is clinical

Treatment objectives
- Stop the attacks of panic or at least reduce the frequency and intensity of symptoms to a minimum
- Help return to normal activities of daily living
- Prevent recurrence of symptoms

Non-pharmacological treatment

- Re-breathing in and out of a paper bag closed around lips and nose (avoid polythene bags, try large paper envelopes)
- Eliminate caffeine-containing foods, e.g. coffee, tea, cola and chocolates, from the diet, as they tend to worsen anxiety
- Relaxation training
- Cognitive behaviour therapy

Pharmacological treatment

Initial management for patients unresponsive to non-pharmacological treatment

1st Line Treatment

Fluoxetine oral

Adult:

10 mg daily (as a single morning dose). Then increase up to 60 mg daily if necessary

Child:

6-18 years: 10 mg daily. Then increase up to 20 mg after 1-2 weeks if necessary

OR

Imipramine oral

Adult:

25-50 mg daily (as a single evening dose) maximum 150 mg daily

Child:

Not recommended for this indication

For persistent panic attacks

Lorazepam oral

Adult:

1-4 mg daily for 2 weeks

Child:

2-18 years: 0.05 mg/kg daily for 2 weeks

For anticipated anxiety attacks

Lorazepam oral

Adult:

1-4 mg stat.

Child:

0.25-0.5 mg stat.

For acute symptomatic control

Lorazepam oral

Adult:

1-4 mg every 8-12 hours as required (maximum 10 mg daily)

Child:

Not recommended for this indication

OR

Diazepam oral

Adult:

2-5 mg every 12 hours for 2 weeks and gradually taper of over the next 2 weeks. (Do not give for more than one month continuously)

Child:

1-12 years: 1.25-5 mg every 6 hours as needed

Caution

- Duration of treatment for recurrent cases should be at least 6 weeks and should be continued for up to 6 months or more after attacks have remitted to prevent early relapse. Wean off slowly over a month or more.

Prevention

- No specific preventive measures.

Referral

- Refer:
    - Children with symptoms suggestive of a panic disorder to a paediatrician.
    - Patients to a psychologist for cognitive behaviour therapy
- To a psychiatrist for additional drug therapy where indicated.

Psychogenic Seizures

Psychogenic seizures or pseudoseizures are non-epileptic seizures, which mimic epilepsy with an underlying psychological cause. In patients with this form of the disorder, there may be a history of physical, sexual or psychological abuse.

Signs and symptoms
- Recurrent tonic clonic-like seizures
- Attacks usually occur only when the attention of other people can be attracted
- Patients hardly ever get injured, even when they fall (unlike in true seizures)
- Thrusting pelvic movements are common during "seizure" attacks
- Tongue biting, if it occurs is usually at the top of the tongue instead of the sides as in true seizures
- May have urinary incontinence as in normal seizures

Differential diagnosis
- Syncope
- Epilepsy

Complications
- Head trauma
- Status epilepticus
- Sudden death
- Chronic psychosis

Investigations
- Serum prolactin
- Electroencephalography

Treatment objectives
- Stop seizures
- Restore normalcy

Non-pharmacological treatment
- Reassure parents, guardians etc.
- Counselling
- Psychotherapy

Pharmacological treatment
- Anti-epileptic medicines do not appear to have any beneficial effect on the frequency of attacks

Prevention
- Treat the underlying mental condition
- Patients with post-traumatic disorders should be encouraged to have appropriate therapy, e.g. counselling, psychotherapy

Referral
- Refer all cases for evaluation by psychologist or psychiatrist.

Insomnia

Insomnia is defined as a subjective report of difficulty with sleep initiation, duration, consolidation, or quality that occurs despite adequate opportunity for sleep, and that results in some form of daytime impairment. Insomnia symptoms occur quite commonly in the general population.

Risk factors
- Increasing age
- Female sex
- Comorbid disorders such as medical, psychiatric, substance use
- Shift work.
- Patients with psychiatric and chronic pain disorders have relatively high rates of insomnia.

Causes
- Behavioural - spending more time in bed to "catch up" on sleep

- Stress
- Learned habits which do not enhance sleep
- Cognitive distortions (e.g. if one does not sleep throughout the night, one has not slept at all)
- Medicines (e.g. for treatment of common cold, hypertension, asthma)
- Caffeine-containing beverages (e.g. coffee, tea)
- Withdrawal from alcohol and other drugs of abuse (e.g. cocaine, marijuana, amphetamines)
- Medical conditions (e.g. sleep apnoea, airway obstruction, liver disease, renal disease, thyroid disorders)
- Psychological and environmental factors
- Other psychiatric disorders such as anxiety and mood disorders
- Travel (especially across time zones, leading to jet lag)
- Shift work

Symptoms
- Prolonged average time for falling asleep - longer than 30 minutes
- Total sleep time less than 6.5 hours
- Difficulty falling asleep (early insomnia)
- Frequent awakenings and difficulty returning to sleep
- (middle insomnia)
- Awakening too early in the morning (late insomnia)
- Sleep that does not feel restful, refreshing or restorative
- Anticipating poor sleep hours before bedtime, and becoming more alert and anxious as bedtime approaches

Daytime effects of poor sleep:
- Fatigue and sleepiness
- Mood disturbances and cognitive difficulties
- Poor quality of life (worsened by interpersonal difficulties, or avoidance of day activities)
- Exacerbation of comorbid conditions such as depression, high blood pressure, etc.
- Day-to-day variability

History taking and assessment of patients with insomnia
- Characterisation of the sleeping environment (couch/bed, light/dark, quiet/noisy, room temperature, alone/bed partner, TV on/off), patent's state of mind (sleepy vs wide awake, relaxed vs anxious)
- Identify perpetuating negative behaviours and cognitive processes
- Assess sleep-wake schedule with sleep diary: time to fall asleep (sleep latency), number of awakenings, Wake time After Sleep Onset (WASO), sleep duration

Assess:
- Breathing-related sleep disorders (snoring, gasping, coughing)
- Sleep-related movement disorders (kicking, restlessness)
- Parasomnias (behaviours or vocalisation)
- Comorbid medical/neurological disorders (reflux, palpitations, seizures, headaches)
- Other physical sensations and emotions associated with wakefulness (such as pain, restlessness, anxiety, frustration, sadness)

Assess Daytime Activities and Daytime Function:
- Napping (frequency/day, times, voluntary/involuntary)
- Work (work times, work type such as driving or with dangerous consequences, disabled, caretaker responsibilities)
- Lifestyle (sedentary/active, homebound, light exposure, exercise)
- Travel (especially across time zones)
- Quality of life and exacerbation of comorbid disorders

Differential diagnosis
- Central sleep apnoea
- Depression
- Anxiety disorder
- Emphysema
- Chronic obstructive pulmonary disease
- Post-traumatic stress disorder

Complications
- Poor performance at a job or school
- Mental health disorders: depression, anxiety, substance abuse etc.
- Increased risk and severity of long term diseases (cardiovascular diseases).

Investigations
- Full blood count

- Blood urea, electrolytes and creatinine
- Liver function tests
- Blood glucose
- Thyroid function tests

Treatment objectives
- Achieve reduction of waking symptoms
- Improve daytime function
- Reduce distress
- Treat comorbid conditions

Non-pharmacological treatment
- Stimulus control therapy (avoid stimulating sleep environments such as leaving lights, TV and radio on)
- Relaxation training
- Cognitive behaviour therapy
- Avoidance of daytime sleep
- Avoidance of excessive stimulant consumption pre-bedtime (e.g. coffee, tea, alcohol etc.)

Pharmacological treatment

1st Line Treatment
Lorazepam oral
Adult:
1-4 mg at bedtime
Child:
Not recommended

OR
Triazolam oral
Adult:
Elderly: 125-250 microgram at bedtime
< 60 years: 125-500 microgram at bedtime
Child:
Not recommended

2nd Line Treatment
Melatonin oral (particularly for children)
Adult:
3-5 mg daily, 1-2 hours before bedtime (maximum 10 mg)
Child:
1 month-18 years: 2-3 mg at bedtime. Increase if necessary, after 1-2 weeks to 4-6 mg daily (maximum 10 mg)

OR
Amitriptyline oral
Adult:
25-50 mg at night for two weeks
Child:
Not recommended

Prevention
Encourage the following:
- Good sleep habits - consistent bedtime and wake time
- Making the bedroom comfortable for sleeping
- Avoidance of large meals and drinks before bedtime
- Medication checks to see if they affect sleep
- Avoidance of nicotine
- Limited use of caffeine and alcohol.

Referral
- Refer to a clinical psychologist for those patients who do not respond to the common non-pharmacological and pharmacological interventions for cognitive behaviour therapy.
- Refer patients with underlying physical causes to the appropriate specialists.

Attention Deficit Hyperactivity Disorder (ADHD)

Attention Deficit Hyperactivity Disorder (ADHD) is the most common neurobehavioral disorder affecting children.

Causes

- Unknown

Related factors

- Hereditary
- Imbalance of neurotransmitters

Signs and symptoms

Inattention

Child often:
- Fails to finish things he or she starts
- Does not seem to listen
- Has difficulty concentrating on school work

Impulsivity

Child often:
- Acts before thinking
- Hits others when upset
- Is unable to wait for his or her turn in a game
- Engages in dangerous activities without consideration of the consequences
- Has difficulty organising work (this is not due to cognitive impairment)

Hyperactivity

Child:
- Tries to do several things at once
- Talks incessantly,
- Struggles to sit still at a desk and fidgets

Distractibility is evidenced by

- Not listening when spoken to with an inclination to daydream
- Not being able to work independently
- Disorganised behaviour

Differential diagnosis

- Anxiety disorder
- Depression
- Hyperthyroidism and thyrotoxicosis
- Post-traumatic stress disorder
- Dysthymic Disorder

Complications

- Educational failure in children and adults
- Accident and injuries
- Unemployment
- Unstable relationships
- Poor physical and mental health
- Poor self-esteem
- Risk of alcohol and drug abuse

Investigations

Diagnosis is clinical

Treatment objectives

- Reduce hyperactivity
- Improve attention
- Improve compliance with instructions

Non-pharmacological treatment

Behaviour management techniques - Evidence Rating: [A]

- A class helper to sit with the child in class and focus attention on school work
- Parenting class to help parents cope
- Desist from punitive physical interventions, e.g. caning

Pharmacological treatment

1st Line Treatment

Methylphenidate oral
Adult:
10 mg every 8-12 hours (maximum 60 mg). Then increase weekly by 5-10 mg, if necessary, to a maximum of 30 mg every 12 hours
Child:
6-18 years 2.5-5 mg every 12 hours. Increase weekly by 5-10 mg, if necessary, to a maximum of 30 mg every 12 hours
4-6 years: 2.5 mg, every 12 hours. Increase weekly by 2.5 mg daily to a maximum of 1.4 mg/kg if necessary, in 2 to 3 divided doses.
< 4 years: Not recommended

OR
Atomoxetine oral
Adult:
40 mg once daily for 7 days Then increase according to response to a maximum of 100 mg
Child:
> 6 years (weight > 70 kg): 40 mg once daily for 7days. Then increase according to response to a maximum of 80 mg
> 6 years (weight < 70 kg): 500 micrograms/kg daily for 7 days Then increase according to response to a maximum 1.2 mg/kg daily
< 6 years: Not recommended

2nd Line Treatment
Imipramine oral
Adult:
75 mg daily. Then increase to 150 mg daily if necessary (maximum 200 mg per day)
Child:
6-18 years: 10-30 mg every 12 hours

Prevention
- Implement programs that promote maternal health during pregnancy (such as no alcohol and cigarette use).
- Physical exercise

Referral
Refer to:
- Clinical psychologist for behaviour management.
- Occupational therapist
- Remedial teacher
- Speech therapist following a needs assessment.

Refer to a specialist if there is no clinical improvement after a month of the above-recommended therapy.

Autistic Spectrum Disorder (ASD)

Autism is a neurodevelopmental disorder characterised by qualitative impairments occurring in a child before the age of 36 months, in three key areas; social interaction (often the earliest features of Autistic Spectrum Disorder-ASD), communication, interests and activities. ASD is increasingly being recognised in Sierra Leone.

Causes
- No clear aetiology
- Genetic

Signs and symptoms
- Absence of joint attention (i.e. failure to show interest, follow gaze, lack of social smiling and limited use of gestures e.g. shaking the head, waving or clapping)
- Communication deficit
    - Receptive: fails to acquire language or delays in understanding language
    - Expressive: delays the in use of language
- Limited range of interests (limited play with toys and other objects)

- Repetitive activities (e.g. spinning objects)
- Global developmental delays (e.g. walking, speech etc.)
- Learning difficulties
- Attention-deficit
- Sleeping difficulties
- Feeding difficulties
- Lack of pointing to objects by 24 months
- No single words by 18 months
- No two-word spontaneous phrase by 24 months
- Loss of language
- Avoidance of eye contact

Differential diagnosis
- Attention deficit hyperactivity disorder
- Congenital rubella syndrome
- Tourette syndrome
- Fragile X syndrome
- Down syndrome

Complications
- Seizures
- Sensitivity to sensor input (light, noises etc.)
- Depression
- Anxiety
- Mood swings
- Mental impairment
- Tumour in different organs

Investigations
- Usually, none required
- Electroencephalogram (EEG) if seizures suspected
- Brain CT or magnetic resonance imaging (MRI) only in special circumstances, e.g. abnormal physical features present

Treatment objectives
- Correct social communication difficulties using a multidisciplinary behavioural and educational approach

Non-pharmacological treatment
- Applied Behaviour Analysis (ABA) - teaching based on teacher request, prompt assistance to the child, child response and feedback

Pharmacological treatment

For aggression, irritability or self-mutilation
Risperidone oral
Child:
5-18 years (body weight > 50 kg): 0.5 mg daily. May increase by 0.5 mg on alternate days (maximum 1 mg daily)
5-18 years (body weight < 50 kg) 0.25-0.5 mg daily. May increase by 0.25 mg on alternate days (maximum 0.75 mg daily)
< 5 years: Not recommended

For sleep problems
Melatonin oral
Child:
1 month-18 years: 2-3 mg daily (before bedtime) Then increase if necessary, after 1-2 weeks to 4-6 mg (daily before bedtime) maximum 10 mg

For significant hyperactivity-in children ≥ 4 years
Methylphenidate oral
Child:
6-18 years: 5 mg every 12-24 hours. Then increase if necessary, at weekly intervals by 5-10 mg (maximum of 20 mg every 8 hours)
4-6 years: 2.5 mg, every 12 hours. Then increase if necessary, by 2.5 mg at weekly intervals (maximum 0.4-0.5 mg/ kg every 8 hours)

Caution
Discontinue if there is no response after a month

Prevention
- No prevention but early diagnosis and treatment can improve behaviour skills and language development.

Referral
- All suspected cases of autism should be referred to a tertiary centre.

Respiratory Diseases

Pneumonia

Pneumonia is acute respiration infection that causes inflammation of the tissue in one or both lungs. The alveoli of the lungs are filled with pus and fluid, making breathing painful and limiting oxygen intake. Pneumonia accounts for 15% of all deaths of children under 5 years old. Predisposing factors include malnutrition, old age, immunosuppression, cardiovascular diseases, diabetes.

Causes
Pneumonia is caused by a number of infectious agents, including viruses, bacteria and fungi. The most common are:
- Bacterial pneumonia
  - *Streptococcus pneumoniae*
- Viral pneumonia
  - Respiratory syncytial virus *(RSV)*
  - *Haemophilus influenzae* type b (Hib)
- Aspiration pneumonia – caused by aspirating vomit, smoke, or any substance
- Fungal pneumonia – Affect people with immunosuppression
  - *Mycoplasma pneumoniae*
- Hospital-acquired pneumonia
  - *Pseudomonas aeruginosa*

Signs and symptoms
- Breathing is rapid, shallow and difficult
- Fever
- Cough may be dry, or produce thick yellow, green, brown or blood-stained phlegm
- Chest pain

Differential diagnosis
- COPD
- Asthma
- Pulmonary oedema
- Pulmonary embolism

Complications
- Bacteraemia and septic shock
- Lung abscesses.
- Pleural effusions, empyema, and pleurisy
- Respiratory failure

Investigations
- Chest x ray
- Blood cultures

Treatment objectives
- Restore respiratory functions
- Eradicate causative agents

Non-pharmacological treatment
- Rest
- Adequate hydration

Pharmacological treatment

Amoxicillin + clavulanic acid oral
Adults:
Amoxicillin 500mg + **clavulanic acid 125** orally every 8 hours for 14 days.
Child:
Amoxicillin 15mg/kg + **clavulanic acid** (maximum 500mg) orally every 8 hours for 14 days.

OR
Ceftriaxone IV or IM
Adult
1 to 2 g IV or IM divided every 12 to 24 hours (Max: 4 g/day) depending on severity of illness and causative organism
Child:
50 to 75 mg/kg/dose IV or IM every 24 hours (Max: 1 g/day).
OR
50 to 75 mg/kg/day IV or IM divided every 12 hours (Max: 2 g/day) for serious infections.

OR
Amoxicillin oral
Adult:
500 mg orally every 8 hours for 10-14 days
Child:
50 mg/kg in 2 or 3 divided doses for 10-14 days

If received antibiotics within the past 3 months or with comorbidities
ADD
Azithromycin oral
500 mg at once, then 250 mg daily

Note:
- Administer for a minimum of 5 days
- Should be afebrile for 48-72 hours

- Or until afebrile for 3 days.

Prevention
- Pneumococcal or influenza vaccination
- Stop smoking

Acute rhinitis (common cold, coryza)

An inflammation of the nasal membranes including the nose, paranasal sinuses, throat, larynx, and often the trachea and bronchi.

Causes
- Viruses

Signs and symptoms
- Tickling sensation in nose
- Cough
- Sore throat
- Runny nose
- Sneezing
- Headache
- Fever

Differential diagnosis
- Allergic rhinitis
- Bronchitis
- Pertussis
- Sinusitis

Complications
- Acute or chronic sinusitis
- Otitis media
- Sleep disturbance or apnoea
- Pneumonia

Treatment objectives
- Treat symptoms
- Most colds resolve spontaneously in 7–10 days

Non-pharmacological treatment
- Bed rest
- Drink warm fluids to maintain hydration
- Administer steam inhalation

Pharmacological treatment
- Relief pain and aches with paracetamol for 2 to 3 days
- Do not give antibiotics as they will neither hasten recovery nor prevent complications

Note
- Avoid cough syrups in children below 6 years
- Avoid aspirin which may increase the risk of Reye's syndrome in children

Prevention
- Avoid contact with infected persons
- Advice parents to return if the condition worsens especially if breathing becomes difficult and laboured.

Pharyngitis (Tonsillitis)

Acute inflammation of the tonsils which usually has a rapid onset.

Causes
- Mostly viral infection

- Bacterial infection especially beta-haemolytic streptococcus

Signs and symptoms
- Fever
- Sore throat
- Dysphagia
- Enlargement of the tonsils
- Painful swallowing
- Tender cervical or submandibular lymph nodes
- Body aches

Complications
- Quinsy especially for young children aged 2-4 years

Differential diagnosis
- Pharyngitis

Investigations
- Culture and sensitivity of throat swab

Non pharmacologic management
- Bed rest
- Drinks to soothe the throat

Pharmacological treatment

First Line
Amoxicillin oral
Adult: 500-875mg every 12 hours for 10 days
Child:
up to 5 years: 50 mg/kg/day in 2 or 3 divided doses for 10 days

AND
Paracetamol oral
Adult:
1gm every 8 hours until fever is controlled
Child:
10-20 mg/kg body weight every 6 hourly/PRN

Second line
Cephalexin oral
Adult:
500 mg every 12 hours for 10 days
Child:
Cephalexin 12.5 to 25 mg/kg every 12 hours

If allergic to penicillin
Azithromycin oral
Adult:
500 mg daily for 5 days
Child:
12 mg/kg once daily for 5 days

Adenoid hypertrophy

Adenoid hypertrophy is hyperplasia of the pharyngeal tonsils and only becomes symptomatic when it leads to congestion of the choanae and eustachian tubes. The condition is common in children and causes recurrent inflammation of the upper respiratory tract.

Causes
- Physiological

- Adenoidal inflammation due to:
  - Viral or bacterial infections
  - Allergens

Signs and symptoms
- Nasal obstruction leading to mouth–breathing
- Difficulty in breathing and eating, drooling, snoring and toneless voice.
- "Adenoid facies" may later develop
- Eustachian tube obstruction often leads to deafness.
- Other features:
  - Nasal discharge
  - Postnasal drip
  - Cough
  - Cervical adenitis
- Mental dullness and apathy may be marked due to poor breathing, bad posture or deafness.
- Nocturnal enuresis
- Habit tics and night terrors may be aggravated

Investigations
- History
- X–ray lateral view of the nasopharynx

Differential diagnosis
- Allergic rhinitis
- Sinusitis
- Otitis media

Complications
- Sinusitis
- Recurrent otitis media
- Pneumonitis

Treatment objectives
- To significantly improve nasopharyngeal airway and consequently improve nasal breathing
- Treat concurrent infection

Non-pharmacological treatment
- Bed rest and warmth
- Analgesics e.g. paracetamol
- Steam inhalation
- Asymptomatic patients do not require treatment

Pharmacological treatment
- Asymptomatic adenoid vegetations do not require treatment
- Treat the underlying cause of inflammation

Allergies:
Beclomethasone nasal spray
<6 years: Not recommended as safety and efficacy are not established
6-11 years: 1 spray/nostril twice daily (168 mcg/day)
Note:
- May increase to 2 sprays/nostril (336 mcg/day) in patients not adequately responding or those with more severe symptoms
- Decrease dose to 1 spray/nostril twice daily once adequate control is achieved

>12 years and adults: 1-2 sprays/nostril twice daily (total dose: 168-336 mcg/day)

Antibiotics for infection
Amoxicillin oral
Adult:
500 mg every 8 hours for 10-14 days
Child:
15mg/kg (maximum 500mg) every 8 hours for 10-14 days

Patient Education
- Clear the nose regularly
- Keep the child warm
- Breastfeed frequently
- Return quickly if:
  - Child's condition worsens
  - Breathing is difficult
  - Feeding becomes a problem.

Referral
- Refer to ENT surgeon for adenotonsillectomy (surgical excision of adenoids) for:
  - Chronic/recurrent otitis media in children
  - Chronic/recurrent sinusitis
  - Severe symptomatic nasal obstruction (e.g., obstructive sleep apnoea)

Sinusitis

Sinusitis is an inflammation of the mucous membrane of the paranasal sinuses. It rarely occurs without concurrent inflammation of the nasal mucosa (rhinitis). Patients with asthma, cystic fibrosis, poor immune functions are more at risk of developing sinusitis.

Causes
- Viral (most common): rhinovirus, coronavirus, adenovirus, influenza, and parainfluenza viruses
- Bacterial: particularly *S. pneumoniae*, *H. influenzae*, *M. catarrhalis*, *S. aureus*, *E. coli*, and Klebsiella.
- Fungal: Aspergillus, *Rhizopus oryzae*
- Allergies
- Air pollution
- Structural problem of the nose

Signs and symptoms
- Acute bacterial rhinosinusitis should be suspected in patients with a pre-existing viral URTI and symptoms that do not improve after 10 days or worsen after initial improvement
- Thick nasal mucus
- A plugged nose
- Facial pain
- Redness of nose, cheeks, or eyelids
- Fever
- Headaches
- A poor sense of smell
- Sore throat
- Cough

Differential diagnosis
- Acute rhinitis (coryza)
- Allergic rhinitis
- Adenoids

Complications
- Meningitis
- Cavernous sinus thrombophlebitis
- Orbital cellulitis or abscess
- Brain abscess

Investigations
- Culture and sensitivity of the discharge
- X-ray of the sinuses

Treatment objectives
- Adequate drainage of the involved sinus
- Appropriate systemic treatment of the likely pathogens

Non-pharmacological treatment
- Humidification/vaporizer

- Warm compresses
- Adequate hydration
- Smoking cessation
- Balanced nutrition

Pharmacological treatment

Amoxicillin/clavulanate oral
Adult:
Mild to moderate: 500/125 mg every 12 hours for 10 days
Severe: 875/125 mg every 12 hours for 7-10 days

Referral

- Failure of treatment
- Onset of complications
- Suspected malignancy
- Need for surgical intervention

Acute Epiglottitis

A severe rapidly progressive infection of the epiglottis and surrounding tissues that may be rapidly progressive and fatal because of sudden airway obstruction by the inflamed tissues.

Infection through the respiratory tract extends downwards to produce a supraglottic cellulitis with marked inflammation. The inflamed epiglottis mechanically obstructs the airway. The work of breathing increases; resulting CO_2 retention and hypoxia may lead to fatal asphyxia within a few hours.

Causes

- *Haemophilus influenza* type B is almost always the pathogen
- S*treptococci* may very rarely be responsible

Signs and symptoms

- Muffled voice (54%)
- Cervical adenopathy
- Fever
- Severe pain on gentle palpation over the larynx or hyoid bone
- Mild cough
- Irritability
- Tachycardia
- Toxic appearance of patient

Signs and symptoms indicating urgent intubation include:

- Respiratory distress
- Airway compromise on examination
- Stridor
- Inability to swallow
- Drooling
- Sitting erect
- Deterioration within 8-12 hours

Differential diagnosis

- Caustic Ingestions
- Acute laryngitis
- Croup

Complications

- Complete airways obstruction and asphyxiation leading to death

Investigations

- X-ray showing enlarged epiglottis (thumb sign) which is associated with airway obstruction. ***Avoid radiography until the patient's airway is secure***

- Direct visualization of the epiglottis using nasopharyngoscopy/laryngoscopy is the preferred method
- Blood cultures may be taken, particularly if the patient is systemically unwell

Caution
- Avoid tongue depression examination as this may cause complete airway blockage and sudden death
- Do not force patient to lie down as it may precipitate airway obstruction
- Because of the rapidity with which airway obstruction can occur, repeat evaluations of airway patency are indicated

Clinical pitfalls include the following:
- Underestimating the potential for sudden deterioration
- Inadequate monitoring in which deterioration goes unnoticed
- Rushing intubation without proper support (anaesthesiologist and person experienced in difficult intubation)
- Performing unnecessary medical procedures that result in agitation and respiratory collapse

Treatment objectives
- Airway management is the most urgent consideration
- Control infection

Non-pharmacological treatment
- Oxygen
- Steam inhalation
- Nasotracheal intubation may be required

Pharmacological treatment

Avoid
- Sedatives
- Inhalers
- Racemic epinephrine

Use
- Antibiotic therapy should begin after blood and epiglottic cultures have been obtained
- Antipyretic agents may also be necessary

Prevention
- Hib vaccine as part of the pentavalent DPT/HepB/Hib vaccine immunization

Acute Laryngotracheobronchitis (Croup)

Croup is a common, respiratory tract illness which affects the larynx and trachea, and may also extend to the bronchi. Croup is the most common aetiology for hoarseness, cough, and onset of acute stridor in febrile children. The vast majority of children with croup recover without consequences or sequelae; however, it can be life-threatening in young infants

Causes
- Viruses
- Parainfluenza virus (75% of cases)
- Second most common pathogen: respiratory syncytial virus (RSV)
- Adenovirus,
- Influenza virus

Signs and symptoms
- Rhinitis (coryza) with nasal discharge and congestion
- Low-grade fever
- Barking cough
- Hoarseness
- Stridor due to subglottic narrowing
- Dyspnoea
- Pallor
- Tachycardia

Differential diagnosis

- Acute epiglottitis
- Epiglottitis (supraglottic laryngitis)
- Laryngeal diphtheria
- Foreign body (FB)
- Measles
- Diphtheria

Complications
- A secondary bacterial infection may result in pneumonia or bacterial tracheitis

Investigations
- Diagnosis of acute cases is usually established clinically.

Treatment objectives
- Prevent asphyxiation
- Treat inflammatory oedema

Non-pharmacological treatment
- Humidification
  - Cool mist from a humidifier
  - Or sitting with the child in a bathroom (not in the shower) filled with steam generated by running hot water
- Encourage oral intake of warm, clear fluids to loosen mucus in the oropharynx
- Avoid smoking in the home; smoke can worsen a child's cough.
- Keep the child's head elevated.

Pharmacological treatment

Dexamethasone IM
Administer 0.6 mg/kg as intramuscular injection

OR
Dexamethasone 0.15 mg/kg

AND
Adrenaline nebulized
400 micrograms/kg (maximum 5 mg)
Treat fever with an antipyretic such as **acetaminophen** or **ibuprofen**

Prevention
- Avoid contact with infected persons
- Isolate infected persons

Asthma
Asthma is the most common chronic disease in childhood and involves airway inflammation, intermittent airflow obstruction, and bronchial hyperresponsiveness. It is characterised by episodic exacerbations (asthma attacks), and reversible airflow obstruction.

Risk factors include:
- Family history of asthma
- Past history of allergies
- Atopic dermatitis
- Low socioeconomic status
- Childhood exposure to second-hand smoke
-

Causes
- Environmental allergens: pollen (seasonal), dust mites, domestic animals, mould spores, dust
- Viral respiratory tract infections (one of the most common stimuli, especially in children)
- Cold air
- Physical exertion (exercise-induced asthma)
- Gastroesophageal reflux disease
- Chronic sinusitis or rhinitis
- Medication: NSAIMS, beta-blockers
- Stress
- Irritants (exposure to solvents, ozone, tobacco or wood smoke, cleaning agents)

Signs and symptoms
- Wheezing

- Coughing
- Shortness of breath
- Chest tightness/pain
- Other nonspecific symptoms in infants or young children:
  - Recurrent bronchitis or pneumonia
  - Persistent cough with colds
  - Recurrent croup

Staging of Asthma

	Intermittent	*Mild persistent*	*Moderate persistent*	*Severe persistent*
Coughing, wheezing, chest tightness etc.	Less than 2 times a week	3-6 times a week	Daily	Continual
Night-time symptoms	Less than twice a month	3-4 times a month	5 or more times a month	Frequent night time symptoms
Lung function test FEV	80% or more above normal values	80% or more above normal values	Above 60% but below 80% of normal values	60% or less of normal values
Peak flow	Less than 20% variability am-to-am or am-to-pm, day-to-day	20-30% variability	More than 30% variability	More than 30% variability

Differential diagnosis

- Allergic rhinitis
- Bronchiolitis
- Chronic obstructive pulmonary disease (can coexist with asthma)
- Foreign body aspiration
- Tracheal stenosis
- Chronic Sinusitis
- Heart Failure
- Upper Respiratory Tract Infection
- Vocal Cord Dysfunction

Complications

- Status asthmaticus

Investigations

- Diagnosis is mainly by clinical features
- Peak flow rate
- Spirometry (Forced Expiratory Volume (FEV)

Treatment objectives

- Achieve and maintain control of asthma symptoms
- Maintain normal activity levels, including exercise
- Maintain pulmonary function as close to normal as possible
- Prevent asthma exacerbations
- Avoid adverse effects from asthma medications
- Prevent asthma mortality

Pharmacological treatment

Acute asthma

Assess the severity of asthma attack following clinical criteria:

Signs and symptom	**Mild to moderate attack**	**Severe attack**	**Life threatening attack**
	– Able to talk in sentences	– Cannot complete sentences in one breath – Too breathless to talk or feed	– Altered level of consciousness (drowsiness, confusion, coma) – Exhaustion
Respiratory rate	– Children 2-5 years ≤ 40/minute	– Children 2-5 years > 40/minute	– Silent chest – Paradoxical thoracoabdominal

	– Children > 5 years ≤ 30/minute	– Children > 5 years > 30/minute – Adults ≥ 25/minute	movement – Cyanosis – Collapse
Heart rate	– Children 2-5 years ≤ 140/minute – Children > 5 years ≤ 125/minute	– Children 2-5 years > 140/minute – Children > 5 years > 125/minute – Adults ≥ 110/minute	– Bradycardia in children – Arrhythmia/hypotension in adults
SpO_2		– ≥ 92%	– < 92%

Management objectives

- Reverse the obstruction
- Relieve hypoxia as soon as possible

Pharmacological treatment

Mild to moderate attack

- Place patient in a 1/2 sitting position.

Salbutamol inhaler:
2 to 4 puffs every 20 to 30 minutes, up to 10 puffs if necessary, during the first hour.

PLUS
Prednisolone oral
1 to 2 mg/kg in one dose

Note:

- If the attack is completely resolved, observe the patient for some hours and then discharge on

Salbutamol for 24 to 48 hours
2 to 4 puffs every 4 to 6 hours

PLUS
Prednisolone oral
1 to 2 mg/kg once daily for 3 days

Note:

- If symptoms worsen or do not improve treat as ***severe attack***

Severe attack

- Hospitalise the patient
- Place in a 1/2 sitting position.

Oxygen
Administer at least 5 litres/minute to maintain the SpO2 between 94 and 98%.

Salbutamol inhaler
Adult and child 5 years and over:
2 to 4 puffs every 20 to 30 minutes, up to 20 puffs

PLUS
Prednisolone oral
1 to 2 mg/kg one dose

If the patient cannot tolerate oral prednisolone (e.g. vomiting), use
Hydrocortisone IV
Adult and child 5 years and over:
100 mg every 6 hours

Note:

- If the attack is completely resolved, observe the patient for at least 4 hours. Continue the treatment with

Salbutamol for 24 to 48 hours (2 to 4 puffs every 4 hours)

PLUS
Prednisolone oral
1 to 2 mg/kg once daily to complete 3 days of treatment.

Note:
- If symptoms worsen or do not improve, treat as life threatening attack

Life-threatening attack (intensive care)
- Set up an intravenous line.

Oxygen
- Administer oxygen continuously, at least 5 litres/minute
- Maintain the SpO2 between 94 and 98%.

Salbutamol + ipratropium nebuliser solutions using a nebuliser:
Adult and child 12 years and over:
Salbutamol 5 mg + **ipratropium** 0.5 mg every 20 to 30 minutes
Child:
1 month to < 5 years: **salbutamol** 2.5 mg + **ipratropium** 0.25 mg every 20 to 30 minutes
5 ***to < 12 years*** **salbutamol** 2.5 to 5 mg + **ipratropium** 0.25 mg every 20 to 30 minutes

Note:
Mix the two solutions in a nebuliser reservoir

PLUS
Prednisolone oral
1 to 2 mg/kg one dose

If the patient cannot tolerate oral prednisolone (e.g. vomiting), give
Hydrocortisone IV
Adult and child 5 years and over:
100 mg every 6 hours

Note:
- If the attack is resolved after one hour: switch to **salbutamol** aerosol and continue prednisolone oral as for mild to moderate attack
- If symptoms do not improve after one hour, administer

Magnesium sulphate IV infusion
Adult:
1 to 2 g
Child over 2 years*:*
40 mg/kg

Note:
- Administer **magnesium sulphate** in 0.9% **sodium chloride** as IV infusion over 20 minutes
- monitoring blood pressure
- Continue **salbutamol** by nebulisation and **corticosteroids**, as above.
- Steroids(Prednisolone) must be tapered with doses of 2mg/day for 2 weeks or more

Prevention
- Treat infections early
- Avoid triggers to which the patient is sensitive:
  - Exposure to very hot or cold weather
  - Exposure to known allergens
  - Environmental tobacco smoke
  - Exertion during high levels of air pollution
  - Use of beta blockers
  - Use of nonsteroidal anti-inflammatory medicines (NSAIMs)
  - Food items or additives (e.g. sulphites)
  - Occupational exposures
  - Stress
  - Keep your immunizations up to date
  - Use an air conditioner to reduce airborne pollen circulating indoors

Referral

- Unresponsive asthma (status asthmaticus)

Asthma in special groups

Pregnant women

- Asthma symptoms can be worse, better, or unchanged during pregnancy.
- Same stepwise management as with other patients
- Inhalation treatments preferred
- Poorly managed asthma can increase the risk of pregnancy complications (e.g., preeclampsia, premature birth, congenital abnormalities).
- Monthly monitoring of asthma is recommended.

Children

- Asthma in patients under 5 years of age is challenging to diagnose and is often underdiagnosed.
- Treatment similar to that for adults, with inhaled corticosteroids as the initial drug of choice
- Young children (< 5 years) may require nebulizers because of difficulty using inhalers.

Chronic Asthma

Pharmacological treatment

- Only patients with persistent asthma need long-term treatment
- Start treatment at the step most appropriate to the initial severity and adjust depending on clinical response

Category	*Severity of symptoms*	*Treatment*
Intermittent asthma	– Day-time symptoms occur once weekly – Night-time symptoms occur 2 times monthly – Normal physical activity	Inhaled **salbutamol** when symptomatic
Mild persistent asthma	– Day-time symptoms occur more than once weekly, but less than once daily – Night-time symptoms occur more than 2 times monthly – Symptoms may affect activity	Continuous treatment with inhaled **beclomethasone** **PLUS** Inhaled **salbutamol** when symptomatic
Moderate persistent asthma	– Symptoms occur daily – Night-time symptoms occur more than once weekly – Symptoms affect activity	Continuous treatment with inhaled **beclomethasone** **PLUS** Inhaled **salbutamol** (1 puff 4 times daily)
Severe persistent asthma	– Symptoms occur daily – Night-time symptoms occur frequently – Symptoms limit physical activity	Continuous treatment with inhaled **beclomethasone** **PLUS** Inhaled **salbutamol** (1-2 puffs 4-6 times daily)

Dosing of inhaled corticosteroid
For patients not previously receiving inhaled corticosteroid

Beclomethasone *oral inhaler*

Adult and child 12years and above:
Initial dose: 40 to 80 mcg via oral inhalation twice a day

For patients switching from another inhaled corticosteroid:

- Initial dose selection should be based on the previous inhaled corticosteroid strength
- 40 to 320 mcg via oral inhalation twice a day

Maintenance dose

- After 2 weeks, may increase dose for additional asthma control
- After asthma stability has been achieved, titrate to the lowest effective dose to reduce the possibility of side effect
- Maximum dose: 320 mcg twice a day

Child: 5-11years

Initial dose: 40 mcg via oral inhalation twice a day

Maintenance dose
- After 2 weeks, may increase dose to 80 mcg twice daily for additional asthma control
- After asthma stability has been achieved, titrate to the lowest effective dose to reduce the possibility of side effects
- Maximum dose: 80 mcg twice a day

Note:
- Onset and degree of improvement in asthma control is variable; improvements may occur within 24 hours, but may take 1 to 2 weeks; maximum benefit is usually achieved within 3 to 4 weeks.
- If asthma symptoms arise, a fast-acting inhaled bronchodilator should be used for immediate relief; this drug should not be used for the relief of acute bronchospasm.

Acute bronchitis

Acute bronchitis is a self-limiting lower respiratory tract infection characterized by inflammation of the bronchi. Acute bronchitis usually follows an upper respiratory tract infection.

Causes
- Caused by a virus in more than 90% of cases
- Bacteria
- Environmental factors

Signs and symptoms
- Cough with or without sputum
- Runny nose
- Chest pain
- Headache
- Malaise
- Fever (uncommon)

Differential diagnosis
- Bronchiolitis
- Pneumonia

Investigations
- Clinical findings
- Auscultatory (wheezing, rhonchi, coarse crackles)

Non-pharmacological treatment
- Adequate hydration
- Rest

Pharmacological treatment
- Antibiotics are not indicated except the patient is at risk of secondary infection
  - Smokers
  - Elderly patients
  - Patients with lung disease
- NSAIDs for symptomatic relief

Prevention
- Smoking and other lung irritants
- Frequent hand washing may also be protective
- Haemophilus influenzae vaccine

Oropharyngeal diseases

Gingivitis

Gingivitis is a non-destructive disease marked by inflammation of the gums.

Causes

- Plaque (most common)
- Poor oral hygiene
- Infection; Bacterial, Viral e.g. herpes simplex, measles
- Vitamin Deficiency
- Medicines and exposure to chemicals
- Trauma
- Allergic reaction

Signs and symptoms

- Bleeding gums or bleeding after brushing and/or flossing
- Bright red or purple gums
- Swollen and/or tender gums
- Bad breath (halitosis)

Differential diagnosis

- Gingival ulceration in leukaemia
- HIV-associated ulcerative gingivitis

Complications

- Periodontal disease
- Tooth Loss

Investigations

- Mouth smear may be helpful to identify causative organism

Treatment objectives
- Relieve pain and inflammation
- Treat infection
- Restore oral health

Non-pharmacological treatment
- Removal of irritating factors such as plaque, calculus, and faulty dentures
- Warm saline mouth wash

Pharmacological treatment

First Line
NSAIDs such as **Ibuprofen,** oral;
Adult:
200-400mg every 8hours
Child:
100-200mg every 8 hours

For infected ulcers
Amoxicillin oral:
Adult:
500mg every 8 hours;
Child:
6-12years: 250mg every 8 hours,
1-5years: 125mg every 8 hours,
<1 year: 62.5mg every 8 hours for 5 days

AND
Metronidazole oral
Adult:
400mg every 8 hours
Child:
7-10 years: 200mg every 8 hours,
3-7 years: 100mg every 8 hours,
1-3 years: 50mg every 8 hours for 5 days

OR
Co-amoxiclav oral
Adult:
625mg every 12 hours
Child:
6-12 years: 5ml of 400/57 suspension every 12 hours
1-6 years: 2.5ml of 400/57 suspension every 12 hours
1month-1year: 0.25ml/kg of 125/31 suspension every 8 hours
Neonates: 0.25ml/kg of 125/31 suspension every 6 hours for 7days

Prevention
- Maintain regular oral hygiene
- Regular Scaling and Polishing every six (6) months
- Use of antibacterial mouth washes

Referral
- Extensive and ulcerative gingivitis to a dental specialist
- Presence of calculus for scaling and polishing of the teeth.

Dental Caries

Dental caries, also known as tooth decay is damage to the surface of the tooth resulting in holes or tiny openings.
Causes
- Bacteria in the mouth
- High carbohydrate diets
- Susceptible teeth

Signs and symptoms

- Initially asymptomatic
- Tooth may be sensitive when eating hot, cold or sweet foods or drinks
- Visible holes, black spots or pits in the tooth

Differential diagnosis

- Dental fluorosis
- Development disorders such as hypo mineralization and hypoplasia of the tooth, white spot lesion, pigmented lesion of the tooth.

Complications

- Pulpitis
- Dental abscess
- Acute Periodontitis
- Sepsis

Investigations

- Xray (Peri-apical or bitewing)
- Pulp Tester

Treatment objectives

- Relieve pain
- Restore tooth cavity

Pharmacological treatment

Paracetamol oral
Adult:
500mg-1g every 6-8hours
Child:
6-12 years: 250-500mg every 6-8 hours
1-5years: 120-250mg every 6-8 hours
3months-1year: 60-120mg every 6-8 hours when required

OR
Ibuprofen oral
Adult:
200-400mg every 8 hours
Child:
100-200mg every 8 hours

Antibacterial mouthwash
Gargle frequently.

Referral

- Refer patient to a dentist for;
  - Amalgam fillings, Glass Ionomer Cements and Composite Atraumatic Restorative Technique
  - Root canal therapy, pulpotomy and pulpectomy, if pulp is involved

Prevention

- Use Fluoride-containing tooth paste
- Reduce consumption of sugar
- Apply pit and fissure sealants.
- Regular dental checks

Dental Abscess

Dental Abscess is a collection of pus in the pulp of a tooth that can spread to the local (gum, alveolar bone) or regional (oral, cervical, facial) structures.

Causes

- Trauma
- Infections caused by untreated cavity

- Injury from dental appliance.
- Poor oral hygiene
- Dental caries

Signs and symptoms
- Fever
- Swelling of the gum around the affected tooth resulting in facial swelling
- Pain
- Bad breath

Differential diagnosis
- Periapical granuloma or cyst

Complications
- Dental cyst
- Osteomyelitis
- Ludwig's angina

Investigations
- X-ray of affected tooth

Treatment objectives
- Relieve pain
- Drain pus
- Treat infection

Non-pharmacological treatment
- Supra and Sub gingival Scaling
- Root planning
- Frequent mouth rinse with saline or antiseptic mouthwash

Pharmacological treatment

Paracetamol oral
Adult:
500mg-1g every 6-8 hours
Child:
6-12years: 250-500mg every 6-8 hours
1-5years: 120-250mg every 6-8 hours
3months-1year: 60-120mg every 6-8 hours when required

OR
Ibuprofen oral
Adult:
200-400mg every 8hours
Child:
100-200mg every 8 hours

AND
Amoxicillin oral
Adult:
500mg every 8 hours for 7days
Child:
6-12 years: 250mg every 8 hours for 7 days
1-5 years: 125mg every 8 hours for 7 days
<1 year: 62.5mg every 8 hours for 7days

AND
Metronidazole oral
Adult:
400mg every 8 hours for 7 days
Child:
100-200mg every 8 hours for 7days

OR
Clindamycin oral
Adult:
150-300mg every 6-8 hours for 7days
Child:
3-6mg/kg every 6 hours for 7 days

Referral

- Refer immediately to a dental surgeon after initiation of treatment

Prevention

- Good oral hygiene
- Use of fluoride-containing toothpaste

Osteomyelitis

Osteomyelitis is the inflammation of the Bone Marrow of the jaws caused by an infecting organism.

Causes

- Infection
- Trauma
- Radiation injury
- Poor oral hygiene etc.

Signs and symptoms

- Throbbing, deep seated pain
- Swelling due to inflammation
- Purulent discharge
- Irritability
- Trismus (difficulty opening the mouth)
- Pathological fracture

Differential diagnosis

- Fibrous dysplasia
- Peripheral Osteoma

Complications

- Cellulitis
- Septicaemia

Investigations

- Blood test
- Biopsy
- X-ray
- MRI and CT Scan

Treatment objectives

- Relieve pain
- Treat infection and other underlying causes
- Restore the facial profile

Non-pharmacological treatment

- Lifestyle changes e.g smoking cessation to improve blood circulation.
- Replace infected prosthetic part, if needed.

Pharmacological treatment

Amoxicillin oral:
Adult:
500mg every 8 hours for 7days
Child:
6-12 years: 250mg every 8 hours for 7 days
1-5 years 125mg every 8 hours for 7 days,
<1 year: 62.5mg every 8 hours for 7days

AND
Metronidazole oral
Adult:
400mg every 8 hours for 7 days
Child:
100-200mg every 8 hours for 7days

Alleviate pain
Paracetamol oral
Adult:
500mg-1g every 6-8hours
Child:
6-12years: 250-500mg every 6-8 hours
1-5years: 120-250mg every 6-8 hours,
3months-1year: 60-120mg every 6-8 hours when required

OR
Ibuprofen oral
Adult:
200-400mg every 8 hours
Child:
100-200mg every 8 hours
- Treat any underlying conditions

Referral
- Refer to dental surgeon for;
    - Excision and Draining of pus or fluid that has built up in response to the infection around the infected bone.
    - Debridement: removal of as much diseased bone as possible, including any surrounding tissue with signs of infection may also need removing.

Prevention
- Regular dental assessment and care.

Periodontitis

Periodontitis, a severe gum disease, is an inflammation of the periodontium (Periodontal ligament, alveolar bone, gingiva and cementum.

Causes
- Poor Oral Hygiene
- Infection

Signs and symptoms
- Swollen or puffy gums
- Bright red, dusky red or purplish gums
- Pus between the teeth and gums
- Loose teeth
- New spaces developing between the teeth
- Bleeding gum
- Bad breath
- Painful chewing

Complications
- Tooth loss
- Systemic disease such as respiratory disease, rheumatoid arthritis, coronary artery disease and problems controlling blood sugar in diabetes

Investigations
- Physical examination
- Dental X-ray to check for bone loss

Treatment objectives
- Reduce pain and inflammation
- Prevent further bleeding from the gum
- Treat infection

Non-pharmacological treatment

- Scaling
- Root planning
- Use of mouthwash
- Bone grafting
- Soft tissue grafts
- Flap surgery (pocket reduction surgery)

Pharmacological treatment

Paracetamol oral
Adult:
500mg-1g every 6-8hours
Child:
6-12years: 250-500mg every 6-8 hours
1-5years: 120-250mg every 6-8 hours,
3months-1year: 60-120mg every 6-8 hours when required

OR
Ibuprofen oral
Adult:
200-400mg every 8 hours
Child:
100-200mg every 8 hours

AND
Amoxicillin oral:
Adult:
500mg every 8 hours for 7days
Child:
6-12 years: 250mg every 8 hours for 7 days
1-5 years 125mg every 8 hours for 7 days,
<1 year: 62.5mg every 8 hours for 7days
OR
Metronidazole oral
Adult:
400mg every 8 hours for 7 days
Child:
100-200mg every 8 hours for 7days

Referral

Refer to a dental specialist for further treatment

Prevention

- Maintain good oral hygiene specifically twice daily brushing and flossing
- Regular dental check up

Xerostomia

Xerostomia is an unusually dry mouth.

Causes

- Medications e.g. diuretics, anticholinergics etc
- Cancer treatment
- Aging
- Tobacco and alcohol use
- Recreational drug use
- Infection of the salivary glands
- Other health conditions. such as diabetes, stroke, Alzheimer's disease, autoimmune diseases, etc.
- Snoring and breathing with your mouth open also can contribute to dry mouth

Signs and symptoms

- Inflammation of the tongue
- Bad breath
- Cheilitis (cracking lips)
- Dryness in the mouth

- Sticky and dry feelings in the mouth
- Frequent thirst

Complications

- Increased plaque, tooth decay and gum disease
- Mouth sores
- Oral thrush
- Sores or split skin at the corners of your mouth, or cracked lips
- Poor nutrition as a result of difficulty in chewing and swallowing

Investigations

- Blood test and imaging scan of the salivary glands
- Sialometry (measures the flow rate of saliva)
- Biopsy etc.

Treatment objectives

- Increase the flow of saliva
- Replace lost secretions
- Control dental Caries
- Treat infections

Non-pharmacological treatment

- Increase hydration; Sipping water or sugar-free drinks or sucking ice chips throughout the day to moisten mouth, and drink water during meals to aid chewing and swallowing
- Chew sugar-free xylitol-containing gum
- Use saliva substitute such as carboxymethyl cellulose as mouthwash and avoid alcohol base mouthwash
- Reduce consumption of sugary and acidic foods or drinks, spicy foods, astringents, excessively hot or cold drinks.
- Use of humidifier to add moisture in the room

Pharmacological treatment

- Treat underlying condition
- Stimulate saliva production

Stomatitis

Stomatitis is an inflammation of the mucous membranes of the mouth, which can affect the cheeks, gums, inside of the lips, or on the tongue. May present with or without sores.

Causes

- Trauma to the mouth
- Ill-fitting dentures
- Nutritional deficiencies and Infection
- Allergic reaction
- Radiotherapy

Signs and symptoms

- Mouth ulcers with a white or yellow layer and red base, usually inside the lips, cheek, or on the tongue
- Swelling and bleeding gums
- Blisters and painful sores
- Red patches
- Oral dysesthesia- a burning feeling in the mouth

Investigations

- Physical examination
- Swabs, both bacterial and viral
- Tissue scrapings or swab for fungal infections
- Biopsy
- Blood tests
- Patch test to identify allergy

Treatment objectives

- Relieve pain
- Promote rapid healing of the mouth
- Reduce inflammation

Non-pharmacological treatment

- Give nutritional diet if the cause is as a result of specific nutritional deficiency

- Mouthwash or saline rinse to clean the mouth
- Eliminate causes of allergy
- Drink more water

Pharmacological treatment

- Apply topical anaesthetic such as lidocaine or xylocaine to the ulcer (not recommended for children under 6years)
- Use of topical corticosteroid preparations such as triamcinolone dental paste
- For viral infections: Take a dose of valacyclovir at the first sign of an attack, coat the lesions with 5% acyclovir ointment
- Use of topical antibiotics gel
- Pain Reliever

Prevention

- Take nutritional supplements such as Folate, vitamins, B-6, B-12.
- Practice good oral hygiene

Fibrous Epulis

This is a common tumour-like lesion of the gingiva; it appears in the interdental papilla as a result of local irritation (calculus, bacteria, plaques, caries or restorations with irregular margins).

Causes

- Trauma and long-term irritation or friction resulting from badly fitting dentures, fillings and crown, plaque and rough tooth edges.

Signs and symptoms

- Round and pedunculated swelling
- Irritation

Investigations

- Excisional biopsy

Treatment/Management

- Surgical removal

Referral

- Dental surgeon for surgical excision of lesion

Prevention

- Avoid potential sources of trauma and irritation of the gingiva.

Halitosis

Halitosis is a persistent, unpleasant odour in exhaled breath, commonly called bad breath.

Causes

- Xerostomia
- Poor oral hygiene
- Dental caries
- Periodontal disease
- Systemic conditions- Lung abscess, Bowel obstruction, Diabetic acidosis, Kidney failure, Liver disease, GIT infection
- Upper respiratory tract infections
- Foods and beverages

Symptom

- Bad breath

Investigations

- Smelling the breath of the affected person
- Nasal endoscopy,
- Flexible laryngoscopy,

Treatment objectives

- Restore normal mouth odour

Non-pharmacological treatment

- Maintain proper oral hygiene
- Chew sugar-free gum
- Use of mouth rinses.

Referral

- Specialist for treatment of underlying health condition

Prevention

- Good oral hygiene
- Drink plenty of water
- Chew sugar-free gum
- Cut down on the intake of caffeine containing products

Salivary Glands Enlargement

Enlargement of the salivary glands due to obstruction in the glands and their ducts.
Can be unilateral or bilateral

Causes

- Salivary stones, sialoliths or calculus
- Salivary gland infection, or Sialadenitis
- Cyst
- Tumours
- Sjögren's syndrome

Signs and symptoms

- Salivary gland swelling
- Foul-tasting drainage into the mouth
- Tenderness
- Dry mouth

Investigations

- Ultrasound
- MRI scan
- CT scan
- Biopsy

Treatment objectives

- Reduce inflammation
- Treat underlying infection

Non-pharmacological treatment

- Excess fluid intake to treat dehydration
- Apply warm compress to affected area for 10-15minutes several times daily
- Rinse mouth with warm salt water
- Manual removal of stones by warm compresses
- Sour foods/ fruit (Lemon)to increase the flow of saliva
- Surgical removal

Pharmacological treatment

- Treat infection with Antibiotics

Prevention

- Practice good oral hygiene
- Drink of plenty of water

Referral

- Surgeon for surgical intervention.

Pericoronitis

Pericoronitis is an inflammation of the soft tissue surrounding the crown of a partially erupted or impacted tooth.

Causes

- Accumulation of bacteria and food debris beneath the gum.
- Trauma to the gum flap from opposing tooth

Types

Acute and Chronic

Signs and symptoms

- Tenderness around impacted tooth
- Facial swellings
- Dysphagia
- Enlargement of regional lymph nodes
- Pain
- Difficulty in opening the mouth
- Fever

Investigations

- Physical examination
- X ray to determine the alignment of the affected tooth.

Treatment objectives

- Manage or alleviate the pain near the affected tooth
- Reduce inflammation

Non-pharmacological treatment

- Rinse mouth with warm saline mouth wash
- Removal of the gum flap (Operculectomy)
- Disimpaction of the third molar by surgical extraction
- Occlusal reduction of opposing tooth

Pharmacological treatment

Paracetamol oral
Adult:
500mg-1g every 6-8 hours
Child:
6-12years: 250-500mg every 6-8 hours
1-5years: 120-250mg every 6-8 hours,
3months-1year: 60-120mg every 6-8 hours when required

OR
Ibuprofen oral
Adult:
200-400mg every 8 hours
Child:
100-200mg every 8 hours

AND
Amoxicillin oral:
Adult:
500mg every 8 hours for 7days
Child:
6-12 years: 250mg every 8 hours for 7 days
1-5 years 125mg every 8 hours for 7 days,
<1 year: 62.5mg every 8 hours for 7days

OR
Metronidazole oral
Adult:
400mg every 8 hours for 7 days
Child:
100-200mg every 8 hours for 7days

Referral
Dentist for definitive treatment

Prevention
- Practice good oral hygiene

Pulpitis

Pulpitis is the inflammation of dental pulp tissue.

Types
- **Reversible**: pulpal inflammation which should resolve once the aetiology is removed (defective restoration or caries).
- **Irreversible pulpitis:** pulpal inflammation which will not resolve once the aetiology is removed.

Causes
- Infection
- Trauma physical Irritation
- Chemical irritation
- Mixed microorganisms.

Signs and symptoms
- Reversible pulpitis
    - Caries
    - Exposed dentin
    - Non-lingering pain to temperature (hot or cold) or osmotic changes

- Irreversible pulpitis
    - Deep caries
    - Intense, lingering pain to temperature changes
    - Spontaneous pain
    - Diffuse or referred pain

Investigations
- Intraoral examination to check for exposed dentin, caries, a deep or defective restoration, or trauma
- Percussion test to rule out acute apical periodontitis
- X-ray
- Electric Pulp tester
- Ethyl Chloride spray

Treatment objectives
- Relieve pain
- Treat inflammation
- Exclude pulp from stimulus in reversible pulpitis
- Extirpate pulp in irreversible pulpitis

Non-pharmacological treatment
- Indirect & direct pulp capping
- Conventional fillings – Amalgam and Composite filling
- Root canal therapy
- Extraction

Pharmacological treatment

Paracetamol oral
Adult:
500mg-1g every 6-8hours
Child:
6-12years: 250-500mg every 6-8 hours
1-5years: 120-250mg every 6-8 hours,
3months-1year: 60-120mg every 6-8 hours when required

OR

Ibuprofen oral
Adult:
200-400mg every 8 hours
Child:
100-200mg every 8 hours

Antibiotics may only be used if there is indication of bacterial infection
Amoxicillin oral:
Adult:
500mg every 8 hours for 7days
Child:
6-12 years: 250mg every 8 hours for 7 days
1-5 years 125mg every 8 hours for 7 days,
<1 year: 62.5mg every 8 hours for 7days

OR
Metronidazole oral
Adult:
400mg every 8 hours for 7 days
Child:
100-200mg every 8 hours for 7days

Referral
Dentist for definitive treatment

Prevention
- Practice good oral hygiene
- Regular and prompt dental check up
- Prevent dental caries

Mandibular Fractures

This is the fracture of the lower jaw . This can either be opened or close fractures.

Causes
- Motor vehicle accidents
- Assaults
- Sports-related injuries
- Falls

Signs and symptoms
- Bleeding from the mouth
- Ecchymosis
- Bone discontinuity
- Step deformity
- Swelling
- Improperly aligned teeth
- Decreased ability to open the mouth
- Pain
- Speech difficulty

Investigations
- Physical examination
- X-ray
- CT scan

Treatment objectives
- Reduce and fix fractured bone
- Relieve pain
- Prevent infection

Non-pharmacological treatment
- Reduction and fixation of fracture

Pharmacological treatment
- Pain medications reference (WHO pain ladder for further treatment)

- Anti-tetanus .
- Antibiotics if suspected bacterial infection. (Ampicillins, Amoxicillins plus Metronidazole)

Referral

- Oral and maxillofacial surgeon for unstable fractures.

Ludwig's Angina

Ludwig's Angina is a rare and often fatal soft-tissue infection (a form of cellulitis) of the neck and floor of the mouth, which is known for aggressively progressing and compromising the airways. It is a surgical emergency.

Causes

- Untreated tooth infection
- Trauma or laceration in the mouth
- A recent tooth extraction
- Oral ulcerations
- Infections of oral malignancy

Signs and symptoms

- Swelling of the neck
- Tongue swelling that causes tongue to push against your plate
- Difficulty swallowing or drooling
- Difficulty breathing
- Neck pain

Complications

- Blockage of the airway
- Sepsis
- Septic shock

Investigations

- Physical examination
- MRI
- CT scan

Treatment objectives

- Secure the airways
- Treat infection

Non pharmacological treatment

- Surgical Intervention

Pharmacological treatment

Co-Amoxiclav IV
Adult:
1.2g every 8 hours
Child:
Neonates and Premature Infants 25mg/kg every 12 hours
Infants up to 3months: 25mg/kg every 8 hours
3month – 12years: 25mg/kg every 8 hours increased to every 6 hours in more severe infections

AND
Gentamicin IV
Adult:
3-5mg/kg daily in divided doses every 8 hours
Child:
Up to 2weeks: 3mg/kg every 12 hours
2wks to 12years: 2mg/kg every 8 hours.

Referral

- Refer to the Oral and Maxillofacial Surgeon

Prevention

- Treat all dental infections promptly

Aphthous Ulcers

Aphthous Ulcers are recurrent ulcers that occur on the mucous membrane of the oral cavity.

Causes

- Stress
- Poorly fitting dentures
- Sharp or broken tooth
- Burning mouth on hot food or beverages
- Sodium lauryl sulphate – an active ingredient in some toothpastes and mouthwashes

Signs and symptoms

- Appearance of round lesions that have red edges and are yellow, white, or gray in the middle
- Burning or tingling sensation inside the mouth
- Painful sores
- Recurrence is common

Investigations

- Physical examination
- Swabs and blood test

Treatment objectives

- Remove irritating factors
- Speed up healing process
- Relieve pain
- Reduce chance of recurrence

Non-pharmacological treatment

- Most ulcers will heal completely without any intervention
- Treat symptomatically

Pharmacological treatment

Paracetamol oral
Adult:
500mg-1g every 6-8 hours
Child:
6-12years: 250-500mg every 6-8 hours
1-5years: 120-250mg every 6-8 hours,
3months-1year: 60-120mg every 6-8 hours when required

OR
Ibuprofen oral
Adult:
200-400mg every 8 hours
Child:
100-200mg every 8 hours

- If the cause is as a result of vitamins deficiency; give nutritional supplements such as folic acid, **vitamin B-6**, **vitamin B-12 and zinc**
- **Antiseptic mouthwash or spray**
- Topical **analgesic.** Topical (gels, creams or inhalers) or systemic steroids may be used to reduce inflammation.

Prevention

- Maintaining good oral hygiene with daily brushing and flossing
- Avoiding hot foods and beverages
- Avoiding triggers of previous occurrence

Glossitis

Glossitis is an inflammation of the tongue characterized by a smooth surface and redness. It can be a sign of local conditions (e.g., allergic reaction, injury) or systemic conditions (e.g., Sjögren syndrome, vitamin deficiencies).

Causes

- Nutritional deficiencies, such as lack of iron, folate or other B vitamins
- Allergy to food or medication
- Bacterial, yeast, fungal or viral infections
- Trauma, such as a burn or abrasion
- Alcoholism and tobacco use
- Eating spicy or hot foods
- Acid reflux
- Dry mouth

Types

- Acute glossitis-it develops usually during an allergic reaction
- Chronic glossitis- Recurring due to underlying health condition
- Atrophic glossitis- typically gives the tongue a glossy appearance and may occur when papillae are lost

Signs and symptoms

- Inflammation of the tongue
- Loss of papillae on the surface of the tongue
- Difficulty with chewing, swallowing or speaking
- Burning sensation
- Pain or tenderness in the tongue
- Change in the colour of your tongue
- Loss of papillae on the surface of your tongue

Investigations

- Physical assessment of the tongue
- Samples of the saliva and blood laboratory test

Treatment objectives

- Reduce inflammation
- Relieve pain
- Restore tongue to normal

Non-pharmacological treatment

- Salt and water gargle

Pharmacological treatment

Paracetamol oral
Adult:
500mg-1g every 6-8 hours
Child:
6-12years: 250-500mg every 6-8 hours
1-5years: 120-250mg every 6-8 hours,
3months-1year: 60-120mg every 6-8 hours when required

OR
Ibuprofen oral
Adult:
200-400mg every 8 hours
Child:
100-200mg every 8 hours

Antibiotics may only be used if there is indication of bacterial infection
Amoxicillin oral:
Adult:
500mg every 8 hours for 7days
Child:
6-12 years: 250mg every 8 hours for 7 days
1-5 years 125mg every 8 hours for 7 days,
<1 year: 62.5mg every 8 hours for 7days

OR
Metronidazole oral
Adult:
400mg every 8 hours for 7 days
Child:
100-200mg every 8 hours for 7days

Parotid Gland Enlargement

Parotid Gland Enlargement is a swollen parotid gland.

Causes

- Salivary stones, or sialoliths
- Viral infections such as mumps, flu etc.
- Bacterial infections

Signs and symptoms

- Inflammation
- Abscess (pus collection)
- Appearance of a ''chipmunk cheeks''
- Tender and painful lump in the cheek
- Difficulty in opening the mouth, speaking, chewing or swallowing
- Fever, chills and general weakness

Investigations

- Ultrasound
- CT scan
- MRI

Treatment objectives

- Relieve pain
- Reduce inflammation
- Restore normal salivary gland structure

Non-pharmacological treatment

- Apply warm compress to affected area for 10-15minutes several times daily
- Rinse mouth with warm salt water
- Manual removal of stones by warm compresses
- Sour foods/ fruit (Lemon)to increase the flow of saliva

Pharmacological treatment

Paracetamol oral
Adult:
500mg-1g every 6-8 hours
Child:
6-12years: 250-500mg every 6-8 hours
1-5years: 120-250mg every 6-8 hours,
3months-1year: 60-120mg every 6-8 hours when required

OR
Ibuprofen oral
Adult:
200-400mg every 8 hours
Child:
100-200mg every 8 hours

Antibiotics may only be used if there is indication of bacterial infection
Amoxicillin oral:
Adult:
500mg every 8 hours for 7days
Child:
6-12 years: 250mg every 8 hours for 7 days
1-5 years 125mg every 8 hours for 7 days,
<1 year: 62.5mg every 8 hours for 7days

OR
Metronidazole oral
Adult:
400mg every 8 hours for 7 days
Child:
100-200mg every 8 hours for 7days

Referral
Refer to a dental specialist for further management
Prevention
- Continuous rehydration and sipping of fluids throughout the day
- Good oral hygiene

Oral Cancer

Cancer of the lining of the lips, mouth, or upper throat.
Causes
- Tobacco smoking
- Heavy alcohol intake of alcohol
- Human papilloma virus 16 and 18
- Radiation and UV light

Signs & Symptoms
- Swellings/thickenings, lumps or bumps, rough spots/crusts/or eroded areas on the lips, gums, or other areas inside the mouth
- The development of velvety white, red, or speckled (white and red) patches in the mouth
- Unexplained bleeding in the mouth
- Unexplained numbness, loss of feeling, or pain/tenderness in any area of the face, mouth, or neck
- Persistent sores on the face, neck, or mouth that bleed easily and do not heal within 2 weeks
- A soreness or feeling that something is caught in the back of the throat
- Difficulty chewing or swallowing, speaking, or moving the jaw or tongue
- Hoarseness, chronic sore throat, or change in voice
- Ear pain
- A change in the way your teeth or dentures fit together
- Dramatic weight loss

Investigations
- Physical Examination
- Biopsy

Treatment objectives
- Surgery
- Radiation Therapy
- Chemotherapy

Referral
- Oncologist for cancer management

Prevention
- Reduce intake of tobacco
- Eliminate or ensure moderate alcohol consumption
- Avoid excessive sun exposure to lips
- Regular dental check up

Oral Lymphoma

A hematologic cancer characterized by a discrete tumour mass in the lymph nodes. The two main categories of lymphomas are Hodgkin's lymphomas (HL) and the non-Hodgkin lymphomas.

Causes
- Unknown

- Risk factors are:
    - Age : above 55years (Non- Hodgkin), young adults(Hodgkin)
    - Sex: Male
    - Infection with Epstein–Barr virus and
    - History of the disease in the family.
    - Impaired Immune System

Signs and symptoms

- Swollen glands (lymph nodes), often in the neck, armpit, or groin that are painless
- Night sweat
- Weight loss
- Shortness of breath
- Persistent fatigue
- Itching
- Fever

Investigations

- Bone marrow aspiration or biopsy
- Chest X-ray
- MRI
- Blood tests

Treatment objectives

- Chemotherapy
- Radiation therapy
- Immunotherapy

Referral

- Oncologist for cancer management

Oral Thrush

Oral thrush is a localized, mucocutaneous Candida infection characterized by white plaques in the oral cavity that can be scraped off, resulting in red, inflamed, or bleeding areas.

Cause

- Candida albicans

Signs and symptoms

- Creamy white, cottage cheese-like lesions on the tongue, cheeks palates, gum and tonsils
- Redness, irritation and pain under dentures (denture stomatitis)
- Slight bleeding if lesions are rubbed or scraped
- Cracking and redness at the corners of your mouth
- Redness, burning or soreness associated with difficulty in eating or swallowing

Differential diagnosis

- Aphthous ulcers

Complications

- Systemic candida infections

Investigations

- Physical examination of the mouth
- Microscopic evaluation and cultural sensitivity of swab sample
- Blood test to identify any possible underlying medical conditions
- Biopsy and histopathological examination

Treatment objectives

- Restore oral health

Non-pharmacological treatment

- Clean baby's mouth and mother's nipple with clean soft wet towel before feeding

Pharmacological treatment

Adult:

Nystatin oral tablets
500,000-1,000,000 IU every 6 hours for 10 days (chewed then swallowed)

Child:
Nystatin oral suspension
< 5 years: 100,000 IU every 6 hours for 10 days
5-12 years: 200,000 IU per dose every 6 hours for 10 days

Note
Avoid feeding the baby for 5-10minutes after administration of nystatin

Prevention
- Sterilize feeding bottles after each use
- Rinse mouth after eating or taking medicine
- Brush teeth at least twice a day and floss daily
- Removal of dentures at bedtime.
- Treat dry mouth.

Acute Necrotizing Ulcerative Gingivitis (ANUG)

Acute necrotizing ulcerative gingivitis (ANUG) is a serious infection of the gums that causes ulcers, swelling, and dead tissues in the mouth.

Causes
- Fusiform and Spirochete bacteria.

Signs and symptoms
- Acutely and severe gum pain.
- Excessive salivation
- Sometimes overwhelmingly foul breath (fetor oris)
- Profuse gum bleeding that requires little or no provocation.
- Interdental papillae are ulcerated with dead tissue

Differential diagnosis
- Primary herpetic gingiva-stomatitis

Investigations/Diagnosis
- Clinical evaluation
- Smear for fusospirochete bacteria

Treatment objectives
- Treat Infection
- Restore oral health

Non-pharmacological treatment
- Primary first-line
  - Proper Oral hygiene; twice daily brushing and daily flossing
- Debridement
- Sequestrectomy

Pharmacological treatment

For systemic signs of infection
A**moxicillin** oral
500 mg 3 times daily for 10 days

AND
Metronidazole oral
400mg three times daily for 10 days

OR
Amoxicillin/clavulanic acid oral
500 mg/125 mg three times daily for 10 days

OR
Amoxicillin/clavulanic acid oral
875 mg/125 mg two times daily for 10 days

OR
Clindamycin oral
150-300 mg three times daily for 10 days

OR
Doxycycline oral
100 mg two times daily for 10 days

Adjunctive therapy includes:
- Saline rinses or **hydrogen peroxide** 3% solution or over-the-counter oxygenating mouth rinses can help to speed resolution
- **Chlorhexidine** 0.12% oral rinse 15 mL two times daily
- For patients who are human immunodeficiency virus (HIV) positive, **nystatin** rinse 5 mL 4 times daily or **fluconazole** oral 200 mg daily for 7-14 days
- Patients with ANUG should be given a **topical anaesthetic** and nonsteroidal anti-inflammatory drugs (**NSAIDs**), because pain control is very important in allowing the patient to perform good oral hygiene

Prevention
- Take proper care of teeth and gums.
- Regular dental check-up.
- Eat balanced diet

Periapical Abscess

Periapical Abscess is a localized collection of pus at the root of a tooth, usually caused by an infection that has spread from a tooth to the surrounding tissues.

Causes
- Dental caries or nonviable teeth
- Significant erosion of the pulp with bacterial overgrowth

Signs and symptoms
- Acute pain, swelling, and mild tooth elevation
- Exquisite sensitivity to percussion or chewing on the involved tooth
- Swelling in surrounding gingiva, buccal, lingual or palatal regions
- Small white pustule (parulis) in gingival surface characteristic for abscesses may be observed
- Tender, swollen lymph nodes under the jaw or neck
- Sudden rush of foul-smelling and foul-tasting, salty fluid in the mouth and pain relief, if abscess ruptures
- Mobile tooth

Investigations
- Tenderness on percussion (vertical percussion)
- X-ray

Treatment Objectives
- Relieve symptoms
- Eliminate infections

Non-pharmacological treatment
- Extraction of the posterior teeth
- Incision and Drainage

Pharmacological treatment

Paracetamol
1gm oral every 6 hours for 3 days

OR
Ibuprofen 400mg every 8 hours

OR
Diclofenac 50mg every 8 hours

AND
Amoxicillin-clavulanate 875 mg oral every 12 hours for 7 days

OR
Clindamycin 300 mg oral every 8 hours for 7 days

OR
Ampicillin/Sulbactam 3g IV every 6 hours for 7 day

Prevention

- Brush teeth at least twice a day with fluoride toothpaste.
- Daily dental flossing or an interdental cleaner
- Replace toothbrush every three or four months, or when bristles are frayed.
- Regular dental check-ups and professional cleanings.
- Regular use of an antiseptic or a fluoride mouth rinse to add an extra layer of protection against tooth decay.

Dry Socket

Dry socket (alveolar osteitis) is a painful complication of tooth extraction

Causes

- Destruction of the clot that normally fills the socket due to;
    - Bacterial contamination of the socket
    - Trauma at the surgical site from a difficult extraction, as with an impacted wisdom tooth
- Predisposing factors
    - Smoking
    - Poor oral hygiene
    - Greater-than-usual trauma during the tooth extraction surgery
    - History of dry socket after tooth extraction
    - Oral contraceptives

Signs and symptoms

- Severe pain within (2-4) days following a tooth extraction exacerbated by air on the site
- Loss of blood clot at tooth extraction site, appearing as empty-looking (dry) socket
- Visible bone in the socket
- Pain that radiates from the socket to your ear, eye, temple or neck on the same side of face as the extraction
- Bad breath or unpleasant taste in the mouth

Complications

- Osteomyelitis

Investigations

- Clinical examination
- X-ray

Treatment objectives

- Reduce dental pain
- Promote healing process

Non-pharmacological treatment

- Flush extraction site with warm salt water solution
- Pack socket with gauze or a gelatine sponge coated with an antiseptic dressing

Pharmacological treatment

- To ease the pain and mild swelling, a nonsteroidal anti-inflammatory drug (NSAID), such as ibuprofen may be recommended

Prevention

- Avoid cigarettes, cigars, and any other tobacco products a day after surgery
- Minimal trauma during extraction
- Avoid rinsing and spitting a lot or drinking through a straw after tooth extraction

Traumatic Dental Injuries

Traumatic dental injuries often occur as a result of an accident or sports injury.
It may result in loosening, displacement and or loss of teeth, fracture of teeth and or bone, lacerations and bleeding.

Causes

- Falls (in sports and play) at home or school (commonest cause)
- Motor accidents.

Signs and symptoms

- Fractured tooth
- Missing tooth

Investigations

- Check for facial fractures and trauma to other sites, rule out evidence of head injury (amnesia, loss of consciousness, neurological signs)
- Intra-oral examination: Look for soft-tissue lacerations, dentoalveolar fractures and damage to teeth
- Check for tooth fragments which may be displaced in soft tissues
- Examine traumatized teeth and check mobility
- X-rays: (periapical x-ray) especially for suspected root fracture, and OPG x-ray for suspected alveolar bone fracture and jaw fracture

Treatment objectives

- Reduce pain
- Restore dentition

Non-pharmacological treatment

- Suture soft tissue wounds
- For significantly traumatized primary/deciduous teeth - Extraction with mobility and or displacement.

Pharmacological Treatment

Pain control
Paracetamol oral 1g every 8 hours for 3 days

OR
Diclofenac oral 50 mg every 8 hours for 3 days

OR
Ibuprofen oral 400 mg every 8 hours for 3 days

Referral

- Dentist and/or orthodontics or endodontic specialist for advanced management

Malocclusion

A malocclusion is a misalignment or incorrect relation between the teeth of the two dental arches when they approach each other as the jaws close.

Causes

- Childhood habits such as thumb sucking, tongue thrusting, pacifier use beyond age 3, and prolonged use of feeding bottle
- Extra teeth, lost teeth, impacted teeth, or abnormally shaped teeth
- Ill-fitting dental fillings, crowns, dental appliances, retainers, or braces
- Misalignment of jaw fractures after a severe injury
- Tumours of the mouth and jaw

Signs and symptoms

- Improper alignment of the teeth
- Alteration in the appearance of the face
- Frequent biting of the inner cheeks or tongue
- Discomfort when chewing or biting
- Speech problems, including the development of a lisp
- Breathing through the mouth rather than the nose

Investigations

- Clinical Examinations.
- Dental x-rays to determine teeth alignment
- If malocclusion is detected, it is classified by its type and severity. They are:
    - **Class 1 malocclusion - the upper teeth overlaps the lower teeth. The bite is normal and the overlap is slight. (most common)**
    - Class 2 malocclusion (retrognathism or retrognathia) - a severe overbite is present. The upper teeth and jaw significantly overlap the lower jaw and teeth.
    - Class 3 malocclusion (known as prognathism), a severe underbite. The lower jaw protrudes forward, causing the lower teeth to overlap the upper teeth and jaw.

Treatment objectives

- Mild malocclusion does not require any treatment.
- Severe malocclusion will require referral to the orthodontist

Referral

- Orthodontists; Depending on type of malocclusion, the orthodontist may initiate any of the following treatments;
    - Braces to correct the position of the teeth
    - Remove teeth to correct overcrowding
    - Reshape, bond, or cap teeth
    - Surgery to reshape or shorten the jaw
    - Wires or plates to stabilize the jaw bone

Prevention

- Prevention is difficult since most cases of malocclusion are hereditary.
- Limit pacifier and bottle use to reduce changes in the development of the jaw.
- Early detection - this may reduce the length (and severity) of the treatment needed to correct the problem.

Fluorosis (Mottling)

Fluorosis is a condition caused by excessive consumption of fluoride, typically due to very high levels in drinking water resulting in deposition of fluoride in the hard and soft tissues of the body.

Causes

- Excessive intake of fluorides from multiple sources such as food, water, air (due to gaseous industrial waste). Drinking water is the most significant source.
- Excessive use of toothpaste

Signs and symptoms

- Tiny white specks or streaks that may be unnoticeable
- Dark brown stains and rough, pitted enamel that is difficult to clean.

Investigations/diagnosis

- Physical examination of teeth and gums
- X-rays to make sure the teeth have no other defects or cavities.

Treatment objectives

- Remove surface-stained areas

Non-pharmacological treatment

- Apply over-the-counter tooth whitening products or other procedures.
- Tooth coloured (composite) fillings, veneers
- Bonding, which coats the tooth with a hard resin that bonds to the enamel

- Crowns

Prevention

- Monitor fluoride levels in drinking water
- Use of fluoride-free toothpastes in endemic areas
- For children under 6, a small pea-sized amount of toothpaste should be applied for brushing. Avoid toothpastes with flavours that may encourage swallowing
- Encourage children to spit rather than swallow after brushing.
- Keep all fluoride-containing products out of reach of young children.

Dentin Hypersensitivity

Dentin hypersensitivity also known as tooth hypersensitivity may be defined as a short or transient sharp pain of a rapid onset that arises from exposed dentin and cannot be ascribed to any other dental defect or pathology. This condition is due to wearing off of the enamel, making it thinner leading to exposure of the dentin.

Causes

- Improper tooth brushing e.g. among overenthusiastic brushers
- Tooth grinding
- Chipped or fractured tooth
- Consumption of large amount of exogenous and endogenous acids in diets
- Gingival recession due to old age or improper tooth brushing,
- Periodontal treated patients
- Bulimics

Signs and symptoms

- Sensitivity to hot, cold, sweet or very acidic foods and drinks and breathing in cold air

Differential diagnosis

- Dental caries
- Fractured or chipped enamel
- Pain as a result of irreversible pulpitis
- Post dental bleaching sensitivity

Investigations/Diagnosis

- Air/water syringe (thermal),
- Dental explorer (touch),
- Percussion testing,
- Bite stress tests, and other thermal tests such as an ice cube, and assessment of occlusion.

Treatment objectives

- Diagnose and treat cause of DH
- Reduce Dentin hypersensitivity

Non-pharmacological treatment Objectives

- Educate patient on correct method of tooth brushing,
- Apply over-the counter desensitizing toothpastes (such as potassium nitrate, strontium acetate and/or strontium chloride-containing formulations)
- Alcohol-free mouth rinse
- Root canal therapy (RCT).

Referral

- Dentist – for further management including root canal therapy (where applicable)

Eye diseases

Cataract

Cloudiness of the crystalline lens, which typically develops with age.

Causes
It may however also be caused by eye trauma, eye infections, eye inflammation, diabetes and corticosteroid use

Signs and symptoms
- Gradual, painless loss of vision
- In the early stages, feels like looking through frosted glass
- Frequent changes in eyeglass prescriptions
- Need for ever-brighter lights for reading
- Double vision in one eye
- Loss of vision when advanced
- Ophthalmoscopy (with pupil dilated): white reflex (cloudy lens), poor red reflex

Investigations
- Biometry (when surgery is to be done)
- Ocular ultrasound scan: especially in cases of trauma to exclude pathology of the posterior segment of the eye

Treatment objectives
- Improve/restore vision

Non-pharmacological treatment
- Spectacles when the cataract is immature
- Surgery

Refer for specialist care

Glaucoma

Glaucoma is a group of diseases of the optic nerve that result in loss of vision (majorly visual field) or blindness, usually due to raised intraocular pressure.
It can be classified into:
- Congenital (Buphthalmous)
- Developmental
- Acquired:
  - Primary:
    - Acute
    - Chronic
  - Secondary

Acute Glaucoma

Sudden severe elevation of intraocular pressure in one or both eyes, usually associated with decrease in vision.

Signs and symptoms

- Red eye, cloudy cornea, severe eye pain, loss of vision
- Seeing halos around objects, photophobia, headache
- Sluggish pupillary reaction, intraocular pressure usually > 40mmHg

Investigations

- Intraocular pressure measurement using a local anesthetic drop (e.g. Amethocaine, Proparacaine) with (perkin's, goldman) or without (tonopen) fluorescein strips depending on the device used.
- Central and peripheral visual field test.
- Fundoscopy to determine cup/disc ratio
- Gonioscopy to view the angle of the eye

Treatment Objectives

- Reduce pain
- Preserve vision

Pharmacological treatment

Open-angle glaucoma

Timolol Maleate
Adult
0.5% eye drops every 12 hours
Child
0.25% eye drops every 12 hours

Note:
- Not to be given to **asthmatics** or patients with a history of **bradycardia and heart failure**

OR
Betaxolol
0.25% or 0.5% instil one drop every 12 hours

In patients who comply to treatment and there is no good response

ADD
Latanoprost
0.005% one drop every 24 hours in the affected eye

Note:
- May be used as first line in patients with contraindications to beta blockers
- May be used as a second line drug in patients on beta blockers if the target IOP reduction has not been reached

Failure to respond give:
Pilocarpine Hydrochloride
2% or 4% instil one drop in the affected eye every 6 hours

> **Note:** Pilocarpine causes long standing pupil constriction so it should not be used unless a patient is prepared for glaucoma surgery or as an alternative topical treatment for patients who are contraindicated for Timolol use.
> **Consult a specialist before using it.**

In severe cases or while waiting for surgery, use
Acetazolamide oral
500mg stat, **then** 250mg oral, every 6 hours for 3 days
Child
250mg oral, stat. **Then** 125mg oral, every 12 hours for 3 days

Note:
- To prevent potassium imbalance, patient is to eat a banana every day whilst on treatment

Angle-closure glaucoma (acute)
Acetazolamide oral
500mg immediately as a single dose, followed by 250mg every 6 hours

PLUS
Timolol 0.25-0.5%, ophthalmic drops, instil 1 drop every 12 hours

Note:
- Manage the associated pain and vomiting

Prevention
- Early detection and prompt treatment
- Incorporation of glaucoma screening into the public health promotion and prevention programmes

Refer for specialist care

Xerophthalmia/Vitamin A Deficiency

A progressive eye disease with abnormal dryness of conjunctiva usually associated with deficiency of vitamin A, which can eventually lead to blindness.

Signs and symptoms
Ocular:
- Early: reduced vision at night and in the dark
- Dry eye, loss of eye sheen with conjunctival wrinkling
- Bitot spots: greyish foamy deposits of dead tissue on the conjunctivae
- Corneal ulceration and melting, corneal scar, corneal dryness
- Retinopathy
- Late: Blindness

Systemic:
- Growth retardation in children
- Dry, hyperkeratotic skin
- Increased susceptibility to infections.

Differential diagnosis
- Trachoma
- Corneal injury
- Retinitis pigmentosa

Treatment objectives
- Preserve vision
- Replenish Vitamin A Stores

Non-pharmacological treatment
- Give food with high Vitamin A content e.g. animal sources fish, liver, poultry, meat, diary products, eggs, tomatoes, carrots etc.
- Plant sources: green leafy vegetables, tomatoes, carrots, pepper, palm oil

Pharmacological treatment

Vitamin A oral
Adult
200,000 IU once daily day 1, day 2 and day 8

Note:
- In pregnant women, be careful due to risk of **teratogenicity** to unborn child.
- Treatment varies depending on the stage of disease.
- If severe (see below), risk of blindness outweighs teratogenic risk.

Pregnant Women
Dry conjunctiva or Bitot Spot
10,000 IU once daily or 25,000 IU once weekly for at least 4 weeks.

Corneal involvement
Give adult dose as above

Child
6 months – 1 year (or < 8kg):
100,000 IU once daily on day 1, day 2 and day 8
Over 1 year (> 8kg):
200,000 IU once daily on day 1, day 2 and day 8

Note:
- Vitamin A deficiency is rare in children < 6months of age who are breast fed.
- If present, give 50,000 IU once daily on day 1, day 2 and day 8.

Corneal lesions immediately give:
Tetracycline eye ointment 1%
Adult and child
Apply ointment two times daily

Note:
- Fit eye shield
- Do not give any eye drops containing a **corticosteroid**

Prevention
- Health education
- Administration of high dose vitamin A supplements to at risk children (especially those with measles)
- Appropriate and adequate nutrition
- Fortification of foods with vitamin A

Refer for specialist care

Conjunctivitis

Conjunctivitis is inflammation of the conjunctiva, which may be infectious or non-infectious.

Signs and symptoms	**Acute Bacterial**	**Viral**	**Allergic**	**Chronic, endemic trachoma**
Discharge	Purulent	Watery/none	Watery/ Mucoid	None/purulent
Itching	Mild	Mild	Marked	None/some
One or both eyes	One or both	One or both	Both	Both
Recurrences	Unusual	Unusual	Usual	Chronic

Acute Bacterial Conjunctivitis

Non- pharmacological Treatment
- Cold compress to eyes
- Good eye hygiene (regular eye wash with clean or normal saline)
- Limit exposure to contacts if infectious cause suspected

Pharmacological treatment

Adult	**Child**
Ciprofloxacin 0.3% eye drops Instil eye drops 4 times daily for 1 week **OR** **Tetracycline eye ointment** 1% Apply ointment two times daily **Adult with severe pain or photophobia** **ADD** **Cyclopentolate** eye drops	**Chloramphenicol 0.5%** eye drops, Instil eye drops 4 times daily for 1 week. **OR** **Tetracycline eye ointment** 1% Apply ointment two times daily **Child with severe pain or photophobia** **ADD** **Cyclopentolate** eye drops

Instil into the eye 3 times daily for 3 days. **PLUS** **Paracetamol** oral 1g every 6 hours as required	Instil eye drops 3 times daily for 3 days. **PLUS** **Paracetamol oral** 10-15mg/kg/dose every 6 hours as required

Note:
- Do not give any eye drops containing a **corticosteroid**

Referral
- Refer for specialist care if no improvement in 4 days

Viral Conjunctivitis

Non-pharmacological treatment
- Cold compress to eyes
- Good eye hygiene (regular eye wash with clean water or normal saline)
- Limit exposure to contacts if infectious cause suspected

Pharmacological treatment
- No pharmacological intervention since condition is self-limiting

In severe inflammation, redness and photophobia, give:

Adult & child
Diclofenac 0.1% eye drops
Instil drops 4 times daily for 1 week

PLUS
Cyclopentolate 1% eye drops
Instil eye drops 3 times daily for 3 days

Note:
Do not give any eye drops containing a **corticosteroid**

Referral
- If no improvement in 1 week, refer for specialist care

Conjunctivitis in the New Born (Neonatal Conjunctivitis)

Usually presents within the first week of birth as acute bacterial conjunctivitis. Severe infection may also be associated with:
- Fever
- Severe eye lid swelling with difficulty in opening the eyes
- Irritability, poor feeding

Tetracycline eye ointment 1% 3 times daily

PLUS

Chloramphenicol eye drops 0.5% 3 times daily

Referral
- Refer immediately to an ophthalmologist: ***this is usually a systemic condition that requires admission and treating of the mother and sexual partner(s)***.

Allergic Conjunctivitis

Inflammation of the conjunctivae due to allergic reaction. Usually it is triggered by allergens in the environment such as dust, pollen etc. There may be a family history of allergy, asthma or other atopic conditions. May be acute or chronic, seasonal or perennial.

Signs and symptoms

- Papillae formation inside the upper eye lids, hyperaemia
- Itching, watery or mucoid discharge
- Photophobia, eyelid swelling, foreign body sensation
- White deposits at the limbus (horner trantas dots)
- Shield corneal ulcer (severe cases), conjunctiva growing onto cornea (severe cases)

Treatment objectives
- Relieve symptoms
- Preserve vision
- Reduce recurrence

Non-pharmacological treatment
- Avoid allergens when possible
- Cold compress to the eyes

Pharmacological treatment

Adult and child> 6 years
Cromoglycate sodium 2% eye drops 4 times daily for 1 month

Persistent allergic conjunctivitis

Adult and children >6 years of age:
Cetirizine oral
5mg once daily

Note:
- Do not give antihistamine to children under 2years of age
- Caution in pregnant women.
- **Cromoglycate** should not use in children < 6 years old
- In case of severe of allergy i.e. in case of giant papillae or corneal involvement, a short course of steroid eye drops (dexamethasone or prednisolone acetate ophthalmic suspension) may be used.
- The dose and frequency of administration will depend on severity of the condition and this should be managed by an ***eye specialist***.

Refer for specialist care

Trachoma

Trachoma is a chronic infection caused by Chlamydia *trachomatis*. It begins as a conjunctivitis, which gets worse if left untreated. It is spread from person to person by hand or files. It is most common in developing countries where there is overcrowding, poor public utilities and poor hygiene.

Signs and symptoms

Acute	Chronic
- Tearing painful eyes - Photophobia - Watery or pus filled eyes - Hyperaemia (red eyes)	- Papillae formation inside the upper eye lids - Top edge of cornea looks grey instead of brown (pannus formation) - Papillae disappear leaving white scars - Scars distort the upper lid with subsequent inward deviation of eye lashes (trichiasis) or lid margin (entropion) - Eyelashes abrade the cornea resulting in ulcers and scarring. - Conjunctivae becomes more grey and scarred leading to partial or complete blindness

Treatment objectives
- Preserve vision
- Treat infection
- Treat the community pool
- Prevent spread of infection

Non-pharmacological treatment
- Provide education on personal and environmental hygiene
- Regular face and hands washing

Pharmacological treatment

Adult
Azithromycin oral
1g orally stat

OR
Tetracycline eye ointment 1%
Apply twice daily for 6 weeks

Note: Caution in pregnant women
Child
Azithromycin oral
20mg/kg in a single dose.

OR
Tetracycline eye ointment 1%
Apply twice daily for 6 weeks

Referral
Refer for specialist care

Retinoblastoma

This is the most common intraocular tumour of childhood. Usually affects children 1-2 years of age, but may occur later or earlier. It can affect one or both eyes. In some cases, there is a family history. It needs URGENT diagnosis and referral to an ophthalmologist since this cancer can lead to death.

Signs and symptoms
- White reflex (cat eye)
- Squint (cross eye)
- Redness, swelling/protrusion of the eye (advanced case)
- Loss of vision

Investigations
- Full blood count
- Urea & electrolytes
- Liver function tests
- Bone marrow aspiration/biopsy
- Cerebrospinal fluid examination for microbiology, biochemistry and cytology
- Ultrasound scan of the eye
- Magnetic resonance imaging of the eye
- Examination under anaesthesia using indirect ophthalmoscopy and retinal camera

Treatment objectives
Objectives will depend on the stage of the disease.
- Preserve the life of the child
- Preserve the globe and vision

Non-pharmacological treatment
- Nutritional support
- Symptomatic and palliative care as necessary

Pharmacological/surgical/radiation treatment
Management will depend on the stage of the tumour. Treatment options include one or more of the following:
- **Enucleation**
- **Chemotherapy:** Vincristine, Etoposide and Carboplatin (VEC protocol)
- Radiotherapy

Note
Pancytopenia is the main side effect of chemotherapy. If necessary, give Filgrastim.

Prevention
- Counselling for the family: awareness and monthly follow up of siblings is important for early detection.

Referral

Refer all cases for specialist care: ophthalmologist, paediatrician, oncologist, counsellor nutritionist, and others as appropriate.

Iritis/Uveitis

This is inflammation of the vascular coat of the eye (uvea), which may be the iris, ciliary body and/or choroid. It can be caused by trauma to the eye, disease (ankylosing spondylitis, Reiter's syndrome, psoriasis) and infections (include ebola, toxoplasmosis, herpes zoster). It requires **URGENT** referral to an eye specialist.

Signs and symptoms

- Red eyes
- Photophobia
- Tearing
- Blurred vision
- Eye pain, worse on exposure to light
- Headache
- White spots on the cornea
- Small or funny shaped pupils
- Cloudy lens (cataract)
- High or low intraocular pressure
- Cloudy vitreous
- Retinal inflammation or detachment

Investigations

- Intraocular pressure
- Ultrasound scan of the eye
- Specific blood tests, if necessary to detect specific causes
- Chest radiograph to exclude sarcoidosis and tuberculosis
- **Serology for rheumatoid factor, antinuclear antibody**

Treatment objectives

- Relieve symptoms
- Preserve vision
- Identify underlying cause(s) in cases of recurrence

Non-pharmacological treatment

- Sunglasses
- Replenish potassium stores if on acetazolamide (e.g. with bananas)

Pharmacological treatment

Adult and child
Prednisolone eye drops 1% 4 times daily (can increase up to every 2 hours if severe)

PLUS
Cyclopentolate eye drops 1% 3 times daily

If intraocular pressure is high
ADD
Timolol maleate eye drops twice daily

If pressure > 40mmHg
ADD
Acetazolamide tablets
Adult:
500mg stat, then 250mg 4 times daily for 3 days.
Child:
< 12 years
250mg stat, then 125mg 4 times daily for 3 days.

Note:

- Prednisolone can lead to raised intraocular pressure, cataract and increased risk of eye infection.
- Acetazolamide depletes potassium stores. Tell the patient to eat a banana a day to replenish potassium stores.

OR
Dexamethasone 0.1% eye drops

Adult and child
Instil drops 4 times daily (can increase up to every 2 hours if severe)

Note:
- Dexamethasone can lead to raised intraocular pressure, cataract and increased risk of eye infection

Referral
Refer **URGENTLY** to an ophthalmologist. Severe cases may require systemic treatment such as corticosteroid tablet and antibiotics.

Keratitis
Is the inflammation of the cornea.

Causes
- Infection: bacterial, viral, or fungal
- Trauma: chemical, foreign bodies

Signs and symptoms
- Redness and tearing, blurring of vision, photophobia, acute unilateral painful eye.
- Dendritic corneal ulcer seen on staining with fluorescein.

Full ocular examination and fluorescein stain are required to confirm diagnosis

Investigations
- Pus swab for microscopy, culture and sensitivity
- Corneal scraping for microscopy, culture and sensitivity

Pharmacological treatment

Bacterial	Viral	Fungal
Gentamicin eye drops instil drops every 1-2 hours until infection is controlled **OR** **Ciprofloxacin** 0.3%, ophthalmic drops, instil 1 drop every hour for 3 days, then reduce to 1drop every 3-4 hours.	**Acyclovir** 3% ophthalmic ointment Apply every 4 hours. Continue for 3 days after ulcer has been healed **PLUS** **Acyclovir**, oral 400mg h for 7-10 days depending on the initial response as well as the extent of the ulcer **Note:** Topical corticosteroids are contraindicated	5% **Natamycin** ophthalmic suspension Instil one drop every 1-2 hours for 3-4 days, continue for 14-21 days until infection is eradicated.

Treatment of non-infectious keratitis
Artificial tear drops. However, if keratitis is causing significant tearing and pain, a 24-hour eye patch and topical eye medications may be necessary.

Refer to ophthalmologist for specialist care

Orbital cellulitis

Is a sudden acute inflammation of the tissues around the eye

Causes
- Children: most common cause is post sinus infection by Haemophilus influenzae
- Adults: common causes are Staphylococcus aureus, Streptococcus pneumoniae, and beta-haemolytic streptococcus, bacteroides species
- Sinus infection, tooth extraction, orbital trauma may be the trigger

Signs and symptoms
- Swollen eyelids, purulent nasal discharge may be present
- Fever and headache
- Pain in the eye especially on eye movement, decrease vision
- Conjunctival chemosis and injection,
- Proptosis

Differential diagnosis
- Infection: cavernous sinus thrombosis
- Endocrine dysfunction: dysthyroid exophthalmos
- Idiopathic inflammation: orbital myositis, orbital pseudo tumour, Wegener's granulomatosis
- Neoplasm with inflammation, e.g. Burkitt's lymphoma

Investigations
- Full blood count, ESR
- Blood culture
- Assessment of purulent nasal discharge or from the abscess (swab for microscopy, culture and sensitivity)
- CT Scan and MRI will help differentiate it from other diseases

Treatment objectives
- Achieve normal body temperature
- Treat infection
- Relieve pain

Patient must be hospitalized

Non- pharmacological treatment
- Adequate hydration
- Other supportive care measures

Pharmacological treatment

Ampicillin/cloxacillin
Adult:
1g IV stat then 500mg 6hrly for 2 weeks
Child
***> 1month old*:** 50mg/kg IV 8hrly for 7-14days
***≤ 1 month old*:** 25-50mg/kg, IV 8hrly for 7-14days

PLUS
Gentamicin IV
Adult
160mg once a day for 7days
Child
***> 1month old*:** 7.5mg/kg IV, once a day for 5-7days
≤ 1 month old: 5mg/kg, once a day for 5-7days

PLUS
Metronidazole
Adult:
500mg IV 8hrly for 7 days
Child:
> 1 month old: 7.5-15mg/kg 6hrly for 7-10days

PLUS
Analgesic/non-steroidal anti-inflammatory medicines
Ibuprofen oral
Adult:
400mg-800mg 6-8hrly, not to exceed 3.2g/day
Child:
30-40mg/kg per day in 3-4 doses

OR
Paracetamol
Adult:
1g 4-6hrly to a maximum of 4 doses per 24 hours, for 3days
Child:
10-14mg/kg for 3 days

Note: Do not use ibuprofen in patients with bleeding disorders or peptic ulcers

Refer to Ophthalmologist for specialist care

Stye (Hordeolum)

This is a localized infection of the eyelids. It can be external (stye: abscess of gland of Zeis on the lid margin) or internal (abscess of meibomian gland).

Cause
- Staphylococcus aureus

Signs and symptoms
- Itching in the early stages
- Swelling pain and tenderness, pus formation
- May rupture spontaneously

Differential diagnosis
- Other infections of the eyelids
- Blepharitis

Non-pharmacological treatment
- Apply warm compress to the eye

Pharmacological treatment
- Apply Tetracycline eye ointment 1% 2-4 times daily until 2 days after symptoms disappear

Prevention
- Remove any loose eyelashes
- Good personal (eye) hygiene

Refer to Ophthalmologist for specialist care

Endophthalmitis

This is an infection of the ocular cavity. It is an ophthalmic emergency that can cause blindness. It may occur secondary to bacteraemia or following penetrating eye injury or surgery.

Causes
- Perioperative introduction of microbial organisms into the eye

Signs and symptoms
- Redness
- Eyelid swelling.
- Pain
- Decrease in visual acuity
- Loss of vision

Investigations
- Vitreal scraping for microscopy, culture and sensitivity

Treatment objectives
- Relieve pain
- Treat infection

Pharmacological treatment

Endogenous endophthalmitis
Ceftriaxone IV
2g once daily for 7days
Note:
- Adjust antibiotics according to culture and sensitivity

PLUS
Vancomycin 1mg/0.1 mL
Administer intravitreal and repeat after 72 hours

Note:
Administer using **separate** tuberculin syringes

Post-surgical endophthalmitis
Ceftazidime 2.25mg/0.1ml intravitreal
Administer intravitreal and repeat after 16-24 hours

PLUS
Vancomycin 1mg/0.1 mL
Administer intravitreal, repeat after 72hrs.

Note:
Administer using separate tuberculin syringes

If there is soft tissue involvement or as a prophylaxis after a penetrating injury

ADD
Ciprofloxacin oral
750mg 12hrly for 7days

Treatment should be specialist-initiated; vitrectomy is often required

Scleritis/Episcleritis

This is inflammation of the superficial, episcleral layer of the eye or inflammation of the sclerae.

Signs and symptoms

Episcleritis	Scleritis
- Acute onset of redness with discomfort (more gradual in nodular episcleritis) - May present late as symptoms are mild - Discomfort, grittiness, aching in or around the eye - Very rarely, marked pain - 40% bilateral - Localised or diffuse red eye - Watering and occasional mild photophobia - Corneal involvement is possible but rare - Up to 10% of cases have an associated anterior uveitis	- Subacute or gradual onset (in *scleromalacia perforans* and posterior scleritis there may be no anterior redness) - Boring eye pain, often radiating to the forehead, brow and jaw and usually severe. Worse in necrotizing scleritis; may be mild or absent in *scleromalacia perforans* - Pain worse with movement of the eye and at night (may wake the patient) - 50% is bilateral - Localised or diffuse red eye - Associated watering, photophobia - No discharge - Gradual decrease in vision - Diplopia - Systemic symptoms (fever, vomiting, headache) - May be associated with: corneal involvement, glaucoma, uveitis, retinal detachment, cataract formation and rapid onset refractive changes

Differential diagnosis

- Each is in the differential diagnosis list for the other
- Uveitis
- Conjunctivitis
- Contact lens-related problem

Posterior scleritis has a more extensive list of differential diagnosis including:

- Optic neuritis
- Retinal detachment
- Tumours of the choroid
- Orbital inflammatory disease

Investigations for episcleritis (after thorough history)

- Biochemical tests (FBC and inflammatory markers, rheumatoid screen, syphilis screen)

Investigations for scleritis

- Biochemical tests (FBC and inflammatory markers, rheumatoid screen, syphilis screen)
- Urine dipstick for blood and protein
- Plain radiographs (eyes), MRI or CT Scan (sinuses and orbits)

Treatment objectives for Episcleritis/Scleritis

- Relieve symptoms
- Prevent complications

Non-pharmacological treatment of Episcleritis/Scleritis

- Artificial tears may provide some relief, particularly in nodular disease

Pharmacological treatment of Episcleritis/Scleritis

Topical ophthalmic

Prednisolone 0.5%
OR
Dexamethasone 0.1%
OR
Betamethasone 0.1%
Apply daily to affected part

Systemic Non-steroidal anti-inflammatory medicines (NSAIMS)

Ibuprofen oral
400mg four times daily

OR
Naproxen
500mg three times daily

For patients who do not respond to the above treatment after one month, give:

Prednisolone oral
80mg once daily for at least one month in a tapering dose

Note:
Long term therapy with steroids should be avoided because of danger of inducing cataracts, glaucoma and systemic complications

Refer to ophthalmologist for specialist care

Corneal Ulcer

This is a painful red eye condition resulting from a raw discontinuity to the corneal epithelium

Causes
- Infection (bacterial, viral e.g. Herpes simplex and measles, fungal)
- Trauma (physical or chemical)
- Nutritional (Vitamin A deficiency)

Signs and symptoms
- Painful and red eye of acute onset
- Excessive tearing, severe photophobia, poor vision
- Grey/white spot on the cornea staining with fluorescein
- Hypopyon (pus or white cells in the anterior chamber)

Examination of the eye
In specialized eye units, the following should be done:
- Examination of the eye with slit lamp microscope
- Fluorescein sodium drops or a drop of local anaesthetic on a fluorescein strip to assess the pattern of the ulcer and measure the size of the corneal defect

Investigations
- Corneal scrapping for Gram stain, microscopy and potassium hydroxide staining if bacterial and fungal organisms are suspected

Pharmacological treatment

While waiting for laboratory results, give:
Ciprofloxacin 0.3%, ophthalmic drops, instil 1-2 drops every hour for 3 days then reduce to every 3-4 hours from 3-14 days

OR
For suspected or confirmed fungal infection
Natamycin 5% ophthalmic drops
Instil 1 drop every 1-2 hours for 3-4 days (specialist use only).
Then reduce to 1 drop every 3-4 hours. Continue for 14-21 days until resolution of infection

OR
Chlorhexidine 0.2% ophthalmic drops
Instil 1 drop every 1-2 hours for 3-4 days (specialist use only).
Then reduce to 1 drop every 3-4 hours. Continue for 14-21 days until resolution of infection

Antiviral for suspected viral causes
Acyclovir 3% eye ointment
Administer every 5 hours until there is no corneal stain, then continue with treatment every 8 hours for a maximum of 10-14 days
Note:
Treatment may be changed depending on corneal scrapping results

Referral
- Refer for specialist ophthalmological care

Diseases of the Retina

Main diseases of the retina that cause blindness are diabetic retinopathy, diabetic macular oedema, retinal detachment and age-related macular degeneration

Diabetic Retinopathy

This is a complication of diabetes mellitus resulting in chronic, progressive, sight-threatening disease of the retinal blood vessels associated with prolonged hyperglycaemia and other conditions linked to diabetes mellitus.

Signs and symptoms

- Sudden painless loss of vision or gradual and progressive loss of vision

Conduct a thorough eye examination

Investigations/other examination

- Fundus photography, optical coherence tomography, fluorescein angiography

Note:

- Dilate the pupils with combined **Tropicamide** 1% and **Cyclopentolate** 1% eye drops

Pharmacological treatment

Antioxidant in non-proliferative diabetic retinopathy
Multivitamin + Carotenoid tablets once daily to a maximum of 3 months

In proliferative disease give:
Intravitreal anti-vascular endothelial growth factor (**anti-VEGF**):

Ranibizumab
0.3 mg per 0.05mL stat

Note:

- Repeat after every month to a maximum of 6 months.
- Re-assess on 3-monthly basis.
- If there are signs of disease progression, restart treatment, with close follow up.

PLUS
Triamcinolone Acetonide
4 mg/0.1mL intravitreal stat. Repeat after 3 months if necessary

Note:

- These injections should only be given by ophthalmologists

Surgical Treatment

- This is done in the proliferative stage
- It involves removal of vitreous and/or blood, peeling of formed fibrovascular tissue and re-attachment of retina. If the retina is detached it is combined with retinal photocoagulation
- The vitreous cavity may be filled with tamponade liquid such as silicon oil or expansile gas like sulphur perfluoro propane or hexafluoride depending on the level of complication
- It may also be combined with pharmacological treatment (Anti-VEGF) mentioned above

Laser Treatment

- Laser photocoagulation: extent and type of this treatment depends on the stage of the disease

Note

- Ophthalmologists should work together with physicians to holistically treat the diabetic patient
- Poorly controlled diabetes and diabetic retinopathy can lead to blindness
- All patients with diabetes regardless of their eye conditions, should have a thorough eye examination by available eye care personnel or an ophthalmologist at least once a year
- Dilated eye examination and direct viewing of the retina by an ophthalmologist or qualified eye care personnel is mandatory

Referral

- There should be urgent referral of all diabetic patients with sudden loss of vision to eye specialist

Age Related Macular Degeneration

It is a disease condition characterized by progressive macular changes that are associated with increase in age

Investigations

- Drusens around macular areas (yellowish excrescence in the retina)
- Affects elderly over 60 years
- Poor central vision
- Later can lead to blindness

Investigations

- Fundoscopy through a well-dilated pupil
- Optical coherence tomography and/or fluorescein angiography

Pharmacological/surgical treatment

Intravitreal injection in the affected eye
Ranibizumab 0.5mg per 0.05ml stat

Give antioxidant in non-proliferative diabetic retinopathy
Multivitamin + Beta-Carotenoids, Zinc Sulphate and Lutein
1 tablet once daily to a maximum of 3months

Surgical Treatment
Type of surgery depends on the presentation/stage of the disease

Refer to Ophthalmologist for specialist care

Refractive Errors

This is the inability of images to be focused properly on the retina. The most common ones are long sightedness, short sightedness, presbyopia and astigmatism.

Refractive error	Causes	Signs and symptoms
Hypermetropia, long-sightedness or far-sightedness, also termed hypermetropia can be physiological (axial or refractive) or pathological (mal-development, anatomical or drug-induced)	Axial aetiology (length of the eye, small eyes Refractive aetiology (power of the eye) Trauma Paralysis of accommodation	Blurred vision, eye strain Lazy eye Squint/crossed eye Headaches
Myopia, short-sightedness or near-sightedness. It can be simple (length and power), pathological/degenerative (mal-development) or pseudo myopia	Axial aetiology (length 0f the eye, big eyeball) Refractive aetiology (power of the eye) Ocular disease, e.g. keratoconus Trauma	Blurred distance vision Flashes & floaters (high myopia) Asthenopia (eye strain, headaches etc.)
Presbyopia – an age-related visual impairment. It results from the gradual decrease in accommodation expected with age, and can have multiple effects on quality of vision and quality of life	Age (35-40years) Hyperopia (accommodative demand, especially if uncorrected) Ocular disease/trauma (removal or injury to lens, ciliary body or zonules) Systemic diseases (diabetes, etc.) Drug side effects Occupation (near vision demands)	Blurred near vision Difficulty seeing at usual near working distance Asthenopia (fatigue, eye strain, headaches etc.) Drowsiness Diplopia (double vision)
Astigmatism: a condition where the cornea and sometimes the lens has different radius of curvature in all meridians (different focus in different planes). Some myopic and hyperopic patients may have astigmatism	Same causes as hypermetropia and myopia	Poor vision at distance Photophobia Headache (sometimes) Diagnosis reached through refraction

Investigations
- History (blurred vision, asthenopia, etc)
- Visual acuity (distance, near and pinhole), refraction
- Ocular motility, binocular vision and accommodation
- Ocular health assessment (slit lamp, fundus assessment)

Treatment
- Optical correction with spectacles or contact lenses
- Vision therapy/orthoptics (for pseudo myopia)
- For presbyopia: multifocal lenses
- Refractive surgery

Low Vision

This loss of eyesight that makes everyday tasks difficult, which cannot be corrected with surgery or spectacles

Causes
- Congenital (e.g. prenatal or postnatal trauma, genetic or development abnormalities)
- Hereditary (e.g. retinitis pigmentosa or Stargardt's macular degeneration)
- Acquired conditions (e.g. ocular infection or disease, trauma, age-related changes, or systemic disease)

Signs and symptoms
- Loss of the ability to read standard-sized print
- Difficulty performing work-related tasks or leisure activities
- Inability to recognize faces or familiar people
- Visual activity in a range from <6/18 to perception of light and reduced central visual field

Investigations
- History, visual acuity
- Refraction, ocular motility, binocular vision assessment
- Visual field assessment
- Ocular health assessment: external examination, slit lamp examination, tonometry, fundoscopy with dilated pupils

Treatment (after appropriate evaluation)
- Provide spectacles if indicated
- Low vision devices such as optical devices (magnifier telescope) and/or non-optical devices (reading stands and/or reading slits) as per assessment results
- Surgical intervention is indicated e.g. if the patient has cataract

Note: Refer to ophthalmologist for specialist care

Vision loss

Vision loss refers to the partial or complete loss of vision

Causes
- Accidents or injuries to the surface of the eye (chemical burn or sports injuries)
- Diabetes
- Glaucoma
- Macular degeneration

Investigations
- Detailed history and physical examination

Treatment
- Rehabilitation (e.g. occupational), education, and work and social integration

Refer
- Ophthalmologist for specialist care

Corneal Foreign bodies

This is the presence of foreign material on or in the cornea

Causes
- Solids: dust, insects, metal or wood particles
- Liquids: splashes of irritating fluids

Signs and symptoms
- Pain (typically relieved with topical anaesthetics)
- Foreign body sensation (typically relieved with topical anaesthesia)
- Photophobia
- Tearing
- Red eye

Differential diagnosis
- Other eye injuries or trauma

Treatment objectives
- Relieve pain
- Prevent infection
- Prevent permanent loss of function

Non-pharmacological treatment
- Make a thin finger of moistened cotton wool, move eyelid out of the way, and gently remove foreign body
- Wash the eye with plenty of clean water or normal saline

Pharmacological treatment

Tetracycline eye ointment 1%,
Apply and cover the eye, and refer for specialist care

Refer to ophthalmologist for specialist care

Blunt Injuries

This results from striking the eye with a blunt object. It may result in minor or severe injury to the eye.

Signs and symptoms
- Eye lid swelling and subcutaneous bleeding
- Decreased visual acuity, proptosis and diplopia

Non-pharmacological treatment
- Applying cold compress maybe helpful in lid swelling

Pharmacological treatment

Assess visual acuity. If this is normal and there are no features of orbital bone fracture give
Paracetamol oral
500mg 2 tablets every 6-8 hours until pain resolves

***Referral*:** If the visual acuity is poor, pad the eye, give a pain reliever and refer urgently to specialist

Penetrating eye injury

This is injury caused by a sharp object which penetrates the cornea or sclera.

Investigations
- Plain radiograph of the orbit/face

Treatment
- A cut involving the lid margin needs to be repaired
- A cut involving the eye lid may injure the lacrimal system if located in the medial aspect of the lid

Referral
If a foreign body is in the eye, apply an eye shield to the eye, give analgesic and refer the patients immediately to an ophthalmologist

Corneal Abrasion

This is a scratch or scrape on the surface of the cornea

Causes
- Finger nails, makeup brushes

Signs and symptoms
- The feeling that something is stuck in the eye
- Red, painful, watery eyes
- Blurry or hazy vision
- Photophobia

Investigations evaluation
- Good history and physical Examination

Treatment objectives
- Reduce morbidity
- Prevent complications

Pharmacological treatment

Chloramphenicol 1% ophthalmic ointment
Apply every 8 hours to the injured eye

For deep corneal or scleral injuries:
- Cover the affected eye with a shield ***and refer immediately***

For pain:
Paracetamol
1g orally every 6-8 hours when required, up to a maximum of 4 doses per 24 hours

Referral
- Suspicion of open globe or intra-orbital penetration must be seen by an ophthalmologist

Chemical Injuries to the eye
- These are due to either acidic or alkaline substances getting in the eye

Treatment

Exposure to acid or chemical
- Irrigate the eye with **copious amount of water** as first aid treatment

At health facility:
- On arrival, commence continuous irrigation with **normal saline** to wash out the entire chemical

After irrigation of the eye
Tetracycline eye ointment
Apply and pad the eye and **immediately** refer for specialist attention

Tear gas
- Irrigate the eye with **copious amounts of water**

Squamous Cell Carcinoma of Conjunctiva (SCC)

Is a cancer on the surface of the eye that tends to occur in older people (age 60 years and above) and young adults (30-40yrs) with HIV/AIDS

Signs and symptoms
- Eye irritation, discomfort or foreign bodies sensation, red eye
- Growth or tumour on eye ball that may exhibit the following features: leucoplakia (white), flesh-colour or red patch
- Rounded, elevated growth with a gel-like appearance
- Large dilated blood vessels leading to the tumour

Note
- Squamous cell carcinoma should be suspected in cases of chronic conjunctivitis that last longer than 3 months

Investigations
- Excision (total) biopsy for histopathological examination

Differential diagnosis
- Pterygium
- Solar keratosis
- Pinguecula

Referral:
- Refer to ophthalmologist and eventually to oncologist (cancer treatment centre) for cancer care

Retinitis

This is inflammation of the retina in the eye, which can permanently damage the retina and lead to blindness.

Causes
- Toxoplasmosis
- Cytomegalovirus
- Candida
- HIV/AIDS

Signs and symptoms
- Blurred vision in just one of the eyes is an early indication of the onset of retinitis
- Loss of night vision
- Loss of peripheral vision

Investigations
- Blood or cerebrospinal fluid (CSF) should be tested for any of the causes listed above

Treatment
- Supplements such as Vitamin A, lutein, omega-3 fatty acid can be used
- Ganciclovir 2mg intravitreal once a week

Referral: Refer to ophthalmologist for specialist care

Dry eye

This occurs when there is inadequate tear volume or function

Causes
- Contact lens use
- Allergies
- Pregnancy
- Sjogren's syndrome
- Vitamin A deficiency

Signs and symptoms
- Feeling of dryness, grittiness burning and foreign body sensation usually worse during the day
- Redness, stringy discharge, and transient blurring of vision

Investigations
- Vital staining of corneal and conjunctival epithelium with fluorescein.
- Tear film osmolarity

Treatment objectives
- Reduce morbidity
- Prevent complications

Treatment

Tear substitutes

Hydroxypropyl cellulose, ophthalmic drops
Instil 1 drop every 6 hours

Onchocerciasis

This is a tissue parasitic infestation caused by a filarial worm

Cause
- Onchocerca *volvulus*

Signs and symptoms
- Itching, bumps under the skin, and blindness
- Atypical skin lesions (Leopard skin), skin inflammation with papules

Investigations
- Rapid diagnostic test (OV -16- Onchocerciasis IgG)
- Skin snip for microscopic examination
- Slit lamp eye examination

Treatment

Ivermectin oral
0.15mg/kg once every 12 months for 10-15 years

Note:
Patients with heavy ocular infestation require re-treatment every 3-6 months

For details on treatment of onchocerciasis, see chapter on worm infestations

Herpes Zoster Ophthalmicus

Occurs when Varicella z*oster* reactivates in the trigeminal ganglion and passes down the ophthalmic division of the trigeminal nerve

Cause
- Varicella *zoster* virus

Signs and symptoms
- Painful vesicular rash in the trigeminal nerve dermatomes
- Some patients develop conjunctivitis, keratitis, uveitis, retinitis and cranial nerve involvement (oculomotor and optic nerve)
- Later: chronic ocular inflammation, loss of vision, post-herpetic neuralgia

Investigations
- HIV Testing

Pharmacological treatment

Acyclovir oral
800mg every 4 hours for 7-10 days

PLUS
Amitriptyline oral
25mg at night for 3 months

If contraindicated select an appropriate alternative

Note:
- Antiviral treatment with **acyclovir** should be initiated within 3 days from the onset of symptoms
- HIV infected patients should be treated with anti-HIV medicines in addition to acyclovir

Refer to ophthalmologist for specialist care

Ear, Nose and Throat Conditions

Otitis Externa

This condition refers to the Inflammation of the external ear. This can be diffused or localized; acute or chronic; inflammatory or infectious as the case may be.

Causes

- Infections: mostly due bacteria e.g. streptococcus, staphylococcus aureus, Ps. pyocyanea, B. proteus and E. coli but may also be due to fungi e.g. Candida (whitish) or aspergilla (blackish) or herpes zoster virus.
- It may also occur in generalized allergic and seborrheic states.
- Trauma: this can be blunt or penetrating injuries

Signs and symptoms

- Pain and tenderness accentuated by movement of the tragus.
- Pre or post auricular or cervical lymphadenitis may be present.
- Swelling with obliteration of the canal lumen may occur due to inflammation causing deafness.
- Discharge (mucoid, purulent, mucopurulent, bloodstained, bloody or clear) may be offensive or odourless with or without itching.
- Fever (though uncommon) may be present.
- Redness of the canal and/ear drum with or without haematoma
- Ulceration of the external canal wall with or without granulomatous formation

Investigations

- Investigation is based on clinical features
- X-ray of the temporal bone or CT- Scan as may be required

Non-pharmacological treatment

Exclude any underlying suppurative otitis media. If suppurative otitis media is diagnosed, see Section on Otitis media, chronic, suppurative.

- Most cases recover after thorough cleansing and drying of the ear.
- Keep the ear clean and dry (dry mopping).
- Do not leave pieces of cotton wool, etc. in the ear.
- Do not instil anything into the ear unless prescribed.

Pharmacological treatment

Otitis Eterna (Furuncle)

Clinical Diagnosis	*Antibiotic*	*Duration*	*Comments*
Acute Otitis Eterna (Furuncle)	**Ciprofloxacin** oral 500mg every 12 hours **PLUS** **Tropical steroid**	5 days	
Acute Diffuse Otitis Externa (swimmers ear)	***Mild to moderate*** Topical Antimicrobial ***Severe (e.g. Cellulitis or blocked ear canal):*** **Ciprofloxacin** oral 500mg every 12 hours	7 days	
Perichondritis	***First line*** **Ciprofloxacin** oral 500mg – 750mg every 12 hours ***Second line*** **ADD** **Clindamycin** oral 450mg every 6 hours	7 days	
Malignant Otitis Externa	**Clindamycin** IV 900mg every 8 hours	4 – 6 weeks	- Ensure swabs are taken prior to starting topical therapy

Clinical Diagnosis	*Antibiotic*	*Duration*	*Comments*
	PLUS Topical treatment ***Oral Step down*** **Ciprofloxacin** oral 500mg – 750mg every 12 hours		- Switch to orals based on clinical assessment and microbiological results - Assess for any bone and intracranial extension - Discuss all cases with microbiology

Otitis Media, Acute

This refers to an acute inflammation of the middle ear, usually suppurative, occurring after an upper respiratory tract infection, rhinitis and sinusitis.

Causes
- Infections: The commonest organisms are bacteria such as Streptococcus, H. influenza; viruses e.g. Rhinovirus
- Trauma

Signs and symptoms
- Pain
- Drum perforation
- Loss of hearing
- Fever in about half of the cases
- Red bulging ear drum
- Loss of the normal light reflex of the eardrum
- Mild redness of the eardrum and rubbing the ear are not reliable signs.

Non-pharmacological treatment
- Do not instil anything into the ear.
- Avoid getting the inside of the ear wet.
- Dry mop ear if discharge is present.
- Do not plug the ear with cotton wool, etc.
- Exclude TB and HIV infections as contributing factors for recurrent ear infection.

Referral
- Severe pain, fever or vomiting, not responding to treatment after 72 hours (if otoscopy confirmed) or after 24 hours (if otoscopy unconfirmed).
- Recurrent otitis media.
- Painful swelling behind the ear or tenderness on percussion of the mastoid. Suspected meningitis.

Otitis Media, Chronic, Suppurative

A purulent discharge from the ear with perforation for > 2 weeks. If the eardrum has been ruptured for ≥ 2 weeks, a secondary infection with multiple organisms usually occurs. Oral antibiotic treatment is generally ineffective.

Causes
- Untreated or unresolved acute otitis media with a central perforation in the ear
- Recurrent ear discharge usually after Upper respiratory tract infections
- Secondary infection with gram-negative organisms, yeast and fungi.

Signs and symptoms
- A purulent discharge from the ear for more than 2 weeks, usually not foul smelling.
- Impaired hearing.
- A central perforation in the ear drum.
- TB may present with a chronically discharging ear. Consider the diagnosis of TB if other Signs and symptoms suggestive of TB are present (e.g. cough, weight loss, excessive night sweats, failure to thrive, etc.). See Section for Pulmonary tuberculosis (TB).

Non-pharmacological treatment

- Do not send pus swabs collected from the external ear canal for routine bacterial and fungal MC+S (microscopy, culture and sensitivity) or for microscopy and culture for tuberculosis.
- Explain to patients and caregivers that a chronically draining ear can only heal if it is dry.
- Dry mopping is the most important part of the treatment. It should be demonstrated to the child's caregiver or patient if old enough. Roll a piece of clean absorbent cloth into a wick.
    - Carefully insert the wick into the ear with twisting action.
    - Remove the wick and replace with a clean dry wick.
    - Repeat this until the wick is dry when removed.
    - Do not leave anything in the ear.
    - Do not instil anything else in the ear.
    - Avoid getting the inside of the ear wet while swimming and bathing.
    - Check HIV status if unknown.

Referral

- All sick children, vomiting, drowsy, etc. Painful swelling behind the ear.
- Ear discharge still present for ≥ 4 weeks, despite dry mopping.

Note

- These referrals do not all require referral to an ENT. They may be referred to a hospital outpatient department for consideration of a topical antibiotic eardrops.
- Any attic perforation.
- Any perforation not progressively improving after 3 months or closed by 6 months, even if dry. Moderate or severe hearing loss.

Mastoiditis with Sub-Periosteal Abscess

It is due to infection of the mastoid air cells in the middle ear, a complication of Chronic Suppurative Otitis Media. It presents as a fluctuant painful swelling on the post auricular area. The overlying skin is also inflamed.

Non-pharmacological treatment

- Aspirate the swelling before incision and drainage, and then refer for mastoidectomy at a zonal/national hospital.

Pharmacological treatment (Antibiotics)

Clinical Diagnosis	*Antibiotics*	*Duration*	*Penicillin allergy*	*Comments*
Acute Otitis Media	Antibiotics should *not* be routinely prescribed for uncomplicated AOM. ***For severe disease or when risk of complications:*** ***First line*** **Amoxicillin** oral 500mg every 8 hours ***Second line*** **Amoxicillin/clavulanic acid** oral 625mg every 8 hours	5 days	Antibiotics should *not* be routinely prescribed for uncomplicated AOM. ***For severe disease or when risk of complications:*** ***First line*** **Clarithromycin** oral 500mg every 12 hours ***Second line*** **Doxycycline** oral 100mg every 12 hours **AND** **Metronidazole** oral 400mg every 8 hours	- Most cases are viral and self-limiting. - Antibiotics should be delayed for 2-3 days and patient re-assessed.
Chronic Otitis Media	Topical treatment			- Refer to ENT - Discuss with duty microbiologist or laboratory scientist considering

Clinical Diagnosis	*Antibiotics*	*Duration*	*Penicillin allergy*	*Comments*
				systemic antibiotic
Acute mastoiditis	**Amoxicillin/clavulanic acid** IV 1.2g every 8 hours ***Oral Step down:*** **Amoxicillin/clavulanic acid** oral 625mg every 8 hours	10 – 14 days	**Clindamycin** IV 900mg every 8 hours **AND** **Ciprofloxacin** oral 500mg every 12 hours ***Oral Step down:*** **Clindamycin** oral 450mg 4 times daily **AND** **Ciprofloxacin** oral 500mg every 12 hours	- IV to oral switch when clinically suitable (24 – 48hrs) - Review culture and sensitivity results - Assess for any bone and intracranial extension
Infection of Bone Anchored Hearing Aid (BAHA) implant	**Amoxicillin/clavulanic acid** oral 625mg every 8 hours	7-14 days then review	**Clindamycin oral** 450mg 4 times daily	

Wax/Cerumen Impaction

Usually occurs following the use of cotton buds which hinder the natural movement of cerumen outwards.

Non-pharmacological treatment:
- Remove using cerumen hook, syringing or suctioning under direct vision.

Foreign Body in the Ear

Usually happens in children. Common foreign bodies include beads, stones and seeds (bean, maize, orange).
In adults, foreign bodies include cotton bud and insect

Non-pharmacological treatment:
- Restrain the child
- Remove using a cerumen hook under direct vision (if the child cannot be restrained, sedation is advised).
- An insect should be killed (by soaking the ear canal with normal saline or spirit) before removal.

Hearing Loss

A child with hearing loss should be detected and intervention started immediately after delivery. New born hearing screening is done using an otoacoustic emission machine. Any child suspected of hearing loss (usually presenting with delayed speech development) **should be referred** to a zonal/national hospital immediately since early intervention has a better outcome.

Acute Rhinitis

It is a viral inflammatory condition in the nasal mucous membrane, usually part of a more widespread infection of the upper respiratory tract.

Causes
- Viruses
- Bacteria
- Irritants
- Allergens.

Signs and symptoms
- Sneezing
- Itching: Nose, eyes, ears, palate

- Rhinorrhea
- Headache
- Earache
- Red eyes
- Fatigue
- Drowsiness
- Malaise

Complications
- Acute or chronic sinusitis
- Otitis media
- Sleep disturbance or apnea
- Dental problems (overbite): Caused by excessive breathing through the mouth
- Palatal abnormalities
- Eustachian tube dysfunction

Non-pharmacological treatment
- Bed rest
- Warm drinks

Pharmacological treatment

Ephedrine nasal drops not more than 5 days.
Adult:
1% for adults 1–2 drops into each nostril every 6 hours
Child:
0.5%, 1–2 drops into each nostril every 6 hours

Note
- Oral drugs to reduce swelling of the mucous membrane, antihistamines and antibiotics are not indicated

Allergic Rhinitis

It is an irritation of the nasal mucosa by an allergen in a previously sensitized individual.

Causes
- Common allergens include house dust (mite's faces), pollens, cockroach antigen, animal dander, moulds (indoor).

Signs and symptoms
- Itchy nostrils, throat, eyes
- Watery nasal discharge
- Nasal congestion
- Sneezing

Investigations
- Anterior Rhinoscopy: – watery nasal discharge, nasal congestion

Non-pharmacological treatment
- Avoidance of an allergen (if possible)

Pharmacological treatment

Cetirizine oral
Adults:
10mg daily for adults until when symptoms have improved.
Child:
2–6 years: 5mg daily until when symptoms have improved.

PLUS
Beclomethasone nasal
Two puffs each nostril once daily until symptoms have improved.

Acute Rhinosinusitis

It is the inflammation of the mucosal lining of the nose and paranasal sinuses of not more than 12 weeks duration. In sinusitis of dental origin, anaerobic bacteria are often found.

Acute Purulent Rhinosinusitis

Bacterial infection with pus accumulation in one or more of the paranasal sinuses.

Investigations

- Anterior rhinoscopy – watery/purulent nasal discharge occasionally foul smelling Nasal congestion
- Plain Paranasal Sinuses X ray (Water's, Caldwell views) Mucosal thickening; air fluid levels

Pharmacological treatment

Clinical Diagnosis	*Antibiotic*	*Duration*	*Penicillin allergy*	*Comments*
Acute Rhino-sinusitis	***Antibiotics should ONLY be prescribed in SEVERE infection as this condition can have a viral cause.***			
Acute Bacterial Rhinosinusitis (severe or persistent symptoms)	***First line*** **Amoxicillin/clavulanic acid** oral 625mg every 8 hours ***Second line*** **Doxycycline** oral 100mg every 12 hours	5 days	***First line*** Clarithromycin oral 500mg every 12 hours ***Second line*** Doxycycline oral 100mg every 12 hours	
Peri-orbital Cellulitis	**Clindamycin** IV 900mg every 8 hours **AND** **Ciprofloxacin** oral 500mg every 12 hours ***Oral Step down*** **Clindamycin** oral 450mg 4 times daily **AND** **Ciprofloxacin** oral 500mg every 12 hours	2 weeks	**Clindamycin** IV 900mg every 8 hours **AND** **Ciprofloxacin** oral 500mg every 12 hours ***Oral step down*** **Clindamycin** oral 450mg 4 times daily **AND** **Ciprofloxacin** oral 500mg every 12 hours	- IV to oral switch when clinically suitable (24 – 48hrs)

Referral

Refer the following to ENT specialists

- Children with ethmoiditis presenting as an acute periorbital inflammation or orbital cellulitis must be hospitalized immediately.
- Adults with pronounced symptoms despite treatment. If sinusitis of dental origin is suspected Recurrent sinusitis (>3 attacks in a year) or chronic sinusitis (duration of illness of >12 weeks)

Nose Bleeding (Epistaxis)

It is a condition that involve bleeding through the nose.

Causes

- It may be due to a local cause in the nasal cavity (e.g. trauma, tumour, foreign body, septal varices, or septal deviation);
- Systemic cause (e.g. blood disorders, vascular disorders, renal failure, hepatic failure, or use of anticoagulants (warfarin, heparin)
- (Usually 90% from a plexus of veins in Little's areas) due to nose–picking, trauma (fall in games, assault, etc,
- Nasal and paranasal neoplasms.
- Nasal infection
- Systemic derangements e.g. acute fevers, disease with uraemia,
- Abnormalities of blood clotting, foreign bodies in the nose.

Management

- Most cases of epistaxis are minor; do not require hospitalization. Patients with significant nose bleeding do require hospitalization.

Non-pharmacological treatment

- Stabilize the patient: put an open intravenous line, do blood grouping and cross matching the patient in a sitting position and advise the patient to pinch the soft part of the nose gently for 5 minutes.
- Put on a gown, glasses, head light and sterile gloves and evacuate clots. Do a thorough head and neck examination.
- Cauterize septal varices (if any) using a silverex stick
- Do an anterior nasal packing by introducing into the nasal cavity as far posterior as possible sterile Vaseline gauzes (or iodine-soaked gauzes if not available) using dissecting forceps (if bayonet forceps is not available).
- Put rolled dry gauze on the columella and plaster it.

If the patient is still bleeding

- Do a posterior nasal packing using a Foley's catheter introduced through the nasal cavity into the oropharynx, balloon it with normal saline up to 10–15cc while pulling it outward to impinge on the posterior nasal choana, then do anterior nasal packing as above.
- Put dry gauze on the nose to prevent necrosis of the columella and fix the catheter on the nose with an umbilical clamp.
- Almost all of the nasal bleedings will be controlled by this way.

Note:

- Remove the packs after 72 hours

Pharmacological treatment (to prevent rhinosinusitis)

Phenoxymethylpenicillin oral
Adult:
500mg every 8 hours for 7 days.
Child:
***up to 5 years*:** 6 mg/kg every 6 hours for 10 days

OR
Azithromycin oral
Adult:
500mg once daily for 3 days.
Child:
10mg/kg once daily for 3 days

OR
Amoxicillin 500mg/clavulanic acid 125mg oral
Adult:
One tablet every 8 hours for 7 days
Child:
Amoxicillin 250mg/clavulanic acid 125mg) every 12 hours for 7 days

PLUS
Paracetamol oral until fever is controlled
Adult:
1gm every 8 hours
Child:
10 mg/kg body weight every 8 hours

Note:
Putting an ice cube on the forehead, extending the neck or placing a cotton bud soaked with adrenaline in the vestibule will not help.

Referral

- Refer the patient to the next facility with adequate expertise and facilities if:
- The patient is still bleeding repack and refer immediately, Failure to manage the underlying cause, refer the patient.

Foreign Bodies in the Nose

This situation usually occurs in children.

Non-pharmacological treatment
- Restrain the child before removal using a cerumen hook, if the child cannot be restrained sedation is advised.

Sino-Nasal Malignancy

Is a malignancy of the nose and paranasal sinuses. Risk factors include wood dust (both soft and hard), wielding dust, lather industry fumes, hydrocarbons fumes, and aflatoxin dust.

Investigations
- Nasal bleeding
- Nasal discharge
- Nasal obstruction
- Teeth loosening
- Cheek swelling
- Proptosis
- Hearing loss

Referral
- Refer the patient to the next facility with adequate expertise and facilities.

Naso-Pharyngeal Malignancy

- It is a malignancy which arises from the nasopharynx. Risk factors include genetic predisposition, Epstein Bar virus, smoked and/or salted foods.

Investigations
- Cervical lymphadenopathy, usually bilateral
- Nose bleeding
- Hearing loss, tinnitus or ear pain

Referral
- Refer the patient to the next facility with adequate expertise and facilities

Note:
- A patient presenting with cervical lymphadenopathy has nasopharyngeal carcinoma until proven otherwise.

Hypo-Pharyngeal Malignancy

It is a malignancy which arises from the hypopharynx. Risk factors include cigarette smoking, alcohol intake and gastroesophageal reflux disease.

Investigations
- Progressive dysphasia
- Progressive odynophagia
- Hematemesis/haemoptysis
- Ear pain (referred otalgia)
- Cervical lymphadenopathy
- Difficulty in breathing (inspiratory stridor)

Referral:
- Refer the patient to the next facility with adequate expertise and facilities

Adenoid Hypertrophy

It is hypertrophy of the lymphoid tissues in the nasopharynx; presenting with mouth breathing, snoring and otitis media with effusion. It is reported mainly in children.

Investigations:

- Nasopharynx lateral view X-ray.

Pharmacological treatment:

Cetirizine oral

Adult:
10mg nocte for 2 weeks.
Child:
5mg nocte for 2 weeks

AND
Normal saline (sodium chloride 0.9%) **nasal spray/drops** every 4 hours for 2 weeks

AND
Phenoxymethylpenicillin oral
Adult:
500mg every 8 hours for 7 days.
Child:
up to 5 years: 6 mg/kg every 6 hours for 10 days

OR
Azithromycin oral
500mg once daily for 3 days
Child: 10mg/kg once daily for 3 days
OR
Amoxicillin/clavulanic acid oral
Adult:
625mg (500mg amoxicillin+125mg Clavulanic acid) every 8 hours for 7 days
Child:
375mg (250mg amoxicillin+ 125 Clavulanic acid) every 12 hours for 7 days;

AND
Paracetamol oral until fever is controlled
Adult:
1gm every 8 hours
Child:
10 mg/kg body weight every 8 hours

Pharyngotonsillitis

Pharyngotonsillitis is an acute inflammation of the pharynx and tonsils, which is characterized by fever and a painful throat.

Pharmacological treatment

Phenoxymethylpenicillin oral
Adult:
500mg every 8 hours for 7 days.
Child:
up to 5 years: 6 mg/kg every 6 hours for 10 days

OR
Azithromycin oral
Adult:
500mg once daily for 3 days.
Child:

10mg/kg once daily for 3 days

OR
Amoxicillin/Clavulanic acid oral
Adult:
625mg (500mg amoxicillin+125mg Clavulanic acid) every 8 hours for 7 days
Child:
375mg (250mg amoxicillin+125 Clavulanic acid) every 12 hours for 7 days;

AND
Paracetamol oral until fever is controlled
Adult:
1gm every 8 hours
Child:
10 mg/kg body weight every 8 hours

Note
Refer the patient with tonsillitis to the specialist for tonsillectomy if:
- Chronic tonsillitis
- Recurrent tonsillitis (>3 attacks in a year or 5 or more attacks in 2 years)
- Obstructive tonsillitis (causing an upper airway obstruction)

Laryngitis

- This is an infectious or non-infectious, acute or chronic inflammatory condition of the larynx. It becomes chronic when the condition lasts for more than 3 weeks. The picture of the disease is different in children and adults due to the small size of the larynx in children.
- Acute subglottic laryngitis occurs mainly in children under the age of seven, it is a viral infection
- Oedema of the mucous membrane of the subglottic space causes breathing difficulties, especially on inspiration.
- Laryngitis in children may require active treatment

Acute Laryngitis

Acute subglottic laryngitis occurs mainly in children under the age of seven, it is a viral infection.

Non-pharmacological treatment
- Parents should behave calmly and avoid frightening the child
- Bed rest
- Keep the air damp and cool
- Give extra fluid

Pharmacological treatment
- Epinephrine (adrenaline) inhalation effectively reduces symptoms

Doses of Racemic Epinephrine Preparation

Age	**Racemic Epinephrine** (20 mg/ml)	**0.9% Saline**
0-6 months	0.1 ml	2 ml
6-12 months	0.15 ml	2 ml
>12 months	0.2 ml	2 ml

Note:
- The total fluid volume is inhaled in 5 minutes with the use of inhalator

Hospitalization
- If severe symptoms persist or worsen after epinephrine inhalation, hospitalization is indicated.

Chronic Laryngitis

Non-pharmacological treatment:
- Voice rest
- Stop smoking
- Rehydration
- Refer to specialist for laryngoscopy

Acute Epiglottitis (AE)

Epiglottitis is an acute infectious inflammation of the epiglottis, supraglottic and hypopharynx which occurs both in children and adults. It is commonly caused by *Haemophilus influenzae*. Epiglottitis is a potentially lethal condition especially in children.

Oedema of the epiglottis may cause acute airway obstruction.

Signs and symptoms
- Throat pain and difficulty in swallowing
- Drooling
- Husky voice
- Fever often high and with chills
- Patient prefers sitting posture with an extended neck
- Laborious inspiration
- Cough in some cases
- Anxiety

Investigations:
Plain X-ray of the neck, lateral view characteristically presents with a positive thumb sign (oedematous epiglottis).

Non-pharmacological treatment:
- Immediate hospitalization, preferably in the ICU
- Transportation: sitting, with oxygen supplementation
- Be prepared to treat respiratory failure (intubation or tracheotomy)

Pharmacological treatment

Phenoxymethylpenicillin oral
Adult:
500mg every 8 hours for 7 days.
Child:
Up to 5 years: 6 mg/kg every 6 hours for 10 days

OR
Azithromycin oral
Adult:
500mg once daily for 3 days.
Child:
10mg/kg once daily for 3 days

OR
Amoxicillin/clavulanic acid oral
Adult:
625mg (500mg amoxicillin+125mg Clavulanic acid) every 8 hours for 7 days
Child:
375mg (250mg amoxicillin+125 Clavulanic acid) every 12 hours for 7 days;

AND
Paracetamol oral until fever is controlled
Adult:
1gm every 8 hours
Child:
10 mg/kg body weight every 8 hours

Recurrent Respiratory Papillomatosis (Laryngeal Papilloma)

It is the commonest benign laryngeal tumour of the larynx caused by Human papilloma virus (HPV), occurring in both children and adults. It has a higher recurrence rate in children than in adults, among adults it may turn into a malignancy.

Signs and symptoms
- Hoarse voice, audible respiration (inspiratory stridor)
- Progressive difficulty in breathing
- Progressive inspiratory stridor
- On and off cough

Investigations
- Perform a thorough respiratory system examination
- Indirect laryngoscopy for papilloma croups on the larynx

Non-pharmacological treatment
- If in distress, perform a tracheostomy first then refer

Referral
- Refer the patient to the next facility with adequate expertise and facilities

Foreign Bodies in the Throat

If the foreign body is suspected to be in the hypopharynx, oesophagus, trachea or bronchus Take a thorough history and do a thorough physical examination
Do chest X ray to confirm your diagnosis (though some foreign bodies are radiolucent) Refer to a zonal hospital for removal

Cancer of the Larynx

It is the commonest ENT malignancy. Risk factors include cigarette smoking, alcohol intake, gastroesophageal reflux disease and human papilloma virus.

Investigations
- Progressive hoarseness of voice
- Difficulty in breathing (inspiratory stridor)
- Haemoptysis

Referral
- Refer the patient to the next facility with adequate expertise and facilities

Note
- Any patient with progressive hoarseness of voice for more than two weeks should undergo laryngoscopy

Sino-Nasal Malignancy

This refers to malignancies of the nose and paranasal sinuses. Risk factors include wood dust (both soft and hard), wielding dust, lather industry fumes, hydrocarbons fumes, and aflatoxin dust.

Signs and symptoms
- Nasal bleeding
- Nasal discharge
- Nasal obstruction
- Teeth loosening
- Cheek swelling
- Proptosis
- Hearing loss

Referral
- Refer the patient to the next facility with adequate expertise and facilities

Naso-Pharyngeal Malignancy

It is a malignancy which arises from the nasopharynx. Risk factors include genetic predisposition, Epstein Bar virus, smoked and/or salted foods.

Investigations
- Cervical lymphadenopathy, usually bilateral
- Nose bleeding
- Hearing loss, tinnitus or ear pain

Referral
- Refer the patient to the next facility with adequate expertise and facilities

Note
- A patient presenting with cervical lymphadenopathy has nasopharyngeal carcinoma until proven otherwise

Hypo-Pharyngeal Malignancy

It is a malignancy which arises from the hypopharynx. Risk factors include cigarette smoking, alcohol intake and gastroesophageal reflux disease.

Investigations
- Progressive dysphasia
- Progressive odynophagia
- Hematemesis/haemoptysis
- Ear pain (referred otalgia)
- Cervical lymphadenopathy
- Difficulty in breathing (inspiratory stridor)

Referral
- Refer the patient to the next facility with adequate expertise and facilities

Diphtheria

This is a serious bacterial infection usually affecting the mucous membranes of the nose and sore throat. It usually causes a sore throat, fever, swollen lymph nodes and weakness. The hallmark sign is a sheet of thick, grey material covering the back of the throat, which can block the airway, causing difficulty with breathing.

Causes
The bacterium Corynebacterium *diphtheriae* causes diphtheria:
- Airborne droplets
- Contaminated personal items
- Contaminated household items

Signs and symptoms
- Thick grey membrane covering the throat and tonsils
- Sore throat and hoarseness
- Difficulty with breathing (dyspnoea) or rapid breathing (tachypnoea)
- Nasal discharge
- Fever and chills
- Malaise

Differential diagnosis
- Streptococcal pharyngitis
- Viral pharyngitis
- Vincent's angina
- Infectious mononucleosis
- Oral syphilis
- Candidiasis

Complications
- Breathing difficulties due to airway blockage

- Damage to the heart muscle (myocarditis)
- Nerve damage (polyneuropathy)
- Loss of the ability to move (paralysis)
- Kidney failure

Investigations
- Throat swab for microscopy, culture and sensitivity

Treatment objectives
- Eliminate pain and other symptoms
- Define transmission pattern and monitor disease burden
- Identify new cases and prevent spread or outbreak

Non-pharmacological treatment
- Isolate individual patients in separate patient care areas
- Avoid movement of patients out of isolation areas
- Advise patients to use medical-surgical masks when leaving isolation area

Pharmacological treatment

Diphtheria Anti Toxin (DAT) immunoglobulins

Metronidazole Oral
Adult:
7.5 mg/kg y
OR
Metronidazole IV
Administer (over 1 hour) every 6 hours for 7-10 days (or up to 2-3 weeks)

Child:
Metronidazole oral
30 mg/kg/day
OR
Metronidazole IV injection over 1 hour, in divided doses every 6 hours; not to exceed 4 g/day, for 7-10 days

AND
Erythromycin Oral or IV
40 mg/kg per day up to a maximum of 2 g/d) for 14 days

OR
Procaine penicillin G IM
<10 kg: 300,000 Units/day
>10 kg: 600,000 Units/day for 14 days

Note:
- Patients with allergies to penicillin G or erythromycin can use rifampin or clindamycin.

Prevention

For health care workers

- Hand hygiene
- Appropriate use of medical-surgical masks; gloves, eye protection (face shield or goggles), and long sleeved-gown - PPEs - when within one metre of patient or when entering room.
- Removes PPEs after leaving patient care areas
- Use disposable or dedicated patient care equipment when possible. If not possible, clean and disinfect between use
- Refrain from touching eyes, nose or mouth with contaminated gloved or un-gloved hands
- Avoid contaminating surfaces not involved with direct patient care (i.e. door knobs, light switches, mobile phones, etc.)

Infectious diseases

Malaria

Malaria is a disease caused by the plasmodium parasite, transmitted by the bite of infected mosquitoes. Depending on the degree of parasitaemia, malaria can be uncomplicated or severe (complicated).

Causes

- Malaria is caused by **five** species of the plasmodial parasite namely, *Plasmodium falciparum, Plasmodium Malariae, Plasmodium ovale, Plasmodium vivax and Plasmodium knowlesi*
- *Plasmodium falciparum* is the dominant parasite mainly responsible for over 90% of malaria cases and all the severe forms of the disease.

Signs and symptoms (uncomplicated malaria)

- Fever: temperature above 37.5°C (taken from the axilla) or history of fever
- Loss of appetite, mild vomiting, diarrhoea
- Weakness, headache, joint and muscle pain
- Mild anaemia (mild pallor of palms and mucous membranes)
- Mild dehydration (dry mouth, coated tongue).
- Enlarged spleen (in acute malaria it may be minimally enlarged, soft and mildly tender)

Signs and symptoms (complicated malaria)

- Repeated vomiting
- Prostration
- Impaired consciousness
- Severe anaemia (Haemoglobin < 5g/dl)
- Circulatory collapse (Algid malaria)
- Hypoglycaemia (whole blood glucose <2.2mol/L)
- Pulmonary oedema
- Abnormal bleeding/DIC
- Jaundice (serum bilirubin >3g/dl)
- Haemoglobinuria(Black water fever)
- Febrile seizures
- Acute renal failure
- Hyper-parasitaemia (>5% of RBCs are parasitized)
- Hyperpyrexia (temp > 40oC)
- Lactic acidosis

Investigations

- Microscopy (thick and thin blood smears)
- Rapid Diagnostic Tests (RDTs)

Differential diagnosis

- Typhoid fever
- Respiratory tract infection
- Urinary tract infection
- Meningitis, otitis media, tonsillitis
- Abscess, skin sepsis
- Measles or other infections with rashes (before rash comes)

Treatment objectives

- Eradicate parasitaemia
- Prevent progression to severe malaria

Pharmacological treatment

Uncomplicated Malaria

First Line

Artemether/lumefantrine tabs (AL) for 3 days

Weight	20/120 mg tab	40/240 mg tab	80/480 mg tab
5 kg to <15kg	1 tab two times daily	NA	NA
15kg to <25kg	2 tabs two times daily	1 tab two times daily	NA
25kg to <35kg	3 tabs two times daily	NA	NA
> 35kg	4 tabs two times daily	2 tabs two times daily	1 tab two times daily

Second Line
Artesunate plus amodiaquine (ASAQ) for 3 days

Age	Weight	Tablet strength	Dosage Regimen
2-11 months	4.5kg to <9kg	25mg/67.5mg	1 tablet daily
1yr to 5yrs	9kg to <18kg	50mg/135mg	1 tablet daily
6yrs to 13yrs	18kg to 36kg	100mg/270mg	1 tablet daily
14 years and above	36kg and above	100mg/270mg	2 tablets daily

Uncomplicated malaria treatment in pregnancy

First trimester

Quinine oral for 7 days

PLUS

Clindamycin oral for 7 days

Second and third trimesters of pregnancy

AL or ASAQ as above

Complicated malaria

Artesunate

Age	Route	On admission	12 hours	24 hours	Daily
Adult	IV	2.4mg/kg	2.4mg/kg	2.4mg/kg	2.4mg/kg
Children	IV	≤20kg	≤20kg	≤20kg	≤20kg

Second choice

Age	Route	On admission	Continuation	Comments
Artemether	IM	1.6 mg/kg	1.6 mg/kg daily	
Quinine	IV or divided IM injections	20mg salt/kg	10mg/kg every 8 hours	Infusion rate should not exceed 5m/kg/hr

Pregnancy

1st choice	Artesunate	
2nd choice	Artemether	only where artesunate is unavailable
3rd choice	Quinine	

Intermittent Preventive Treatment in Pregnancy (IPTP

Medicine	14 weeks	Every 4 weeks thereafter	Comments
Sulphadoxine/pyrimethamine 500/25mg	3 tabs	3 tabs	A minimum of 3 doses throughout the pregnancy

Intermittent Preventive Treatment in Infants (IPTi)

Administer SP when giving penta 2, penta 3 and measles vaccines

Dosing Schedule for SP

Weight(Kg)	SP given as single dose
5 to < 10	250mg/12.5mg
10 to < 25	500mg/25mg
25 to < 50	1000mg/50mg
≥ 50	1500mg/75mg

Chemoprophylaxis for the Non-immune

- Mefloquine, atovaquone-proguanil and doxycycline.
- Mefloquine: 5 mg base/kg weekly, giving an adult dose of 250 mg base weekly and appropriate doses to child aged 8 - 13 years
- Contraindicated in children <8 years and in pregnant women

For Visitors

- Commence 2-3 weeks prior to arrival, then weekly while in country, and thereafter for 2-3 weeks after departure.

- Atovaquone-proguanil can be started 24 hours before arrival and stopped seven days after departure. It is dosed daily.

Non-chemotherapeutic prevention of malaria

- Use insecticide-treated materials (e.g. bed nets)
- Destroy adult mosquitoes by indoor residual spraying of dwellings with insecticide or use of knock-down sprays
- Wear clothes which cover the arms and legs and use repellent mosquito coils and creams/sprays on the skin when sitting outdoors at night
- Eliminate collections of stagnant water where mosquitoes breed
- Destroy mosquito larvae by dosing stagnant water bodies with larvicides or with biological methods.

Leprosy

Leprosy, also known as Hansen's disease, is a chronic infectious disease which mainly affects the skin, the peripheral nerves, mucosal surfaces of the upper respiratory tract and the eyes. Leprosy is known to occur at all ages ranging from early infancy to very old age. Leprosy is curable and early treatment averts most disabilities.

Causes

Leprosy transmission is airborne, through droplets discharged from the respiratory tract of untreated infectious cases. Transmission may also occur through skin to skin contact with entry through broken skin

- Infection with *Mycobacterium leprae*

Classification

Depending on the bacillary load, the disease is classified as paucibacillary or multibacillary:

Paucibacillary leprosy	- Milder - Less or up to 5 skin lesions
Multibacillary leprosy	- More than 5 symmetric skin lesions, nodules, plaques, thickened dermis, - Frequent involvement of the nasal mucosa resulting in nasal congestion and epistaxis.

Signs and symptoms

Leprosy mainly affects the skin and peripheral nerves and it is characterized by:

- Hypopigmented skin patch with some sensory loss
- An enlarged or painful peripheral nerve (preferably with some evidence of nerve function loss)
- Nodules found mainly on nose, ears, face, limbs but can occur at any site
- Painless wounds, especially on the sole of the foot, palm of hand, and fingers
- Loss of sensation on hands, feet, or both
- Dryness of hands, feet, or both due to loss of sweating, accompanied by loss of feeling
- If left untreated, leprosy can lead to progressive and permanent damage of nerves, leading to loss of sensation and sweating in the extremities and paralysis of muscles in the hands, feet, and face.

Treatment objectives

- Cure the patient
- Interrupt transmission
- Prevent disabilities

Diagnosis

- Laboratory diagnosis is based on the detection of acid-fast bacilli in a Ziehl-Neelsen stained nasal smear and skin-split smear taken from the ear lobe or from a skin lesion.
- Diagnosis can be made on clinical signs alone based on the WHO clinical classification of the number of lesions

Pharmacological treatment

This is based on multidrug therapy as follows:

Regimen	**Multibacillary**		**Paucibacillary**	
	Adult	**Child**	**Adult**	**Child**
Rifampicin	600mg once a month Supervised	450mg once a month Supervised	600mg once a month Supervised	450mg once a month Supervised
Clofazimine	300mg once a month and 50mg daily	150mg once a month and 50mg daily	-	-

Dapsone	100mg daily	50mg daily	100mg daily	50mg daily
Duration	24 months	24 months	6 months	6 months

Prevention

- Household contacts (anyone who has lived with the patient for at least 1 month since the onset of symptoms) should be screened for the disease

Notification

- This is a notifiable disease

Tuberculosis

Tuberculosis is a communicable disease caused by a tubercle bacillus. The site of infection is the lung however, almost every organ of the body can be affected. Sierra Leone is among the top 30 high TB burden countries in the world

Causes

Mycobacterium tuberculosis complex (M. tuberculosis, M. africanum, M. bovis etc.) Most infections are transmission through inhalation of droplet nuclei containing virulent strains of the tubercle bacillus. Almost every organ of the body can be affected.

Note: (see the national TB guideline of the National TB and Leprosy Control Programme for more details)

Signs and symptoms

Pulmonary TB

The cardinal symptoms are:

- Cough for two weeks or more. In the case of people living with HIV, current cough
- Weight loss
- Fever
- Profuse night sweats

Other symptoms are

- Chest pain
- Coughing of blood
- Shortness of breath

A patient may not present with all the symptoms but any of them is particularly meaningful if accompanied with cough lasting more than two weeks.

Extra Pulmonary TB

Depend on the organ involved. The most common are:

- Painless swelling of lymph nodes (lymphadenitis)
- Pain while breathing in, dull lower chest pain., slight cough (Pleurisy)
- Pain and swelling of joints
- Gibbous or newly developed neurologic disorders of the lower limbs (spondylitis)
- Headache, stiffness of the neck, vomiting and later mental confusion (meningitis)

Investigations

- Microscopy: sputum smear for acid fast bacilli. Should be done for all patients
- Culture: sputum culture is the goal standard. Not widely available
- Molecular techniques: Xpert® MTB/RIF using Gene Xpert. Eligible TB suspect include: Patients treated for TB in the past, HIV patients with suspected TB, patients with TB treatment failure and contacts of patients with drug resistant TB

Treatment objectives

- To cure the patient
- Improve the quality of life of patients

- Prevent the spread of infections
- To prevent relapse and resistance to treatment
- To prevent death

Nonpharmacological treatment

- Provide appropriate nutrition
- Advice to stop smoking, alcohol use and substance abuse
- Advice on improve shelter

Pharmacological treatment

DOTS – Directly Observed treatment Short Course

Classification

- New patient
- Retreatment

General principles

- Treatment of all TB cases should be weight based
- Never treat a patient with probable pulmonary TB without examining the sputum
- Never give a single TB drug alone for treatment purposes as drug resistance usually follows and is permanent.
- Always examine the sputum in suspected case
- Use recommended combinations
- Counsel the patient on the need for full compliance
- Supervise TB therapy
- Ethambutol use is safe in children and should be added to their treatment.

Essential Anti-TB Medicines

Medicine	Recommended dose
Isoniazid(H)	5mg/kg (4-6)
Rifampicin (R)	10 mg/kg (8-12)
Pyrazinamide(Z)	25 mg/kg (20-30)
Ethambutol (E)	15 mg/kg (15-20)

Note: Single dose regimens are being replaced by Fixed Dose Combinations

Available Fixed Dose Combinations

- Rifampicin/Isoniazid/Pyrazinamide/Ethambutol (RHZE – 150/75/400/275mg)
- Rifampicin/Isoniazid/Pyrazinamide (RHZ 75/50/150mg)- Paediatric
- Rifampicin/Isoniazid (RH 75/50mg) - Paediatric
- Rifampicin/Isoniazid (150/75mg)

Recommended Treatment Regimen for Adults

TB Patient Description	*TB Treatment regimens (months)*	
	Initial Phase (daily)	*Continuation Phase*
Pulmonary and most extrapulmonary TB cases	2 months (HRZE) FDC	4 months RH
Bone and joint TB, miliary TB, Meningeal TB	2 months (HRZE) FDC	10 months (HRZE) FDC

Number of tablet for adults and children above 25kg

Body weight (Kg)	*Intensive Phase (RHZE)*	*Continuation Phase (RH)*
25 -29	2	2
30 -39	2	2
40 -54	3	3
55- 70	4	4
71 and above	5	5

Number of Tablet for children below 24kg

Body	*Intensive Phase*		*Continuation Phase*
Kg	*RHZ (75/50/150mg)*	*E 100mg*	*RH 75/50mg*
4-7	1	1	1
8 -11	2	2	2

12-15	3	3	3
16-24	4	4	4
>25	Adult Regimen		

Treatment of Special cases

Pregnant Women

Most anti-TB drugs are safe for use in pregnant women with the exception of aminoglycosides which is ototoxic (deafness, vertigo) to the foetus. All pregnant women should be treated using DOTS.

Breastfeeding Women

Patients should receive the full course of anti-TB chemotherapy as the drugs do not cause any harm to the baby. Regardless of prior vaccination with BCG, the infant should be given chemoprophylaxis for a minimum period of six months and then vaccinated with BCG if not vaccinated before.

Treatment of people living with HIV (PLHIVs) co-infected with TB

Patients infected with HIV respond equally well to TB treatment as those without HIV infection Strat TB treatment first and commence ARVS within 2-8 weeks (convert to smear negative). See guidelines in HIV sections

Treatment of patients with both TB and Leprosy

- Required appropriate anti-TB treatment in addition to the standard MDT
- Rifampicin should be given in doses required for TB
- Patient should continue with anti-leprosy treatment once TB treatment is complete.

Summarizes the treatment of TB in special cases

Type of EPTB	*TB treatment regimen*	*Comments*
TB Meningitis (adult)	2HRZE/7-10HR	Add 2-4mg/kg/day prednisone, taper over 6-8 weeks 9-12 months total treatment
TB Meningitis (children)	2HRZE/10HR	Add 2-4mg/kg/day prednisone, taper over 6-8 weeks 12 months total treatment
Osteoarticular TB (adult)	2HRZE/7HR	9 months total treatment
Osteoarticular TB (children)	2HRZE/10HR	12 months total treatment
Pericardial TB	2HRZE/4HR	Add 2-4mg/kg/day prednisone, taper over 6-8 weeks 6 months total treatment

Prevention of tuberculosis

- Standard precautions: cough etiquette, isolation, use of personal protective equipment like face mask.
- See the National Infection Prevention and Control Guideline for the hierarchy of TB prevention
- Chemoprophylaxis of TB: recommended for HIV patients without active TB. Isoniazid 300mg oral daily for adults or 10mg/kg body weight daily for 6 months. Contraindicated in patients with active hepatitis
- Immunization: BCG vaccine at 0 week under the Expanded Programme on Immunization

Referral

- All patients with rifampicin resistance should be referred to Lakka or Regional Government Hospital. Please inform the TB district supervisor.

Lassa Fever

Lassa fever is a viral haemorrhagic disease.

Cause

- Lassa fever virus from the arena virus family. Transmission is from an infected rat to human or human to human.

Note

See *Manual on Prevention and Control of Lassa Fever for Peripheral Health Unit Staff* for more details

Signs and symptoms

The clinical signs of Lassa Fever are non-specific

- Onset is gradual and its symptoms are similar to those of many other conditions such as common cold, malaria, typhoid and yellow fever, illness can be categorized into four stages

Stage 1:

On set

- High fever greater than 380C
- General weakness and malaise
- Headache
- Muscle and joint pain
- Cough, sneezing

Stage 2

4-7 days after onset

- Sore throat (with white exudative patches) – very common
- Persistent headache
- Generalized body pain
- Abdominal pain
- Conjunctivitis (red eyes)
- Nausea and vomiting
- Diarrhoea
- Hypotension (systolic BP less than 100)
- Anaemia
- Productive cough

Stage 3

7-14 days after onset

- Swollen neck and face
- Convulsion (due to high fever)
- Confusion/disorientation
- Mucosal bleeding from the gums (mouth) nose and eyes

Stage 4

More than 14 days after onset

- Convulsion
- Bleeding (from the vagina, rectum, haematemesis and haemoptysis)
- Coma
- Respiratory distress
- Renal failure
- Death (approximately 20% of cases not treated or treated late)

Diagnosis

- Clinical diagnosis is often difficult, especially early in the course of the disease. It is difficult to distinguish from other viral hemorrhagic fevers such as Ebola virus and other infections such as malaria, shigellosis, typhoid fever and yellow fever.

- Definitive diagnosis requires testing that is available only in reference laboratories using the following tests:
  - Reverse transcriptase polymerase chain reaction (RT-PCR) assay
  - Antibody enzyme-linked immunosorbent assay (ELISA)
  - Antigen detection tests

- Virus isolation by cell culture.

Non-pharmacological treatment

General principles

- Isolate patient
- Observe complete barrier nursing (antiseptic hand washing with chlorine solution and or antiseptic soap, use protective personal equipment)
- Inform the DHMT through the district surveillance officer(s)
- Refer with minimal delay
- Trace all contacts

Pharmacological treatment

Ribavirin IV
30mg/kg body weight as a single loading dose

FOLLOWED BY
16mg/kg intravenous every 6 hours for 4 days

THEN
8mg/kg every 8 hours for 6 additional days.

Note

- **Ribavirin** is most effective within the first 6 days of illness

Prevention

- For close contacts, give oral ribavirin 500mg two times a day for 7 days.
- Healthcare workers caring for Lassa fever patients should apply standard infection prevention and control precautions: wear a face shield or a medical mask and goggles, a clean, non-sterile long-sleeved gown, and gloves.

Reporting

- Lassa Fever is a notifiable disease. All cases must be reported to the District Health Management Team through the district surveillance officers and Program Manager (Lassa Fever Program in Kenema).

Rabies

Rabies is a viral zoonotic disease that causes progressive and fatal inflammation of the brain and spinal cord. Clinically, it has two forms:

- Furious rabies – characterized by hyperactivity and hallucinations.
- Paralytic rabies – characterized by paralysis and coma.

Causes

It is caused by the rabies virus which is transmitted to man through the bite of infected animals: dogs, bats. Saliva from infected animal contains large numbers of the rabies virus and can be inoculated through a bite, laceration or a break in the skin. Incubation period varies between less than 20 days to 1 year as follows:

Incubation period	*Proportion of patients*	*Conditions*
20 – 90 days	75%	
< 20 days	20%	Bites to face, head and hands; or multiple bites
90 days – 1 year	5%	

Signs and symptoms

Diagnosis is often difficult: there may be no history of scratch or bite (exposure through licking) or wounds may have healed; a reliable history may be difficult to obtain.

Early symptoms

- Fever with pain
- Unusual or unexplained tingling, pricking or burning sensation (paraesthesia) at the wound site

Later stages

- The virus spreads to the central nervous system, causing fatal inflammation of the brain and spinal cord

Furious rabies
- Hyperactivity
- Excitable behaviour
- Hydrophobia (fear of water)
- Sometimes aerophobia (fear of drafts or of fresh air).
- Death occurs after a few days due to cardio-respiratory arrest.

Paralytic rabies
- Usually less dramatic
- Longer course than the furious form
- Muscles gradually become paralyzed, starting at the site of the bite or scratch
- A coma slowly develops
- Eventually death occurs

Non-pharmacologic treatment
In all cases, even if patient presents late:
- Cleanse wound or contact site with soap
- Run water (tap or container) over the contact site continuously for at least 15 minutes to reduce viral load
- Remove all foreign materials
- Apply a disinfectant e.g. 10% povidone iodine
- For mucous membranes – Rinse thoroughly with 0.9% sodium chloride (normal saline)
- Do not suture wounds
- If suturing is indicated, administer rabies immunoglobulin several hours before wound closure.

Pharmacologic treatment
- No specific antiviral treatment

Prevention
Post exposure vaccination (PEV)
The decision to start immunization depends on the perceived risk, (nature of contact-broken skin, presence of rabies in the area, status of animal involved). WHO categorizes risks as follows:

Category I	- Contact with animal or licks on intact skin	No exposure	No PEV
Category II	- Nibbles on exposed skin - Minor bite(s) or scratch(es) without bleeding	Minor exposure	PEV
Category III	- Transdermal bite(s) or scratch(es) - Licks on broken skin - Contamination of mucous membranes by animal saliva (licks) - Direct contact with bats	Severe exposure	PEV

If the patient has had no prior rabies vaccination, if he or she is of unknown status, or if more than 5 years have passed since his or her last vaccination, active and passive immunization are provided as follows:

Passive immunization
Human rabies immunoglobulin 20 IU/g instil/ infiltrate intramuscularly around the wound and then, human rabies immunoglobulin 20 IU/kg once daily for seven days

Active immunization

Post-exposure prophylaxis

In those with no previous immunization with rabies vaccine, the vaccine can be administered as deep IM injection as follows

Day 0	1ml in upper arm
Day 3	1ml in upper arm
Day 7	1ml in one upper arm
Day 14	1ml in one upper arm
Day 28	1ml in upper arm

In those previous pre-exposure immunization, post-exposure immunization can be administered as follows:

Day 0	1ml in upper arm
Day 3	1ml in upper arm

Pre-exposure Prophylaxis

- This is given to those at high risk such as laboratory workers, veterinary surgeons and animal handlers

Rabies vaccine

Day 0	1ml
Day7	1ml
Day 28	1ml

Note:
- Repeat after every 2 years for those at continued risk.

Public Education

The public should be advised to do the following:

- Teach children at an early age not to handle stray animals or wildlife, especially bats found on the ground
- Report any animals that are sick or acting strange to local public health authorities
- Keep pets indoors at night and fenced in or on a leash when outdoors
- Keep pet food and water dishes indoors
- Have professional animal trappers remove bat colonies from homes and barns
- Handle sick or dead animals with heavy gloves and shovels
- Keep trash container lids tight and maintain compost piles away from dwellings
- Wash hands with soap and water after contact with wildlife
- If an animal scratch or bite occurs, especially if due to a dog or bat, immediately wash the areas vigorously with soap and water and immediately seek the care of a physician.

Prevention

- Vaccinating dogs is the most cost-effective strategy for preventing rabies in people, and human rabies vaccines exist for pre-exposure immunization.

Referral

- Refer all patients with symptoms and signs of rabies to a tertiary hospital with an Intensive Care Unit (ICU)

Typhoid Fever

Typhoid is an acute life-threatening systemic disease characterized by persistent high-grade fever and abdominal pain.

Causes

- It is caused by Salmonella typhi, transmitted by ingestion of contaminated food or water and is common where sanitary conditions are poor.
- Symptoms are most severe in the elderly, infants, and those who have an existing illness.
- AIDS patients are frequently affected and have recurrences.

Signs and symptoms

- Severe headache
- High fever
- Malaise
- Loss of appetite
- Diarrhoea or constipation
- Abdominal pain

Complications

- Intestinal perforation or haemorrhage
- Peritonitis
- Myocarditis
- Encephalitis

Investigations

- Do complete blood count
- Collect appropriate specimen (blood, urine and stool) for culture and drug susceptibility where the facility is available.

Treatment objectives

- Reduce fever
- Prevent dehydration
- Eliminate infection
- Prevent the spread of the disease in the community

Non-pharmacologic treatment
- Give adequate hydration
- Maintain nutrition (frequent small feeds)

Pharmacological treatment

Uncomplicated Typhoid
Ciprofloxacin oral

Age	*Dose*	*Frequency and duration*
Adult and child >13 years	500mg	Every 12 hours for 10 days
Child < 13 years	250mg	Every 12 hours for 10 days

Amoxicillin oral

Age	*Dose*	*Frequency and duration*
Adult and child >13 years	50mg/kg	Every 12 hours for 10 days
Child < 13 years	50mg/kg	Every 12 hours for 10 days

Complicated Typhoid
Ceftriaxone IV

Age	*Dose*	*Frequency and duration*
Adult	2 g	Once or in 2 dived doses for 14 to 21 days
Child < 13 years	50mg/kg	Daily (max. 4 g daily) for 14 to 21 days

Note
- Never give laxatives in typhoid cases because of the danger of perforation
- Never give ciprofloxacin in pregnant and breastfeeding mothers

Pregnant or breast-feeding women
- Use **azithromycin or ceftriaxone** for pregnant or breastfeeding mothers

Neurological disorders
- In case of severe typhoid fever with neurological disorders (hallucinations, altered mental status) give:

Dexamethasone IV
3 mg/kg stat
Then continue with
1 mg/kg every 6 hours for 2 days (8 doses)

Referral
- Patients who have a high fever and altered state of consciousness
- Patients who have signs of intestinal bleeding or perforation

Yaws

It is re-emerging infectious disease caused by a non-venereal treponemal infection. The major route of infection is through person to person contact.

Cause
- *Treponema pertenue*

Signs and symptoms
- It affects the skin, the palms, and soles of feet
- The lesions are usually rising above the skin surface as papules and if untreated may lead to ulcers

Non-pharmacological treatment

- Personal hygiene by using clean water for bathing and laundering of cloths is highly recommended

Pharmacological treatment

Azithromycin oral
Adult and child
30 mg/kg single dose (max. 2 g)

OR
Benzathine benzylpenicillin IM
Adult and child 10 years and above:
2.4 MIU single dose

Child
< 10 years: 1.2 MIU single dose

Ebola

It is a rare and deadly viral haemorrhagic fever disease.

Causes

It is caused by an infection with a group of viruses within the genus *Ebolavirus*:

- Ebola virus (species *Zaire ebolavirus*)
- Sudan virus (species *Sudan ebolavirus*)
- Taï Forest virus (species *Taï Forest ebolavirus*, formerly *Côte d'Ivoire ebolavirus*)
- Bundibugyo virus (species *Bundibugyo ebolavirus*)
- Reston virus (species *Reston ebolavirus*)
- Bombali virus (species *Bombali ebolavirus)*

Signs and symptoms

Symptoms of Ebola Virus Disease (EVD) include:

- Fever
- Severe headache
- Muscle pain
- Weakness
- Fatigue
- Diarrhoea
- Vomiting
- Abdominal (stomach) pain
- Unexplained haemorrhage (bleeding or bruising)

Transmission: Ebola is mainly transmitted by the following means

The virus spreads through direct contact (such as through broken skin or mucous membranes in the eyes, nose, or mouth) with:

- Blood or body fluids (urine, saliva, sweat, faeces, vomit, breast milk, and semen) of a person who is sick with or has died from Ebola Virus Disease (EVD)
- Objects (such as needles and syringes) contaminated with body fluids from a person sick with EVD or the body of a person who died from EVD
- Infected fruit bats or nonhuman primates (such as apes and monkeys)
- Semen from a man who recovered from EVD (through oral, vaginal, or anal sex). The virus can remain in certain bodily fluids (including semen) of a patient who has recovered from EVD, even if they no longer have symptoms of severe illness.

Diagnosis

- To determine whether Ebola virus infection is a possible diagnosis, there must be a combination of symptoms suggestive of EVD **AND** a possible exposure to EVD within 21 days before the onset of symptoms. An exposure may include contact with:

    - Blood or body fluids from a person sick with or who died from EVD
    - Objects contaminated with blood or body fluids of a person sick with or who died from EVD
    - Infected fruit eaten by bats and primates (apes or monkeys)
    - Semen from a man who has recovered from EVD

- Send blood sample to National Public Health Referral laboratory

Non-pharmacological treatment

Supportive therapy

- Providing fluids and electrolytes (body salts) through infusion into the vein (intravenously).
- Offering oxygen therapy to maintain oxygen status.
- Using medication to support blood pressure, reduce vomiting and diarrhoea and to manage fever and pain.

Precautions

- Isolate patient
- Wash hands frequently
- Use gloves for patient examination and when touching blood, body fluids, secretions, excretions, mucous membranes, non-intact skin;
- Wear gowns to protect skin and prevent soiling of clothing during consultations and activities that are likely to generate splashes or sprays of blood, body fluids, secretions, or excretions;
- Wear surgical mask and goggles, or face shield, to protect mucous membranes of the eyes, nose, and mouth during activities that may generate splashes of blood, body fluids, secretions, and excretions
- Frequently clean and disinfect objects and surfaces
- Use rubber gloves to handle soiled laundry
- Dispose waste safely
- Observe safe injection practices

With confirmed cases of Ebola or other highly infectious agents, use added precautions as follows:

- Personal protective equipment (PPE)
    - Two pairs of gloves,
    - Double gown or coverall suit,
    - Surgical cap or hood, mask, protective glasses,
    - Impermeable apron,
    - Rubber boots.
- Wear PPE prior to entry into isolation area and to be removed before leaving the isolation area.
- Disinfect surfaces, objects, clothing and bedding with chlorine solution
- In the event of a death, do not wash the body. Prompt and safe burial of the dead as quickly as possible, using a body bag.

Sexually Transmitted Infections

Chancroid

This is a bacterial infection, which presents as a small inflammatory papule then pustule at the site of inoculation (genitalia) of men and women, the papule may erode to form painful deep ulceration accompanied by inguinal lymphadenopathy.

Causes

- *Haemophilus ducreyi* (a small gram-negative cocobacillus)

Signs and symptoms

- Soft papule (chancroid) then pustules
- Painful, deep, genital ulcers: the ulcer feels soft, hence the name 'soft sore' (*ulcus molle*)
    - Common sites:
      Men - prepuce, frenulum, glans or shaft of the penis
      Women - labia, fourchette, vestibule, clitoris, cervix, or perineum
- Dysuria
- Painful sexual intercourse (dyspareunia)
- Lymph node swelling in inguinal region

Differential diagnosis

Other causes of genital ulcers include:

- Syphilis, herpes, granuloma inguinale, lymphogranuloma venereum, cancer, trauma and tuberculous chancre

Investigations

- Histologic examination (gram stain)
- Culture and isolation of H. *ducreyi*

Treatment objectives

- Manage symptoms and prevent complications
- Eradicate the organism
- Prevent transmission of infection

Non-pharmacological treatment

- Keep the ulcerated lesions clean

Pharmacological treatment

Non-pregnant patient with chancroid

Ceftriaxone, IM

Adult:

250 mg single dose

OR

Ciprofloxacin, oral

Adult:

500 mg every 12 hours for 3 days (contraindicated in pregnancy)

OR

Adult

Azithromycin 1g single oral dose

OR

Erythromycin, oral

Adult:

1g every 12 hours or 500 mg every 6 hours for 7 days

Note:

- Longer treatment courses may be necessary in immunocompromised patients

Pregnant women with chancroid

Ceftriaxone IM

Adult:

250 mg single dose

Note:

- Ceftriaxone is the treatment of choice in pregnant women

Prevention
- Abstain from sex during treatment or use female or male condom
- Counsel and treat sexual partner(s) regardless of absence of symptoms
- Male circumcision

Referral
- Follow up on patient for a week to confirm improvement of lesion. Refer for specialist care if there is not improvement.

Abnormal vaginal discharge in women

This refers to change of colour, odour and/or vaginal secretions usually accompanied with other signs and symptoms.

Causes
- Vaginitis (*Candida albicans*, Trichomonas *vaginalis* and bacterial vaginosis)
- Cervicitis (*Neisseria gonorrhoea* and Chlamydia *trachomatis*)

Types of discharge	What it might mean	Other signs and symptoms
Bloody or brown	Irregular menstrual cycles, or less often, cervical or endometrial cancer	Abnormal vaginal bleeding, pelvic pain
Cloudy or yellow	Gonorrhoea	Bleeding between periods, urinary incontinence, pelvic pain
Frothy, yellow or greenish with an offensive (bad) smell	Trichomoniasis	Pain and itching while urinating
Pink	Shedding of the uterine lining after childbirth (lochia)	
Thick, white, cheesy	Yeast infection	Swelling and pain around the vulva, itching, painful sexual intercourse
White, gray, or yellow with fishy odour	Bacterial vaginosis	Itching or burning, redness and swelling of the vagina and vulva

Differential diagnosis
- Cancer of the cervix (blood-stained offensive discharge)
- Intra-vaginal use of detergents, chemicals, physical agents, herbs, chronic tampon use and allergic vaginitis

Evaluation/investigations
- History
- Speculum examination
- Vaginal swab: microscopy, gram stain, culture and sensitivity testing
- Blood: syphilis test (VDRL and if positive, do TPHA to confirm an ongoing infection)
- HIV test

Treatment objectives
- Restore normal vaginal secretion
- Alleviate pain
- Prevent complications
- Prevent transmission of the disease

Non-pharmacological treatment
- Advice on avoidance of alcohol consumption during treatment
- Advice patient and partner(s) to abstain from sex while on treatment (or use condom)
- Advice patient on personal hygiene

Pharmacological treatment

Adults:
Ceftriaxone IM
250 mg as a single dose

PLUS
Doxycycline oral
100 mg 2 times daily for 7days
OR
Azithromycin 1g single oral dose

OR
Erythromycin oral
1 g two times daily or 500 mg 4 times daily for 7day

Note:
- Azithromycin and erythromycin can be used for pregnant women
- Treat patients according to presentation as highlighted in the table above by referring to the appropriate section of the Standard Treatment Guidelines.

Prevention
- Advise patient to keep vagina clean by washing regularly with mild soap and water

Referral
- If infection persists refer for specialist care

Abnormal urethral discharge in men

This refers to the presence of abnormal secretion in the distal portion of the urethra.

Causes
- Neisseria *gonorrhoeae*.
- Chlamydia *trachomatis*

Signs and symptoms
- Staining of underwear, frequent urination
- Mucus or pus at the tip of the penis
- Burning pain on passing urine (dysuria)

Evaluation/Investigations
- Take patient's history and examine patient carefully to confirm discharge
- Urethral swab: Gram stain, culture and sensitivity
- Blood: screen for syphilis and HIV

Treatment objectives
- Treat underlying cause
- Manage the signs and symptoms
- Prevent complications
- Prevent transmission of the disease

Non-pharmacological treatment
- Advice on avoidance of alcohol consumption during treatment
- Advice patient and partner(s) to abstain from sex while on treatment or use condom
- Advice patient on personal hygiene

Pharmacological treatment

Treatment of chlamydial infection
Doxycycline oral
100 mg 2 times daily for 7 days

Note:
- Treat partner (s) with similar drugs

If partner is pregnant use
Azithromycin 1g single dose

OR
Erythromycin oral
500 mg every 6hrs for 7 days

Note:
- If gonorrhoea is present refer to section on treatment for gonorrhoea
- Supportive treatment e.g. for pain

Referral
- If infection persists refer for specialist care

Trichomoniasis

Trichomoniasis is one of the most common STIs, caused by a parasitic protozoan Trichomonas *vaginalis*. Women are mostly symptomatic while men are asymptomatic carriers.

Causes
- T. *vaginalis*

Symptoms	**Signs**
In women	***In women***
- Vulvo-vaginal itching, burning or soreness - Pain during sex (major complaint) - Post-coital bleeding, lower abdominal pain	- Purulent, bloody or frothy-yellow green discharge - Vulval inflammation - Pelvic inflammatory disease
In men	***In men***
- Urethritis, urethral pruritus, dysuria, testicular pain, lower abdominal pain	Urethral discharge

Differential diagnosis
- Gonorrhoea
- Trichomoniasis
    - May cause cervicitis or vaginitis

Complications
- Acute salpingitis
- Adverse pregnancy outcomes, particularly premature rupture of membranes, pre-term delivery and low birth weight

Investigations
- Microscopy (this is the gold standard for diagnosis)
- Histology

Treatment objectives
- Eliminate the causative organism in the patient and sexual partner(s)
- Prevent re-infection
- Consistent and correct use of condoms(Male and Female condoms)
- Manage symptoms
- Prevent transmission of the infection
- Prevent complications

Non-pharmacological treatment
- Advice on avoidance of alcohol consumption during treatment
- Advise patient on personal hygiene

Pharmacological treatment

Adult:
Metronidazole oral
2 g as a single dose
OR
400 mg or 500 mg every 12 hours for 7days

OR
Tinidazole oral
2 g orally in a single dose
OR
500 mg orally every 12 hours for 5days

Note:
- Patients should **not consume alcohol** during the course treatment or during the 24 hours after the completion of the medication.

Pregnancy
Metronidazole
2g in a single dose

Note:

- **Metronidazole** is not recommended for pregnant women in the First trimester

Lactation
In lactating women, **breastfeeding must be withheld during treatment** and until 12-24 hours after the last dose to reduce exposure to the infant.

Note:
- Patients on tinidazole therapy should not consume alcohol during therapy or for 72 hours after completion of medication.

Neonatal infections
Metronidazole oral
5 mg/kg 3 times daily for 5days

Prevention
- Advise patient and partner(s) to abstain from sex while on treatment
- Re-screen at 3 months post-therapy for sexually active women, as they have a high risk of re-infection
- Limit number of sexual partners
- Advice on the correct and consistent use of male or female condoms

Referral
- Patients with conditions not responding to the above treatment should be referred for specialized management.

Bacterial Vaginosis (BV)

Bacterial vaginosis is the most common cause of vaginitis. It is characterized by an increase in vaginal discharge and vaginal malodour, caused by a change in the vaginal flora. Not strictly an STI.

Causes
- *Gardnerella vaginalis*
- *Mycoplasma hominis*
- *Mobiluncus curtisii*

Signs and symptoms
- Vaginal odour
- Mild to moderate vaginal discharge (gray, thin, small bubbles in the fluid)
- Vulva irritation, dysuria and dyspareunia (pain during sex)

Differential diagnosis
- Trichomoniasis
- Gonorrhoea

Complications
- Acute salpingitis
- Premature rupture of membranes
- Endometritis
- Pelvic inflammatory disease (PID)

Evaluation/investigations
Vaginal discharge
- pH > 4.5 (pH > 6.0 highly suggestive)
- Microscopic examination (clue cells- vaginal epithelial cells that appear fuzzy without sharp edges when they are coated with bacteria)
- Potassium hydroxide(KOH) test: Drops of a KOH solution are added to a sample of the vaginal discharge. A strong fishy odoor from the mix means bacterial vaginosis is present.
- Vaginal cultures

Treatment objectives
- Eliminate the organism
- Restore normal vaginal secretions

Non-pharmacological treatment
- Diet supplemented with Lactobacillus e.g. yogurt.
- Advise patient to wash only with hypoallergenic bar soaps or no soap at all.

- Avoid vaginal douching with liquid soaps and body washes.

Pharmacological treatment

Metronidazole oral
500 mg every 12 hours for 7days

OR
Metronidazole 0.75% intravaginal gel
Apply gel intravaginally two times daily for 7 days

Pregnancy
Metronidazole oral
500 mg every 12 hours for 7 days
OR
250 mg every 8 hours for 7 days.

Prevention
- Probiotic prophylaxis
- Advise patient to use condom during sex

Referral
- Refer to a gynaecologist if there is recurrence of infection to prevent complications

Genital Ulcer Disease (GUD)

This is an ulcerative, erosive, 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.

Causes

STIs	Non-STI-related infections or conditions
- Herpes Simplex Virus type 1 or 2 (HSV-1 or HSV-2) - Treponema pallidum. causing primary syphilis - Haemophilus ducreyi causing chancroid - Chlamydia trachomatis serotypes L1-L3 causing - Lymphogranuloma venereum (LGV) - *Klebsiella granulomatis* causing granuloma inguinale (donovanosis)	- Infectious non-STI-related causes of genital ulcers - Non-infectious non-STI-related causes of genital ulcers

- Genital ulcer
- Pain
- Urethral discharge

Differential diagnosis
- Cancer of the penis or vulva

Evaluation/Investigations
- Diagnosis is mostly clinical
- Swab for microscopy, culture and sensitivity
- Serology
- Blood for VDRL/TPHA

Treatment objectives
- Treat small ulcers and vesicles, especially if recurrent for Herpes Simplex
- Direct initial management of all ulcers at both syphilis and chancroid

Non-pharmacological treatment
- Keep lesions dry and clean

Pharmacological treatment

For Herpes Simplex
Acyclovir oral
400 mg every 6 hours for 7 days

AND
Paracetamol
500 mg every 6-8 hours or when necessary

In patients with recurrence
Repeat **acyclovir**, the same dose for 5 days

PLUS
Paint lesions with
Povidone iodine topical

OR
Mercurochrome topical

OR
Gentian violet solution topical

Note:
- If **syphilis** is present refer to section on syphilis treatment
- If **chancroid** is present refer to section on chancroid treatment

Referral
- If not responding to treatment refer for specialist care

Acute Epididymo-orchitis (Painful Scrotal Swelling)

This is an inflammation of the epididymis and testis characterized by scrotal pain, tenderness and swelling of less than 6 weeks' duration.

Causes

STI-related	**Non-STI-related**
Chlamydia trachomatis	Testicular torsion
Neisseria gonorrhoeae	Tuberculosis
Treponema pallidum	Mumps orchitis
	Tumours

- Fever
- Unilateral swelling and inflammation of the epididymis, +/- testicle
- Urethral discharge
- Increased frequency of micturition
- Hydrocele
- Scrotal pain

Complications
- Scrotal abscess and pyocele
- Fertility problems
- Testicular atrophy

Investigations
- Urinalysis
- Urine microscopy, culture and sensitivity
- Ultrasound scan of the scrotum

Treatment objectives
- Relieve pain
- Identify and treat underlying causes

Non-pharmacological treatment
- Bed rest
- Scrotal support until inflammation and fever subside

Pharmacological treatment

Sexually transmitted Chlamydia and Gonorrhoea:
Ceftriaxone IM
250 mg as a single dose

PLUS
Doxycycline oral
100 mg two times daily for 10 days

Sexually transmitted Chlamydia, Gonorrhoea and Enteric organisms (e.g. in men who practice insertive anal sex):
Ceftriaxone
250 mg IM as a single dose

PLUS
Ciprofloxacin
500 mg two times daily for 10 days

Enteric organisms:
Ciprofloxacin
500 mg two times daily for 10 days

For pain:
Ibuprofen
400 mg two times daily for 10 days

Referral
- If no improvement after the above treatment refer for specialist care

Pediculosis Pubis

This is infestation of lice, mostly confined to pubic and peri-anal areas. It is a common sexually transmitted disease caused by Phthirus *pubis*

- Papules at the site of bites
- Intense itching in the pubic area
- Small blood stains may be seen on underwear

Evaluation/Investigations
- Physical examination of pubic hair for lice
- Dermascopic examination

Treatment objectives
- Eradicate the lice infestation

Non-pharmacological treatment
- Remove lice from the pubic area using forceps
- Cut infested hair with a shaving machine

Pharmacological treatment

Benzyl benzoate 25% lotion
Apply lotion

OR
Permethrin lotion 1%
Apply lotion and wash off after 10minutes
Repeat after 7-10 days

Prevention
- Frequent changing of underwear - twice a day

Referral
- If infection persists refer for specialist care

Syphilis

This is a venereal disease transmitted by sexual contact with infectious lesions, from mother to foetus in utero, via blood transfusion, and breaks in skin that come in contact with infectious lesions.

Causes

- *Treponema pallidum*

Symptoms	*Signs*
Primary syphilis	**Primary syphilis** (3-4wks after exposure) Painless chancre, punched-out base and rolled edges on penis, vulva or cervix, anus, fingers, tongue, nipples etc.
Secondary syphilis Tiredness, headache, anorexia, nausea, aching pains in the bones. Syphilitic (aseptic) meningitis (in few cases) presents with headache, neck stiffness, facial numbness and weakness; deafness. Hepatitis	**Secondary syphilis** (4-8 weeks after chancre has healed) Painless, gray-white lesions in warm, moist sites. Reddish brown maculo-papular rash over entire body (palms, soles, oral mucosae) Swollen lymph nodes Loss of hair on scalp and face, including eye brows
Latent syphilis (< 1 year in duration): Asymptomatic If untreated progresses to tertiary syphilis	**Latent syphilis** (< 1 year in duration): Positive serological test result in the absence of clinical signs
Tertiary syphilis (up to 40 years after primary infection) Impaired balance; sensation of pins and needles at extremities; incontinence and impotence Hearing problems and vision loss Dementia Chest pain, back pain Headache, dizziness, mood disturbance; weakness and wasting	**Tertiary syphilis** (up to 40 years later after primary infection) Necrotic tissue (gummas) in liver, testes, bones or any organ; cardiovascular syphilis; neurosyphilis

Differential diagnosis

- Other causes of genital ulcers
- Chancroid, herpes, lymphogranuloma venerum, granuloma inguinale, trauma, Behhcet's disease, tuberculous ulcer; cancer

Investigations

- Dark- field microscopy (definitive diagnostic test)
- Serologic testing using the Venereal Disease Research Laboratory (VDRL)
  Note: VDRL test turn positive 1-2 weeks after chancre formation.
- Pregnant females should be screened for syphilis at first prenatal visit
- Screen all patients for HIV infection
- Histology

Treatment objectives

- Manage symptoms
- Eradicate infection
- Prevent transmission of the disease

Non-pharmacological treatment

- Advise on the importance of using condoms
- Advise to abstain from sex during treatment
- Encourage partner testing

Pharmacological treatment

A. Patient with no penicillin allergy	**B. Patient with penicillin allergy**	**Child with no allergy to penicillin (congenital syphilis)**
1st line treatment **Adult:** **Primary or secondary** Early latent syphilis (<2 years duration) • Benzathine benzyl penicillin G 2.4 million IU, IM in a single dose **OR**	**1st line treatment** **Doxycycline**, oral **Adult:** 100 mg every 12 hours for 30days **Note** Pregnancy It should not be used in a	**1st line treatment** **Benzathine penicillin G** **Child:** • **Children >2 years:** Benzyl penicillin 200,000-300,000 IU/Kg (maximum 2.4million IU) IV or IM weekly in divided doses for 2weeks

• Procaine benzyl penicillin 1 million IU, IM, every 24 hours for 10 days <u>Late latent syphilis or late syphilis (other than neurosyphilis)</u> • Benzathine benzyl penicillin G 2.4 million IU, IM, weekly for 3 weeks. **Pregnancy**: Give treatment appropriate to the stage of syphilis as recommended above (2.4 million units IM every week x 2 dose. Pregnant patients must repeat full course of therapy If HIV positive: 2.4 Mega units IM every week x 3 doses. **OR** • **Procaine Penicillin,** 1million IU, IM every 24 hours for 3weeks.	pregnant woman unless, in judgement of physician	• **Children ≤ 2years:** Benzyl penicillin 25,000IU/kg (maximum 1.5million IU) IV or IM, every 12 hours for 10days **OR** • **Procaine benzylpenicillin** **<u>Child:</u>** Congenital Syphilis: 50,000 IU/kg (maximum 1.5million IU) IM, every 24 hours for 10days Primary, secondary, and latent (aged 12 years or older): as adults, 600,000 units IM per day for 8 days. **<u>Child with penicillin allergy</u>** **Doxycycline, oral** **Child:** <or equal to 8 years not recommended for middle to moderate infections >8 years: 2mg/kg; ,maximum 100mg) orally every 12 hours for 30days
2nd line treatment **Tetracycline**, oral **<u>Adult:</u>** **Early syphilis** 500 mg every 6 hours for 15 days **Late Syphilis** 500 mg every 6 hours for 30 days **OR** **Erythromycin**, oral **<u>Adult:</u>** Primary syphilis Erythromycin 500 mg orally every 6 hours for 15 days	**2nd line treatment** **Tetracycline** **Note:** Avoid in pregnancy Give pregnant women adult erythromycin dose under supervision	**2nd Line Treatment** **Tetracycline** **<u>Child:</u>** > 8 years 25-50 mg/kg/day orally divided every 6 hours, not to exceed 3g/day Up to 8 years: not recommended **OR** **Erythromycin, oral** **<u>Neonates:</u>** < 1.2 kg: 20 mg/kg/day divided every 12 hours 1.2 kg or more; 0-7 days old: 20 mg/kg/day in divided every 12 hours 1.2 kg or more, 7 days or older: 30 mg/kg/day divided every 8 hours **<u>Child:</u>** Mild to moderate infections: 30-50 mg/kg/day in divided every 6-12 hours Severe infection 60-100 mg/kg/day in divided doses every 6-12 hours 7.5-12 mg/kg; maximum 250 mg orally every 6 hours for 15 days

Prevention

- Limit spread of infection (counsel on safe sex practices and avoidance of sharing of sharp objects)
- Notification and treatment of sexual partners and exposed drug partners
- Educate health care workers to use standard precautions when treating all patients.
- Empiric treatment is recommended in all patients who have had contact with an infected person.

Referral

- Refer to a specialist if complications arise, especially tertiary syphilis

Genital Herpes

This a viral infection. Two types exist - Herpes Simplex type 1 (HSV-1) and Herpes Simplex type 2 (HSV-2). HSV-1 is associated with orofacial disease while HSV-2 is associated with genital disease. Both viruses can however cause either oral or genital lesions.

Causes

- Herpes Simplex Virus

- Gingivitis - the most striking feature, with markedly swollen, erythematous, friable gums
- Anorexia, fever, malaise, headache, dysuria, sore throat, myalgia, pain, itching
- Vesicular lesions (oral mucosa, tongue, and lips, vagina, penis, thighs and buttocks)
- Tender regional lymphadenopathy

Investigations

- HSV is best confirmed by isolation of the virus in tissue culture
- PCR is more sensitive than culture and is preferred for CNS and ocular infections.

Treatment objectives

- Manage symptoms and morbidity
- Prevent complications

Pharmacological treatment

- No cures available for either types
- Antiviral treatment provides symptomatic relief and reduces duration of symptoms

1st line treatment	Pregnancy	1st line treatment
Acyclovir, oral, Genital Herpes **Adult:** - Initial treatment 400 mg every 8 hours for 7-10 days. - Intermittent treatment for recurrence 400 mg every 8 hours for 5 days - Chronic suppression for recurrence 400 mg every 12 hours for up to 12 months.	- Primary or first episode infection 400 mg every 8 hours for 7-10 days - Symptomatic recurrent episode 400 mg every 8 hours for 5 days or 800 mg orally every 12 hours for 5 days - Daily suppression 400 mg orally, every 8 hours from 36 weeks estimated gestational age until delivery - Severe or disseminated disease 5-10 mg/kg, intravenously every 8 hours for 2-7 days, then oral therapy for primary infection to complete 10 days	Acyclovir **Neonates:** 30 mg/kg/day IV divided every 8 hours for 14-21 days

Prevention

- Advice on the use of condoms and treatment of sexual partners to prevent further spread
- Strategies to prevent vertical HSV transmission:
    - Antiviral suppression for gravidas with first episode infection during pregnancy
    - Routine antiviral suppression for gravidas with a history of genital HSV
    - Identification of seronegative gravidas at risk of primary and non-primary first episode genital HSV infections.

Referral

- Refer for specialist care in cases of complications like bacterial and fungal super-infections of the respiratory tract or CNS.

Genital Warts

It is a superficial mucocutaneous infection that affects the penis, vulva, vagina, cervix, perineum, and perianal area.

Causes
- Human papilloma virus (HPV): causes viral warts (condylomata *acuminata*)
- Treponema *pallidum*: causes syphilitic warts (condylomata)
- Molluscum *contagionsum* virus

- Painless bumps (single or multiple eruptions which can be pearly, filiform, fungating, cauliflower or plaque-like
- Discharge, vaginal bleeding, urethral bleeding or obstruction

Differential diagnosis
- Herpes simplex
- Syphilis

Investigations
- Pap smear
- Colposcopy
- Biopsy if cancer is suspected

Treatment objectives
- Alleviate symptoms
- Stop bleeding if there is any
- Relieve urethral obstruction if there is any
- Search for co-existence of other STIs

Non-pharmacological treatment
- Cryotherapy (recommended to treat external genital/perianal warts, vaginal warts, and urethral meatal warts)
- Surgical excision has the highest success rates

Pharmacological treatment

Keratolytic
Adult:
Podophyllum resin 25% topical solution
Apply solution to lesion

OR
Adult:
Imiquimod 5% topical cream
Apply every 4 hours, 3 times a week for a maximum of 16 weeks

Prevention
- Vaccination with 2 or 4-valent HPV vaccine. The 9-valent HPV vaccine is preferable (if available) as it covers 9 subtypes of the HPV strains 6, 11, 16, 18, 31, 33, 45, 52 and 58.
- Encourage partners to correctly and consistently usecondom during sex.

Referral
- Refer for specialist care treatment is ineffective, to prevent complications
- Refer to an oncologist if precancerous cells are detected

Vulvovaginal Candidiasis

This is a yeast infection of the vagina vulva.

Cause
- Candida *albicans:* most common
- *C. dubliniensis; C. kefyr; C. krusei; C. glabrata; C. guilliermondii; C. parapsilosis; C. tropicalis:* these are increasingly identified as causes of non-albicans candidiasis.

Classification of vulvovaginal candidiasis (VVC)

Uncomplicated vulvovaginal candidiasis	**Complicated**
- Sporadic or infrequent VVC	- Recurrent VVC
- Mild-to-moderate VVC	- Severe VVC

- *Likely to be Candida albicans present in women who are not immunocompromised*	- Non-albicans candidiasis - Likely in women with diabetes, immunocompromised conditions (e.g. HIV infection), debilitation, or immunosuppressive therapy (e.g. corticosteroids)

- Vaginal ulcers
- Abnormal vaginal discharge
- Vaginal itching
- Painful sexual intercourse dyspareunia
- Dysuria

Differential diagnosis
- Other causes of vaginal discharge (see Gonorrhoea)

Investigations
- Positive KOH examination
- Culture of vaginal discharge

Treatment objectives
- Cure the infection
- Prevent recurrence

Pharmacological treatment[4]

Recommended treatment for Uncomplicated VVC
Vaginal and vulval candidiasis

Clotrimazole 1% or 2% cream
Adult:
Apply to anogenital area 2-3 times a day

Vaginal candidiasis
Clotrimazole 10% intravaginal cream
Adult: 5 g per dose via applicator intravaginally at night. Repeat once if necessary

OR
Miconazole vaginal capsules
Child or Adult:
One ovule to be inserted intravaginally at night.
Dose may be repeated if required

OR
Miconazole 2% cream
5 g intravaginally twice daily for 7days or once daily for 10-14 days
Apply cream to anogenital area twice daily

Caution:
- Avoid applicators in young girls who are not sexually active unless there is no alternative
- Avoid in acute porphyria

AND
Fluconazole oral
150 mg single dose

Recommended treatment for Complicated VVC
Recurrent VVC

1st Line Treatment
Fluconazole oral
100 mg or 150 mg or 200 mg weekly for 6 months

[4] CDC guidelines

Maintenance therapy
Fluconazole oral
100 mg or 150 mg or 200 mg every third day for a total of 3 doses [day 1, 4, and 7]

Severe VVC
Fluconazole oral
150 mg in two sequential oral doses (72 hours after initial dose) is recommended

Immunocompromised host
Fluconazole oral
100 mg or 150mg or 200 mg every third day for a total of 3 doses [day 1, 4, and 7]

Pregnant women
Give only topical azole therapies, applied for 7 days
Clotrimazole 1% or 2% cream
Apply to anogenital area 2-3 times a day

OR
Miconazole vaginal capsules
Adult or child:
One ovule to be inserted intravaginally at night.
Dose may be repeated if required

Miconazole 2% cream
5 g intravaginally twice daily for 7days on once daily for 10-14 days
Apply cream to anogenital area twice daily

Caution:
- Avoid applicators in young girls who are not sexually active unless there is no alternative
- Avoid in acute porphyria

HIV infected Patients
Fluconazole oral
200 mg weekly

Prevention
- Reduce or eliminate predisposing factors, after defecation cleaning should be done backwards to prevent contamination of the vulva and vagina

Referral
- If no improvement refer for specialist care

Gonorrhoea

This is a bacterial infection that may involve the genitals, conjunctivae, mouth, and/or rectum.

Causes
- Neisseria *gonorrhoeae*

Signs and symptoms in men	***Signs and symptoms in women***
- Burning sensation during urination - Foul smelling urethral discharge of pus with/without burning sensation - Oropharyngeal gonorrhoea from orogenital sex (fellatio) may present as mouth sores	Mostly asymptomatic - Vaginal discharge, burning sensation during urination, lower abdominal pain or pain with sexual intercourse - Cervicitis - Oropharyngeal gonorrhoea from orogenital sex (fellatio) may present as mouth sores

Complications in men
- Littre abscess involving peri-urethral glands
- Para-urethral abscesses
- Proximal urethral involvement with frequency and terminal haematuria
- Cowper's gland abscess involving the bulbo-urethral glands, producing a swelling behind the base of the scrotum that can produce a proximal or Cowper's stricture
- Prostatitis

- Proctitis
- Urethral stricture leading to hydroureters and hydronephrosis
- Chronic epididymo-orchitis leading to sterility

Complication in women
- Pelvic inflammatory disease (PID)
- Ectopic pregnancy
- Infertility
- Premature rupture of membranes
- Premature labour
- Chorioamnionitis
- Septic abortion

Risk to the new-born infant:
- Ophthalmia neonatorum
- Oropharyngeal gonorrhoea

Differential diagnosis
- Trichomoniasis, vulvovaginal candidiasis, bacterial vaginosis, chlamydiasis, genital warts, cervical warts, syphilitic chancre
- Balanitis, trauma, tumour, testicular torsion

Investigations
- Urethral and vaginal swab for microscopy, culture and sensitivity
- Urine test
- Blood cultures- if disseminated
- VDRL
- HIV screening

Treatment objectives
- Eliminate the organism in the patient and treat partners(s)
- Prevent re-infection
- Prevent complications

Pharmacological treatment

Uncomplicated genital and anorectal gonococcal infections
Ceftriaxone IM
Adult:
250 mg as a single dose

OR
Ciprofloxacin oral
500 mg orally as a single dose

Note:
- Contraindicated during pregnancy

Complicated genital and anorectal gonococcal infections
Ceftriaxone IM
Adult:
1 g IM, every 24 hours for 7days

Uncomplicated oropharyngeal gonococcal infections
Adult and adolescent:
Ceftriaxone IM
250 mg IM as a single dose

Uncomplicated gonorrhoea
Cefixime oral
200 mg oral single dose

Complicated genital and anorectal gonococcal infections
Ceftriaxone IM
Adult:
1g IM, every 24 hours for 7 days

Re-treatment of gonococcal infections after treatment failure
Ceftriaxone IM
500 mg IM as a single dose

OR
Gentamicin IM
240 mg IM as a single dose

Gonococcal conjunctivitis in neonates
Ceftriaxone IM or IV
50 mg/kg (maximum 125 mg) IM or IV as a single dose

For ocular prophylaxis immediately after birth
Tetracycline hydrochloride 1% eye ointment
Apply to both eyes immediately after birth for 7 days

OR
Chloramphenicol 1% eye ointment
Apply to both eyes immediately after birth for 7 days

Gonococcal meningitis and endocarditis
Ceftriaxone IV
1-2 g IV every 12-24 hours for 2-4 weeks, respectively

Prevention
- Advise patient to use condom during sex
- Clean the eyes of new born immediately after birth
- All infants should receive topical anti-gonococcal therapy immediately after birth e.g. tetracycline, 1% ointment

Referral
- If infection persists after the above treatment refer for specialist care

Chlamydia Infection

This is a bacterial infection that can infect women in the cervix, rectum, or throat and men in the urethra, rectum or throat. It is the most common bacterial STI.

Causes
- *Chlamydia trachomatis*

In women	In men
- Abnormal vaginal discharge which may have a strong smell - Burning sensation when urinating - Pain during intercourse - If the chlamydia infects the rectum of women it can cause rectal pain, discharge, and/or bleeding	- Discharge from the penis - Burning sensation when urinating - Pain and swelling in one or both testicles (though less common) - If the chlamydia infects the rectum of men it can cause rectal pain, discharge, and/or bleeding

Differential diagnosis
- Other causes of vaginal or urethral discharge (see Gonorrhoea)

Complications
- Pelvic inflammatory disease (PID)
- Pelvic pain
- Infertility
- Ectopic pregnancy
- Epididymo-orchitis
- Sterility in males

Investigations
- Microscopy, culture and sensitivity (of discharge)
- Swab test

Treatment objectives
- Eliminate the organism in the patient and treat partners(s)
- Prevent re-infection
- Prevent complications
- Counsel and screen for possible co-infection so that appropriate management can be instituted

Non-pharmacological treatment
- Advise patient to clean his/her genital thoroughly

Pharmacological treatment

Uncomplicated genital (cervix & urethra) chlamydia infections
Doxycycline oral
Adult:
100 mg every 12 hours for 7 days
Child:
> 8 years: 2 mg/kg; maximum 100 mg orally every 12 hours for 7 days

Note:
- Contraindicated during pregnancy

OR
Erythromycin 500 mg
Child: 10-15 mg/kg; maximum 500 mg orally every 6 hours for 7 days

Uncomplicated anorectal chlamydia infections
Doxycycline oral
Adult:
100 mg every 12 hours for 7 days

Child:
> 8 years: 2 mg/kg; maximum 100 mg orally every 12 hours for 7 days

Note:
- Contraindicated during pregnancy

Neonates with chlamydia conjunctivitis
Erythromycin oral
50mg/kg/day in four divided doses daily for 14days

Pregnant women with chlamydia infection
Amoxicillin oral
500 mg orally three times a day for 7 days

OR
Erythromycin oral
500 mg four times a day for 7 days

Prevention
- Follow prevention guide in section on Gonorrhoea

Referral
- If no improvement with the above treatment refer for specialist care

Neonatal Conjunctivitis (Ophthalmia Neonatorum)

This is a conjunctival infection of neonates contracted by new-borns during delivery

Causes
- Neisseria *gonorrhoeae* or *Chlamydia trachomatis*

- Non-STI causes: difficult labour; early rupture of membranes; vacuum extraction or other assisted vaginal delivery; Staphylococcus *aureus;* viral
- Conjunctival discharge: purulent, mucoid or mucopurulent, depending on the cause
- Conjunctivae show hyperaemia and chemosis; eyelids are usually swollen
- Pain and tenderness in the eyeball

Complications
- If untreated, may lead to: corneal ulceration, perforation, scaring and blindness

Investigations
- Pus swab, Gram stain, microscopy, culture & sensitivity

Treatment objectives
- Eradicate the causative organism
- Prevent complications

Non-pharmacological treatment
- Clean eyes with normal saline or sterile water

Pharmacological treatment

Ophthalmia neonatorum
Erythromycin 12.5 mg/kg in 4 divided doses orally, daily for 14 days

Prophylaxis
Tetracycline hydrochloride 1% eye ointment
Apply to both eyes immediately after birth

OR
Silver nitrate 1% solution
Apply to both eyes immediately after birth

OR
Chloramphenicol 1% eye ointment
Apply to both eyes immediately after birth

Prevention
- Screen and treat all infected mothers in antenatal care

Referral
- Refer neonate to eye specialist if symptoms worsen

Lymphogranuloma venereum (LGV) - Climatic bubo

This is a chronic infection of the lymphatic system

Causes
- Chlamydia *trachomatis* (serotypes L1, L2, L3)

1st Stage LGV (3-30 days)	**2nd stage LGV (2-6 weeks)**	**3rd stage (genito-anorectal syndrome/anogenitorectal syndrome**
Lesions occur in form of small painless papule, pustule, nodule shallow erosion or herpetiform ulcer on the posterior vaginal wall, vulva, cervix or rectum, and on the coronal sulcus in men There may be muco-purulent discharge from the urethra, vagina or rectum	Inguinal syndrome (painful inguinal lymph nodes) mostly in men (unilateral/bilateral enlargement, inflammation, suppuration and abscesses) Anorectal syndrome -receptive anal sex (proctitis, pain during urination, rectal bleeding, pain during passing stools, abdominal pain, anal pain) Intra-abdominal or retroperitoneal lymphadenopathy (low abdominal pain) Systemic presentation (fever, chills, malaise, myalgias, and arthralgias.	Mainly in women but also in homosexual men (chronic inflammation, perirectal abscess, anal fistulas, strictures and stenosis of rectum, lymphorroids, chronic penile and scrotal oedema

Differential diagnosis
- Chancroid
- Colitis
- Granuloma inguinale
- Herpes simplex, syphilis

Complications
- Necrosis and rupture of lymph nodes
- Anogenital fibrosis and strictures
- Anal fistulae
- Elephantiasis of genital organ
- Systemic complications (pneumonia, hepatitis)

Investigations
- Serology tests - complement fixation, immunofluorescence

Treatment objectives
- Eradicate the causative organism
- Prevent complications

Pharmacological treatment

Adult:
Doxycycline
100 mg two times daily for 14-21 days

OR
Erythromycin oral
500 mg four times daily for 14-21 days
OR
Azithromycin 500mg oral for 14-21 days

Pregnant and lactating female
Erythromycin oral
500 mg four times daily for 21 days
OR
Azithromycin 500mg oral for 14-21 days

HIV patient
Treat the same as HIV negative patients, but for longer

Sex partners exposed to patient in the last 60 days
Doxycycline oral
100 mg two times daily for 7 days
OR
Azithromycin 500mg daily for 14-21days
OR
Erythromycin oral
500 mg four times daily for 14-21 days

Prevention
- Advise patient to use condom during sexual intercourse

Referral
- If no improvement after the above treatment refer for specialist care

Pelvic Inflammatory Infection (PID)

PID is an inflammation of the uterus, fallopian tubes, ovaries and pelvic peritoneum. It is also known as lower abdominal pain syndrome.

Causes
- Neisseria *gonorrhoeae*, Chlamydia *trachomatis* and anaerobic bacteria

Signs and symptoms
- Abnormal vaginal discharge
- Menometrorrhagia (prolonged and excessive uterine bleeding)
- Lower abdominal pain and tenderness
- Vomiting, painful micturition
- Painful coitus (dyspareunia)
- Fever

Complications
- Chronic lower abdominal pain
- Pelvic abscess
- Ectopic pregnancy
- Dysmenorrhea
- Infertility

Evaluation/Investigations
- Physical examination
- HIV test
- Wet prep
- Endometrial biopsy with histopathologic evidence of endometritis
- Laparoscopic findings consistent with PID

Treatment objectives
- Relieve pain
- Eliminate the causative organism
- Prevent complications

Non-pharmacological treatment
- Advise patient to maintain good hygiene

Pharmacological treatment

First line
Ceftriaxone IM
250 mg as a single dose

AND
Doxycycline
100mg every 12 hours for 14 days

Note:
- Contraindicated in pregnancy

AND
Metronidazole oral
400-500 mg every 8 hours for 14 days

Second line
Ceftriaxone IM
1g as a single dose

AND
Doxycycline oral
1OO mg, every 12 hours for 14 days

AND
Metronidazole oral
400-500 mg every 12 hours for 14 days

Third line
Gentamicin IV or IM
2 mg/kg loading dose, followed by a maintenance dose of 1.5 mg/kg every 8 hours

Prevention
- Advise to abstain from sexual intercourse until therapy is completed
- Treat partner(s)

- Consistent and correct condom use

Referral
- If no improvement with the above treatment refer for specialist care

Oropharyngeal Syndrome

Oral sex can lead to oropharyngeal STIs (infections of mouth and throat)

Causes
- Human papilloma virus (HPV), Herpes, *Neisseria gonorrhoeae*, *Chlamydia trachomatis*

Evaluation
- Physical examination of the oral cavity

First visit Patient complains of sore throat, pain on swallowing or dry throat - Take history, examine the throat in good light **If positive history of oral sex** - Treat for gonorrhoea, chlamydia **Second visit** **No improvement** - Provide prolonged chlamydia or gonorrhoea treatment.	**First visit** Patient complains of sore throat, pain on swallowing or dry throat - Take history, examine the throat in good light **No history of oral sex** - Treat for other course of tonsillitis **Amoxicillin** oral 500 mg oral every 8 hours for 7 days **AND** - Mouth gargle	**First visit** Patient complains of sore throat, pain on swallowing or dry throat - Take history, examine the throat in good light **Oral thrush present** - Treat for oral candidiasis **Fluconazole** 200 mg or 150 mg oral once daily for 7 days **Miconazole/Nystatin** oral gel 5 mL apply every 12 hours for 7 days

Referral
- If no improvement refer to specialist

Granuloma Inguinale (Donovanosis)

This is a disease that affects the skin and mucous membranes in the genital region; results in nodular lesions that evolve into ulcers

Causes
- *Klebsiella granulomatis*

Signs and symptoms
- Genital lesion which becomes ulcerated with offensive discharge
- Pseudoelephantiasis of the genitalia, excruciating pain

Differential diagnosis
- Syphilis
- Chancroid
- *Lymphoranuloma venerum*
- Squamous cell and basal carcinoma

Complications
- Obstructed labour
- Squamous cell carcinoma

Investigations
- Direct microscopy

Treatment objectives
- Eliminate the causative organism
- Prevent re-infection

- Prevent complications

Non-pharmacological treatment
- Clean ulcer and maintain good hygiene

Pharmacological treatment

Doxycycline oral
100 mg orally twice a day for at least 14 days and until all lesions have completely healed

OR
Trimethoprim-sulfamethoxazole oral
160 mg/800 mg tablet two times a day for at least 14 days and until all lesions have completely healed

Note:
Addition of another antibiotic to these regimens can be considered if improvement is not evident within the first few days of therapy:

Gentamicin IV
1 mg/kg IV every 8 hours - especially for HIV patients

Prevention
- Counselling, compliance, condom use and contact treatment of sexual contact(s)

Referral
- Refer for specialist care if no improvement

Ano-Rectal Syndrome

These are painful but common conditions like haemorrhoids, tears, fistula, or abscesses that affect the anal region.

Causes
STI Related
- *Chlamydia trichomatis*
- *Treponema palladium* and Herpes *simplex*

Non-STI Related
- Anal fissure
- Faecal impaction
- Food intolerance
- Gastroenteritis
- Inflammatory bowel disease
- Crohn's disease
- Ulcerative colitis

Signs and symptoms
- Pus discharge
- Redness of the rectum/anal canal (proctitis)
- Itching of the rectum; burning sensation

Evaluation/Investigations
- Palpitation of anogenital area
- Digital anoscopy
- HIV tests
- Other investigations as appropriate

Pharmacological treatment

Ceftriaxone IM
250 mg in a single dose

PLUS

Doxycycline oral

100 mg twice a day for 7days

Referral

- Refer for specialist care if no improvement

HIV and HIV-related Infections

Human Immunodeficiency Virus (HIV)/Acquired Immune Deficiency Syndrome (AIDS)

Human immunodeficiency virus (HIV) is a virus that affects primarily CD4 cells (T-helper cells) and leads to the progressive destruction of the immune system which protect the body against infections and malignancies. Without treatment, HIV may gradually destroy the immune system and lead to AIDS which is the most advanced stage of the HIV infection.

Clinical Course of HIV Disease:

Acute (Primary) HIV Infection(acute seroconversion illness)

This occurs 1-4 weeks after infection. Infected people experience transient flu-like symptoms, which may include:

- Mild fever
- Muscle aches and pains
- Fatigue
- Enlargement of lymph nodes
- Sore throat
- Fever
- Skin rash

This stage is difficult to diagnose using standard laboratory assays.

Seroconversion:

- Usually occurs within 4 weeks. Patients develop antibody response, which is detectable by a positive HIV antibody test.

Asymptomatic infection

The individual feels well despite on-going viral replication. Usually lasts a variable period and is marked by a gradual decline in CD4 cell counts.

Early Symptomatic Infection:

- Generalized lymphadenopathy
- Weight loss
- Night sweats
- Pruritic skin rash
- Unexplained fever
- Chronic diarrhoea
- Oral candidiasis
- Oral hairy leucoplakia
- Herpes zoster
- Pneumococcal infections
- Pulmonary TB

Late Disease/AIDS defining Illness

This period is marked by the appearance of opportunistic infections and neoplasms:

- Pulmonary/extrapulmonary tuberculosis and disseminated TB
- *Pneumocystis* pneumonia.
- *Cryptococcal meningitis*
- Recurrent bacterial pneumonia
- Candida oesophagitis
- CNS toxoplasmosis
- *Kaposi sarcoma*
- Non-Hodgkin's lymphoma
- Disseminated/extrapulmonary coccidiomycosis, cryptococcosis or histoplasmosis
- Chronic (> 1 month) intestinal cryptosporidiosis or isosporiasis
- Disseminated extrapulmonary mycobacteria (non-tuberculous)
- Progressive multifocal leukoencephalopathy (PML)
- Recurrent salmonella septicaemia
- HIV wasting syndrome

Staging of HIV/AIDS

WHO Clinical Stage 1	WHO Clinical Stage II	WHO Clinical Stage III	WHO Clinical Stage IV
For Adults and Children • Asymptomatic • Persistent generalized lymphadenopathy	For Adults • Moderate unexplained weight loss (under 10% of presumed or measured body weight) • Angular cheilitis For Adults and Children • Papular itchy skin eruptions • Recurrent oral ulcerations (2 or more episodes in 6 months) • Herpes zoster • Recurrent or chronic respiratory tract infections (sinusitis, otorrhea, tonsillitis, otitis media) • Fungal nail infections Additional for Children • Unexplained persistent hepatomegaly & splenomegaly • Extensive wart virus infection • Extensive molluscum contagiosum • Unexplained persistent parotid gland enlargement • Lineal gingival erythema	For Adults • Unintentional weight loss >10% of body weight in absence of other illness For Adults and Children • Oral candidiasis (after first 6 weeks of life) • Oral hairy leukoplakia • Persistent diarrhea (>1 month in adults, > 14 days in children) • Unexplained anemia (<8g/dl), neutropenia (1000/mm^3), or thrombocytopenia (<50,000/mm^3) • Pulmonary TB • Acute necrotizing ulcerative gingivitis/periodontitis • Unexplained fever (above 37.5°C, intermittent or consistent, for > 4 weeks) Additional for Children • Unexplained moderate malnutrition not adequately responding to standard therapy((For children younger than 5 years, moderate malnutrition is defined as weight-for-height <–2 z-score or mid-upper arm circumference ≥115 mm to <125 mm) • lymph node TB • Severe recurrent bacterial pneumonia • Symptomatic lymphoid interstitial pneumonia • Chronic HIV-associated lung disease	For Adults and Children • HIV wasting syndrome • Pneumocystis pneumonia • Chronic herpes simplex infection (orolabial or cutaneous >1 month, any organ) • Extrapulmonary TB • Kaposi sarcoma • Cytomegalovirus (CMV) infection; retinitis or CMV infection affecting another organ with onset at age > 1 month • Cryptococcus (including meningitis) • Central nervous system toxoplasmosis (after neonatal period) • Disseminated endemic mycosis (extrapulmonary histoplasmosis, coccidiomycosis) • Cryptosporidiosis with diarrhea > 1month • Isosporiasis with diarrhea > 1 month • Progressive multifocal leukoencephaly • Candidiasis of oesophagus, trachea, bronchus • Atypical mycobacterium (MAC) • Lymphoma • HIV encephalopathy • HIV-associated cardiomyopathy or nephropathy Additional for Children • Unexplained severe wasting, stunting or severe malnutrition not responding to standard therapy • Recurrent severe bacterial infections (empyema, sepsis, meningitis, pyomyositis, bone or joint infections) or bacteremia • Extrapulmonary TB, (excluding TB lymphadenopathy)

Differential diagnosis

- Tuberculosis
- Untreated diabetes mellitus
- Malnutrition
- Malignancies
- Other chronic diseases

Investigations

Clinical assessments include medical history and physical examinations

- Full blood count and differentials
- VDRL (or RPR)
- Sputum Xpert for MTB/Rif
- Tuberculin test (PPD)
- Sputum smears for TB
- Urea, electrolytes, and creatinine
- Blood glucose
- Liver function tests
- Lipid studies (fasting triglycerides, LDL, HDL)
- HBV, HCV serology
- Cervical (PAP) smears
- CD4 T cell counts
- HIV RNA level (viral load)
- HIV DNA (paediatric diagnosis <18 months of age)
- Genotype and phenotype assays for resistance testing

Treatment objectives

- Clinical: prevent disease progression
- Immunological: restore immunity
- Virologic: control or suppress viral replication
- Public health: reduce infectivity

Referral

Refer to the Consolidated HIV Guideline for diagnosis, treatment and prevention.

Tuberculosis (TB)

Features
- Cardinal features of pulmonary TB: cough, night sweats, fever and weight loss.
- Pleural effusion is seen more frequently
- Lung infection mimics community acquired pneumonia
- Chest radiograph may be normal in spite of TB
- Sputum smear is often negative
- Tuberculin test is often non-reactive
- Multi-drug resistant tuberculosis is frequent
- Infection by mycobacterium species other than M. *tuberculosis* is common

Referral
- Refer to HIV clinic

Acute Infective Diarrhoea

AIDs-associated diarrhoea may be caused by:
- Salmonella
- E. coli
- Shigella
- Clostridium species
- Campylobacter
- V. cholerae
- E. histolytica
- *Salmonella, shigella and campylobacter cause more severe diarrhoea with longer duration*

Signs and symptoms
- Frequent stools (sometimes with blood) leading to dehydration
- Vomiting
- Fever
- Abdominal pain or cramps

Referral
- Refer to HIV clinic

Mycobacterium Avium Complex (MAC)

Rarely occurs in Sierra Leone; manifests with CD4 counts <50

Signs and symptoms
- Fever
- Night sweats
- Weight loss
- Fatigue
- Diarrhoea
- Wasting
- Lymphadenopathy
- Hepatosplenomegaly

Referral
- Refer to HIV clinic

Mycobacterium Kansasii

Causes:
- It is caused by *Mycobacterium kansasii* and is rare in Sierra Leone

Signs and symptoms
- Fever
- Cough
- Dyspnoea
- Chest radiograph shows thin walled cavities and reticular infiltrates.

Referral
- Refer to HIV clinic

Herpes Simplex

Causes
- Herpes simplex virus (HSV)
- Primary infection usually occurs 2–12 days after introduction of infectious secretions into the oral cavity (Type 1) or genital area (Type 2)

Signs and symptoms
Type 1
- Located on the mouth and lips
- Cluster of small painful vesicles, which could be single or multiple
- Vesicles begin on the buccal or gingival mucosa or tongue
- Vesicles rupture leaving ulcers
- Painful oral lesions and foul breath
- Fever

Type 2
- Located on the buttocks, perineum, scrotum, vulva and penis, and rarely in the rectum
- Tender vesicular lesions in the genital area
- Vesicles ulcerate and are covered with greyish white exudates

Referral
- Refer to HIV clinic

Herpes Zoster (Shingles)

Cause
- This is caused by Herpes Zoster virus

Signs and symptoms
- Crops of vesicles on the skin - localized to a dermatome
- Fever, pain and sores
- Eczema (persistent itching, skin rash)

Genital Warts (See section under Sexually Transmitted Infections)
Vaginal candidiasis *(See section under Sexually Transmitted Infections)*
Oral candidiasis *(See section under Oral Infections)*

Oesophagitis

This is inflammation of the oesophagus caused by infection with fungi, mainly *Candida albicans*

Signs and symptoms
- Odynophagia
- Dysphagia
- Oral Lesions

Cryptococcosis

- This fungal infection is often associated with advanced HIV infection.
- Often appears as meningitis and occasionally as disseminated disease.
- Caused by Cryptococcus neoformans

Signs and symptoms
- Fever
- Headache
- Dizziness
- Confusion
- Irritability
- Seizures – occasional

Meningitis

Signs and symptoms
- Fever – low grade, intermittent
- Headache -mild
- Malaise
- Nausea and vomiting
- Fatigue
- Loss of appetite
- Altered mental status and irritability
- Seizures – rare
- Coughing
- Sweats
- Difficulty in breathing

Pneumocystis Pneumonia ***(See section on Respiratory Conditions)***

AIDS – Associated Diarrhoea

This condition has multiple aetiologies. It is important to identify the cause.

Causes
- Cryptosporidium
- Isospora species
- Giardia
- Microsporidia
- Entamoeba histolytica

Microsporidia

Microsporidia are spore forming parasites belonging to the phylum Microspora. There are over 1,000 species belonging to this phylum. The hosts include fish, mosquitoes, fleas, rodents, rabbits.

Signs and symptoms
- Chronic diarrhoea (loose, watery, non-bloody) with malabsorption
- Weight loss
- Abdominal pain
- Nausea
- Vomiting

In disseminated infections, symptoms of cholecystitis, renal failure and respiratory infections can occur.

Giardiasis

Giardia infection is caused by a microscopic, flagellate protozoan called *Giardia intestinalis* (previously known as *G. lamblia* or *G. duodenalis*). Found worldwide, especially in areas with poor sanitation and unsafe water

Signs and symptoms
- Nausea
- Bloating
- Cramping abdominal pain
- Indigestion
- Malabsorption

Entamoeba Histolytica

This parasite causes amoebiasis which is a major parasitic cause of mortality worldwide. The highest prevalence of amoebiasis is in developing countries where barriers between human faeces and food and water supplies are inadequate.

Signs and symptoms
- Fever
- Abdominal pain

- Watery or bloody diarrhoea
- Liver abscess may occur

Isosporiasis

Isosopriasis is an uncommon diarrhoeal disease caused by *Isospora belli.* Its occurrence is increased in HIV infected patients.

Signs and symptoms

- Profuse, watery, non-bloody, offensive smelling diarrhoea which may contain mucus
- Cramping abdominal pain
- Vomiting
- Malaise, anorexia, weight loss
- Low grade fever
- Steatorrhea in protracted cases

Toxoplasmosis

Toxoplasmosis is caused by a protozoan called Toxoplasma *gondii*. It can affect the central nervous system, respiratory system and the eye.

Signs and symptoms

- Severe headache
- Fever
- Confusion
- Focal neurological deficits
- Altered consciousness
- Convulsions or abnormal behaviour

Respiratory

- Fever
- Cough
- Respiratory difficulties

Eye

- Pain in the eyes
- Photophobia and visual loss

Children

- Failure to thrive; fever

Kaposi Sarcoma

This is an indolent angio-proliferative spindle-cell tumour derived from endothelial and immune cells infected with Human Herpes Virus type 8 (HHV-8). It can form masses in the skin, lymph nodes, or other organs.

Signs and symptoms

- Cutaneous lesions - multiple forms
    - *Macular, papular, nodular or plaque-like appearance, purple, brown or violet in colour*

Gastrointestinal

- Nausea, vomiting, abdominal pain
- Diarrhoea
- Haematemesis, melaena
- Bowel obstruction
- Dysphagia, odynophagia

Pulmonary

- Cough
- Dyspnoea

- Pleural effusion
- Airway obstruction

Neurological Conditions in HIV

Signs and symptoms
- Aseptic meningitis
- Peripheral neuropathy
- Mononeuritis multiplex
- Lumbosacral polyradiculopathy
- Acute and chronic inflammatory demyelinating polyneuropathy
- Bells' Palsy
- Guillen-Barré Syndrome
- Headache and photophobia
- Peripheral neuropathy
- Depressed ankle reflexes
- Painful dysesthesia, moderate sensory loss
- Distal weakness and atrophy in varying degrees
- Multiple cranial and truncal nerves are affected
- Lumbosacral polyradiculopathy; rapid progressive weakness and numbness of the perianal areas leading to sphincter paralysis
- Ascending quadriparesis, usually begins in the lower limb and spreads to the upper extremities, bulbar and facial muscle, and in severe cases the respiratory muscles.

AIDS Dementia Complex

This can be caused by
- HIV
- Herpes Simplex Virus
- Cytomegalovirus (CMV)
- Toxoplasmosis
- Cryptococcus neoformans

Signs and symptoms
- Slowness in thinking
- Difficulty with concentration
- Apathy
- Delirium
- Poor balance and coordination
- Acute psychosis

HIV Wasting Syndrome (Slim's Disease)

This is the commonest clinical presentation of AIDS. It refers to unexplained weight loss of more than 10 percent of a person's body weight, with either diarrhoea or weakness and fever that have lasted at least 30 days.

Signs and symptoms
- Progressive weight loss leading to severe emaciation
- Recurrent episodes of diarrhoea
- Fever (may be intermittent or persistent)

Aphthous Ulcers (Canker Sores)

This is common condition characterized by repeated formation of benign, non-contagious mouth ulcers

Post Exposure Prophylaxis (PEP)

Immediately on exposure take the following steps;
- Use soap and water to wash any wound or skin site that came into contact with infected blood or fluid

- Flush exposed mucous membranes with water
- Irrigate open wound with sterile saline or povidone iodine solution
- Irrigate eyes with clear water, saline or sterile eye irrigants
- Report to concerned authority
- Ascertain the HIV status of the patient and the injured health worker after appropriate counselling
- Take antiretrovirals **immediately** after exposure- these should be started within one hour if possible and at the **latest 72 hours** after exposure.

Criteria for initiating PEP

- Person is not already known to be HIV positive
- The source patient is known to be HIV positive

OR

- HIV status of source patient is unknown

OR

- It is impossible to identify the source patient

Choice of ARVs for PEP in adults and children

	Recommended	Alternatives
Adults	TDF + 3TC + ATV/r** OR TDF+ 3TC + LPV/r	TDF +3TC +DTG*
Children	AZT + 3TC + LPV/r OR ABC+3TC+ LPV/r	ABC + 3TC + DTG*

*DTG is approved for use among children older than six years and weighing more than 15 kg and is widely available for children weighing at least 20kg who can take 50mg film coated adult tablets.
**ATV/r can only be used in adolescents >35kg.

Dosing of all drugs is the same as in ART. The course should be continued for **28 days**. Enhanced adherence counselling is important for patients

Note: PEP is not 100% effective, therefore, counselling of exposed persons to consistently and correctly use condom until a negative result at 6 weeks is recommended.

For more detailed information see the National Consolidated Guidelines on HIV Prevention, Diagnosis, Treatment and Care.

Helminthic infestations

Worms may invade the intestines and other parts of the body causing diseases.

Causes

- Hookworm (*Ancylostoma duodenale* and *Necator americanus* species)
- Ascaris (*Ascaris lumbricoides*)
- Strongyloides (*Strongyloides starcoralis*)
- Tape worm(*Taenia saginata*, *Taenia soliun, Diphylobothrium latum* and *Hymenolepis nana*)
- Thread worm
- Whip worm
- Onchocerciasis (*Onchocerca volvulus*)
- Pin worms (*Enterobius vermicularis*)

Signs and symptoms

- Generalized itching
- Perianal itching (threadworm)
- Dry cough (when the larvae pass through the lungs)
- Wheeze (when the larvae pass through the lungs)
- Abdominal discomfort and or pain
- Passage of worm(s) in the stool
- Altered bowel habit
- Pallor
- Features of malnutrition
- Poor physical growth in children
- Large distended abdomen in children
- Wheezing

Investigations

- Stool for microscopy
- Full blood cell count, including haemoglobin and mean corpuscular volume

Treatment objectives

- Eliminate the worms
- Treat the complications of infestation e.g. anaemia, malnutrition

Prevention

- Proper hand washing with soap and running water before preparing food or eating, and after use of toilets
- Avoid eating raw fish and meat (thoroughly cook meat and fish)
- Properly wash, peel or cook vegetables and fruit
- In case of pinworms and threadworms, the whole family must be treated.

Hookworms

Causes

- Ancylostoma doudenale and Necator americanus

Signs and symptoms

Usually asymptomatic. Features may include:

- Cough
- Pallor
- Weakness
- Weight loss

Investigations

- Stool microscopy for ova and parasites.
- Stool examination for occult blood
- Full blood count, including haemoglobin and mean corpuscular volume

Pharmacological treatment

Mebendazole oral
Adult:
100 mg every 12 hours for 3 days
First trimester pregnancy: Not recommended

Child:
1 – 17 years: 100mg every 12 hours for 3 days
Below 12 months: Not recommended

Albendazole oral
Adult:
400 mg as a single dose
Child:
Below 2 years: 200 mg as a single dose
2 – 17 years: 400 mg as a single dose

Ascariasis (Roundworm)

They usually affect the small intestine.

Causes
- Ascaris lumbricoides

Signs and symptoms
May be asymptomatic. Features may include:
- Abdominal discomfort
- Large swollen abdomen in children
- Vomiting
- Expulsion of round worm

Investigations
- Stool microscopy for occult blood, ova and parasites

Pharmacological treatment

Mebendazole oral
Adult:
500mg as a single dose
OR
100 mg every 12 hours for 3 days
First trimester pregnancy: Not recommended

Child:
1 – 17 years: 100mg every 12 hours for 3 days
OR
500mg as a single dose
Below 12 months: Not recommended

Albendazole oral
Adult:
400 mg as a single dose
First trimester pregnancy: Not recommended
Child:
1- 2 years: 200 mg as a single dose
2 – 17 years: 400 mg as a single dose
Less than 1 year: Not recommended

OR
Levamisole oral
Adult:
120mg to 150mg as a single dose
Child:
2.5-3mg/kg (maximum 150mg) as a single dose

Strongyloidiasis

Strongyloidiasis is a chronic parasitic infection of humans caused by *Strongyloides stercoralis*. Without appropriate therapy, the infection does not resolve and may persist for life. In cases of immunodeficiency, it may be severe or even life-threatening.

Causes

- *Stronglyloides stercoralis*

Signs and symptoms

Acute

- Lower extremity itch
- Cough, dyspnoea, wheezing
- Low grade fever
- Epigastric discomfort, diarrhoea, occasional nausea, and vomiting

Chronic

- Vague abdominal discomfort
- Abdominal pain – burning, cramping
- Intermittent diarrhoea
- Weight loss
- Occasional nausea and vomiting
- Recurrent rashes

Investigations

- Stool for occult blood, ova and parasites

Pharmacological treatment

Albendazole oral
Adult:
400 mg every 12hours for 3 days
Repeat after 3 weeks if necessary

Child:
2 – 17 years: 400 mg every 12 hours for 3 days
Repeat after 3 weeks if necessary

Ivermectin oral
Adult:
200 mcg/kg/day for 2 days
First trimester of pregnancy: Not recommended
Repeat at 6 to 12-month interval depending on symptoms

Child:
5 -17 years: 150 mcg/kg/day as a single dose
Under 5 years: Not recommended
Repeat at 6 to 12-month interval depending on symptoms

Onchocerciasis (River blindness)

Onchocerciasis – or "river blindness" – is a parasitic disease transmitted by repeated bites of infected blackflies.

Causes

- Filarial nematode *Onchocerca volvulus* (the vector is a blackfly which breeds along fast-flowing rivers and streams)

Signs and symptoms

- Pruritis is the most common early symptom – (can be mild to severe and intermittent to unremitting)
- Lymphadenopathy in inguinal and femoral regions
- Subcutaneous nodules over bony prominences
- Visual changes can range from mild to frank blindness
- Weight loss may occur
- Dermatitis – acute or chronic popular dermatitis
- Depigmentation in advanced cases

Investigations
- Blood should be drawn at night and viewed under the microscope for the microfilaria

Pharmacological treatment

Ivermectin oral
Adults and children 5-17 years
150 microgram/kg as a single dose

Repeat
Intervals of 6-12months depending on symptoms until adult worms die out

Eye involvement
Prednisolone oral
1 mg/kg

Note:
Start several days before treatment with **Ivermectin**

Surgical intervention
- Excise individual nodules (nodulectomy)

Threadworms (pinworms)

Threadworms, also known as pinworms, are tiny parasitic worms that infect the large intestine of humans.

Causes
- Enterobius vermicularis
- Poor Hygiene

Signs and symptoms
- Vague abdominal pain
- Perianal itching
- Iron deficiency anaemia
- Rectal prolapse
- Diarrhoea
- Weight loss
- Mild nausea

Investigations
- Identification of the adult worm from stool or vomitus
- Stool microscopy (fresh sample): recognition of the eggs of the worm using the cellophane tape applied to the anus.

Treatment objectives
- Eliminate the worm
- Ensure proper sanitation
- Treat complications of infestation e.g. anemia , malnutrition

Non-pharmacological treatment
- Educate about:
    - The disease.
    - Proper hand washing after using the toilet.
    - Better preparation of food by adequate washing and cooking.

Pharmacological treatment

First line treatment
Mebendazole, oral
Adult: 100 mg every 12 hours for 3 days
OR
500 mg as single dose immediately
Child:
> 2 years: 100 mg every 12 hours for 3 days or 500mg as a single dose

Second line treatment
Albendazole, oral
Adult:

400mg as a single dose
Child:
2 years and above: 400 mg as a single dose
One year to less than 2 years: 200mg as a single dose

Referral

- All patients with mechanical obstruction and complications related to migration of worm larvae must be referred for specialist care.

Whipworm

A whipworm, also known as trichuriasis, infects the large intestine. This worm, which resembles a whip, measures up to 5cm long and its anterior half is thinner than its posterior half.

Causes

- *Trichuris trichiura*

Signs and symptoms

- Abdominal pain
- Painful or frequent defecation
- Sudden and unexpected weight loss
- Headache
- Bloody diarrhoea
- Nausea
- Vomiting

Investigations

- Stool microscopy for whipworms or whipworm eggs

Treatment objectives

- Eliminate worms
- Treat or prevent complications
- Ensure proper hygiene

Pharmacological treatment

First line treatment
Mebendazole, oral
Adult:
100 mg every 12 hours for 3 days
OR
500 mg as single dose
Child:
1-17 years: 100 mg every 12 hours for 3 days
OR
500mg as a single dose

Second line treatment
Albendazole, oral
Adult:
400 mg as a single dose
Child:
2-years and above: 400 mg as a single dose
1year to less than 2 years: 200 mg as a single dose

Tapeworm

Tapeworm infection is caused by segmented helminths. They can be transmitted by ingesting undercooked fish, beef and pork.

Causes

- *Taenia saginata*
- *Taenia solium*
- *Hymenolepiasis nana.*
- *Diphyllobothrium latum*

Signs and symptoms

May be asymptomatic. Features may include:

- Abdominal pain
- Diarrhoea
- Expulsion of white flat rectangular segments in stool
- Weight loss despite increased appetite and food intake

Pharmacological treatment

First line treatment
Taenia solium
Adults and children
Praziquantel oral
5-10 mg/kg as a single dose

Hymenolepiasis nana
Praziquantel oral
Adult:
25mg/kg as a single dose, repeat dose in 10 days
Child:
4-17 years: 25mg/kg as a single dose

Second line treatment
Niclosamide oral
Adults and children > 6 years
2g as a single dose
Child:
2-6 years: 1g as a single dose
< 2 years: 500 mg as a single dose

Cysticercosis

Neurocysticercosis for example is caused by the cysticercal form, i.e. larval form of the pork tape worm, *Taenia solium*.

Causes

- *Taenia solium* (pork tapeworm)

Symptoms and symptoms

- Headaches (migraine like or tension type)
- Depression
- Decrease visual acuity
- Convulsions
- Learning disabilities
- Oedema
- Coma

Investigations

- CT brain scan
- MRI scan
- Soft tissue radiology of the lower limb
- Blood test

Pharmacological treatment

Albendazole oral
Adults
400mg/dose every 12 hours for 8-30 days
OR
15 mg/kg/day (maximum 400mg/dose) every 12 hours for 8-30 days
Child:
7.5mg/kg/dose every 12 hours for 8 to 30 days

PLUS
Prevention of neurological manifestations
24 hour prior to albendazole therapy administer:

Dexamethasone IM
0.15mg/kg/dose every 6 hours

FOLLOW WITH
Prednisone oral
1mg/kg/day for the duration of **albendazole** therapy

Prevention
- Prolong freezing or thorough cooking of pork to kill the parasite
- Through washing of fresh fruit and vegetables in *Taenia solium* endemic areas
- Avoid the use of human waste as fertilizer

Referral
- Patient not responding to initial treatment should be referred to a specialist for definitive management.

Schistosomiasis (Bilharziasis)

Schistosomiasis is a water borne parasitic infection caused by several species of trematode worms.

Causes
- The urinary form is caused by *Schistosoma haematobium* whilst the intestinal form is caused mainly by *Schistosoma mansoni*

Signs and symptoms
Acute
- Headache
- Dysuria
- Haematuria
- Cystitis
- Malaise
- Bloody diarrhoea
- Cough
- Right upper quadrant (RUQ) pain

Chronic
- Bloody diarrhoea
- Abdominal pain, cramping, RUQ pain
- Haematemesis (with portal hypertension)
- Ascites (with portal hypertension)
- Haematuria
- Dysuria
- Valvular or perianal lesions
- Dyspnoea on exertion (with pulmonary hypertension)
- Fatigue (with pulmonary hypertension)

Investigations
- Proper diagnosis can only be made by microscopy

Pharmacological treatment
Praziquantel, oral
Adult:
20mg/kg initially, then another dose of 20mg/kg after 4-6 hours

Child:
4-17 years: 20mg/kg 3 times daily for one day
Doses should be given 4-6 hours apart.

Cutaneous Larva Migrans (Creeping Eruption)

Is caused by infection with larvae of animal hookworm

Causes

- Ancylostoma *braziliense* and Ancylostoma *caninum*, which infect cats and dogs.

Pharmacological treatment

First line treatment

Albendazole oral
Adult:
400mg as a single dose
Child:
1 to <2 years: 200mg as a single dose)
>2 years: 400mg as a single dose

Second line treatment
Thiabendazole oral
25mg/kg twice a day for 2 days
Can be repeated after 2 weeks if necessary

AND
Thiabendazole 10% lotion
Apply topically to tracks four times a day.
Continue for 2 more days after tracks have resolved

Injuries and acute trauma

Burns

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

Causes

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

Signs and symptoms

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

Depth of Burn

1st Degree burns- Superficial epidermal injury with no blisters. Main sign is redness of the skin, tenderness, or hyper sensitivity with intact two-point discrimination. Healing in 7 days	***2nd Degree burns or Partial thickness burns*** It is a dermal injury that is sub-classified as superficial and deep 2nd degree burns. In superficial 2nd degree burns, blisters result, the pink moist wound is painful. A thin eschar is formed. Heals in 10-14 days. In deep 2nd degree burns, blisters are lacking, the wound is pale, moderately painful, a thick escar is formed. Heals in >1 month, requiring surgical debridement	***3rd Degree burns*** Full thickness skin destruction, leather-like rigid eschar. Painless on palpation or pinprick. Requires skin graft	***4th Degree burns*** Full thickness skin and fascia, muscles, or bone destruction. Lifeless body part

Complications

- Shock
- Severe skin infection
- Contractures
- Airway obstruction

Investigations

- Full blood count
- Kidney function tests - to assess loss of electrolytes
- Blood glucose test- to determine glycaemic level

Treatment Objectives

- Promote wound healing and prevent secondary micro-organism infections
- Prevent airway obstruction
- Secure body fluid circulation to prevent kidney damage
- Alleviate pain

- Prevent complications

.Non-pharmacological Treatment

Assess:

- - Airway
- - Breathing: beware of inhalation and rapid airway compromise
- - Circulation: fluid replacement
- - Disability: compartment syndrome
- - Exposure: percentage area of burn.

Essential management points:

- - Stop the burning
- - ABCDE
- - Determine the percentage area of burn (Rule of 9's)
- - Good IV access and early fluid replacement

First Aid

Burns caused by Heat

- Immediate cooling by immersion in clean water for 30 minutes, then apply simple dry and clean dressing.
- Remove clothing if not adherent to the skin and wrap in clean cloth.

Chemical Burns

- Brush off any dry chemicals and copiously irrigate the area with clean running water for about 30 minutes.
- Do not apply ice or ice slush
- Remove contaminated clothing
- Avoid contaminating skin that has not been in contact with the chemical
-

Electrical Burns

- Cool burns as above. A patient unconscious from electrical burns will need urgent cardiac assessment and resuscitation

General Measures

- Ensure room is warm since exposed burn patients lose heat rapidly.
- Monitor pulse, temperature regularly
- Give high protein, high energy diet
- Give vitamin supplementation, high dose vitamin C

Pharmacological Treatment

Mild/moderate burns

Pain control

- Make sure that pain control is adequate, including before procedures such as changing dressings.
- Give oral or IV analgesics as required

Paracetamol oral

Adult:

500 mg to 1 g 6-8 every hours as required

Child:

6-12 years: 250-500 mg every 6-8 hours or when necessary
3-5 years: 250 mg every 6-8 hours or when necessary
Up to 3 years: 125 mg every 6-8 hours or when necessary

OR

Narcotic analgesics

Morphine sulphate IV
0.05–0.1 mg/kg IV every 4 hours if pain is severe

Note

If Total Body Surface Area (TBSA) is <10% and the patient is able to drink, give oral fluids; otherwise consider IV as stated below

Check tetanus vaccination status.

- If not immunized, give tetanus immune globulin.
- If immunized, give tetanus toxoid booster, 0.5mL IM, if this is due
- Leave small blisters alone, drain large blisters and dress if closed dressing method is being used
- Dress with **silver nitrate** (0.5% aqueous) **OR silver sulphadiazine cream** 1%, add saline moistened gauze or paraffin gauze and dry gauze on top to prevent seepage.

Note:
- *Silver sulphadiazine is contraindicated in pregnancy, breastfeeding and premature babies*
- Small superficial 2nd degree burns can be dressed directly with paraffin gauze dressing
- Change after 1-3 days, then when necessary
- Patient may be exposed in a bed cradle if there are extensive burns
- Saline baths should be done before wound dressing; avoid alcohol based solutions
- If wound is infected, dress more frequently with silver sulphadiazine cream until infection is controlled

Severe burns
- First aid and wound management as above
- Plus IV fluid replacement in a total volume per 24 hours according to the calculation below (use **crystalloids**, e.g. **Ringer's lactate**, or **normal saline**)
- If patient is in shock, give IV fluids fast until BP improves
- Manage pain as necessary
- Refer for admission
- Monitor vital signs and urine output

Treat secondary infection if present.
- If there is evidence of local infection (pus, foul odour or presence of cellulitis), treat with

Amoxicillin oral
Adult:
500 mg every 8 hours for 7-14 days
Child:
15 mg/kg orally three times a day

PLUS
Cloxacillin oral
25 mg/kg

If septicaemia is suspected give
Gentamicin IM or IV
7.5 mg/kg once a day

PLUS
Cloxacillin IM or IV
25–50 mg/kg four times a day

Note:
- If infection is suspected beneath an eschar, remove the eschar.

Blood transfusion may be necessary
- If signs/symptoms of inhalation injury, give oxygen and refer for advanced life support (refer to specialist)

Fluid replacement in Burns
- Give oral fluids (ORS or others) and/or IV fluids e.g. 0.9% saline or Ringer's lactate depending on the degree of loss of intravascular fluid
- The total volume of IV solution required in the first 24 hours of the burns is: 4 mL x weight (kg) x % TBSA burned **plus** the normal daily fluid requirement
- Give 50% of fluid replacement in the first 8 hours and 50% in the next 16 hours. The fluid input is balanced against the urine output. The normal urine output is:

Adult:
0.5 mL/kg/hour (30-50 mL/hour)
Child:
(<30 kg) 1-2 mL/kg/hour

Fluid replacement calculation
- Fluid resuscitation is required for burns covering > 10% total body surface. Use Ringer's lactate or 0.9% saline with 5% glucose; for maintenance, use Ringer's lactate with 5% glucose or half-normal (0.45%) saline with 5% glucose.
- First 24 hours: Calculate fluid requirements by adding maintenance fluid requirements to the additional emergency fluid requirements (volume equal to 4 mL/kg for every 1% of surface burnt).
- Administer half of total fluid in first 8 h, and remaining fluid in next 16 h.
- Example: 20 kg child with a 25% burn:
- Total fluid in first 24 h = (60 ml/h x 24 h) + 4 ml x 20 kg x 25% burn = 1440 ml + 2000 ml = 3440 ml (1720 ml over first 8 h)

- Second 24 h: give half to three quarters of fluid required during the first day.

Additional Care
- Nutritional support
- Physiotherapy of affected limb

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

Referral
- If a superficial burn has not healed in 7-10 days, it has either become infected or is deeper than anticipated, if in doubt consult the surgeons.

Wounds

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

Causes
- Sharp objects, e.g. knife, causing cuts, punctures
- Blunt objects causing bruises, abrasions, lacerations
- Infections, e.g. abscesses
- Bites, e.g. insect, animal, human
- Missile and blast injury, e.g. gunshot, mines, explosives, landmines
- Crush injury, e.g. road traffic accidents, building collapse

Signs and symptoms
- Pain, fever, Redness, bleeding
- Inflammation
- Lacerations
- Abrasions
- Bruises with intact skin
- Loss of function and movement

Investigations
- Full blood count
- Blood glucose

Treatment Objectives
- Prevent infection
- Prevent profuse bleeding
- Relieve pain and fever
- Promote healing

Non-pharmacological Treatment
- Stop bleeding.
- Apply manual pressure.
- Raise the bleeding site above the level of the heart..
- Remove all dirt and foreign bodies from the wound.
- Wash affected part of wound with plenty of water or saline solution (you can also clean with chlorhexidine 0.5%, povidone iodine 10% or hydrogen peroxide 6% diluted with equal amount of saline to 3% if wound is contaminated)
- Suture larger and deeper wounds using anaesthetic

Pharmacological Treatment

Minor cuts and bruises
- Apply first aid treatment
- Give **tetanus toxoid** if patient has never been immunized or if last dose was >5 years ago
- Antibiotics are not usually required but if the wound is grossly contaminated, give

Amoxicillin oral
Adult:
500 mg every 6 hours for 7days as empiric treatment
Child:
125-250 mg every 6 hours for 7days

OR In penicillin-allergic patients give

Erythromycin oral
Adult:
500 mg every 6-8 hr (maximum 4 g/day) for 7 days
Child:
60-100 mg/kg/day every 6-8 hrs (maximum 4g/day) for 7 days

Relieve pain with
Paracetamol oral
Adult:
1 g 3-4 times a day when required
Child:
125-500 mg every 6 hours when required

Deep and/or extensive wounds
Follow first aid treatment and procedures for minor wound care above
- Carry out debridement to freshen the wound

If wound is clean and fresh (<8 hours)
- Follow first aid treatment above and procedures for minor wound
- Carry out primary closure by suturing under local anaesthetic
- Use 2% lignocaine hydrochloride (dilute to 1% with equal volume of water for injection)

If wound is >8 hours old or dirty
- Clean thoroughly as described above and dress daily
- Check the state of the wound for 2-3 days
-

If wound >4 days old or deep puncture wound, contaminated wounds, bite/gunshot wounds, abscess cavity
- Follow first aid treatment above and procedures for wound above
- Let it heal by secondary closure (granulation tissue)
- Dress daily if contaminated/dirty, every other day if clean
- Pack cavities (e.g. abscesses) with saline-soaked gauze

Note:
- Use antibiotic prophylaxis only in very contaminated wounds
- Use antibiotic treatment in infected wounds (wounds with local signs of infections e.g. cellulitis, lymphangitis; streaking, purulence, malodour) – with or without systemic signs (fever, chills etc.)

For wound with odour:
Cloxacillin oral
25–50 mg/kg orally four times a day for 5-7days

Note:
- To treat possible S. *aureus* infection (for most wounds)

OR
Ampicillin oral
25–50 mg/kg orally four times a day for 5-7 days

PLUS
Gentamicin IM or IV
7.5 mg/kg IM or IV once a day

PLUS
Metronidazole oral
7.5 mg/kg three times a day for 5-7 days
Note:
- Use regimen if bowel flora are suspected.

Referral
- Refer all complicated wounds for specialist care

Snake Bites

The effect of snakebites may be, neurotoxic, haemotoxic and /or cytotoxic. The overall effect is determined by the predominant toxin in the snake venom

Clinically relevant venomous snakes in Sierra Leone and Africa as a whole include:
- **Elapidae:-** e.g Cobra, Olive whip, Mambas (contain neurotoxic venom)
- **Viperidae:-** e.g Vipers, Adders (contain haemotoxic venom)
- **Colubridae**:- eg Tree snake or Boomslang (contain myotoxic venom)

Signs and symptoms
- Puncture wounds, pain, swelling, discoloration, bleeding

If neurotoxic venom (e.g. green and black mamba)
- Weakness and paralysis of skeletal and respiratory muscles (drooping eyelids, difficulty in swallowing, double vision, slurred speech, difficulty in breathing) – starting 15-30 minutes after the bite
- Excessive sweating and salivation

If haemotoxic venom
- Extensive local damage with swelling, pain, regional lymphadenopathy – starting 10-30 minutes after the bite
- Bleeding oozing from the site, bloody blisters
- Haematuria, haematemesis – even after some days

If myotoxic venom
- Damage to striated muscles (may be associated with myoglobinuria)

Complications
- Cellulitis
- Hypotension
- Acute renal failure
- Convulsions
- Myocardial infarction- due to vasospasm or coronary artery thrombosis
- Pulmonary edoema

Evaluation
Measure limb circumference above and below the bite, mark border of oedema /erythema and reassess every 30 minutes.
- Check compartment pressures if compartment syndrome suspected.
- Full blood count
- Kidney function tests
- Clotting time tests

Treatment objectives
- Neutralize envenomation
- Limit systemic effects
- Ensure local wound care
- Prevent complications

Non-pharmacological treatment
- Reassure patient
- Assess skin for fang penetration
- Immobilize limb with a splint
- Apply firm (not tight) crepe bandage to entire limb to ensure constant pressure (do not occlude blood vessels)

Pharmacological treatment

Patients not immunized against tetanus within the past 5 years give

Tetanus toxoid IM
0.5ml

Tetanus immunoglobulin, IM
<5 years: 75 units
5-10 years: 125 units
>10years: 250 units

To relieve pain

Paracetamol oral
Adult:
1 g 3-4 times a day or when necessary every 6-8 hours
Child:
125-500 mg 3-4 times a day or when necessary every 6-8 hours

For cobras, mambas, rinkhals, puff adders, gaboon vipers and boom slang bites

Antivenom
If there are systemic or severe local signs (swelling of more than half the limb or severe necrosis, bleeding), give antivenom, if available
Monovalent antivenom if the species of snake is known.
Polyvalent antivenom (PASV) if the species is not known.
Follow the directions given on preparation of the antivenom.
The dose for children is the same as that for adults.

Note:
Give a test dose of 0.5 mL (intradermal)

Procedure:
- 2 vials(20mL) of **PASV** into 100 mL of 5% dextrose in 0.9% saline for one hour
- Re-assess patient's haematological and neurological parameters.
- If no improvement, continue one vial (10 mL) of **PASV** into 100 mL of 5% **dextrose in saline** every hour until parameters normalize
- Then a further one vial of PASV in 500 mL of 5% **dextrose in saline** for next 24 hours
- Monitor closely for **anaphylaxis** or other serious adverse reactions
- If itching or an urticarial rash, restlessness, fever, cough or difficult breathing develop, stop antivenom and give **adrenaline** at 0.5 mL of 1:1000 IM
- Possible additional treatment includes bronchodilators, antihistamines (**chlorphenamine** at 0.25 mg/kg) and **hydrocorticone** 100 mg IV.
- When the patient is stable, re-start antivenom infusion slowly

If local necrosis develops
- Remove blisters, clean and dress daily, debride after lesions stabilize (minimum 15 days)

Venom in eyes

Clinical presentation
- Periocular swelling
- Mild conjunctival inflammation
- Corneal inflammation
- Frank corneal ulceration
- Perforation with eventual blindness

Management
- Irrigate eyes with plenty of water or 0.9% sodium chloride
- Cover with eye pads
- Immediately refer to ophthalmologist

Criteria for referral for administration of antivenom
- Signs of systemic poisoning (paralysis, respiratory difficulty, bleeding)
- Spreading 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
    - Significant swelling of head or neck

Antibiotics
- Indicated only if wound is infected

Referral
- Snakebite with neurotoxic or haemotoxic manifestations may need intensive care.

Insect bites and Stings

Majority of serious sting-related reactions belong to the order hymenoptera. These include bees, wasps, spiders, scorpions, ants, hornets and centipedes.

Signs and symptoms
- Swelling,
- Discolouration,
- Burning sensation,
- Pain at the site of the sting
- There may be signs of anaphylactic shock

Differential diagnosis
- Allergic reaction

Treatment objectives
- Relieve pain
- Prevent anaphylactic shock
- Reduce morbidity
- Prevent complications
- Neutralize the toxin

Non-pharmacological treatment
- Apply cold water/ice
- Clean the area with soap and water to remove contaminated particles left behind by some insects
- If the sting remains implanted in the skin, carefully remove with a needle or knife blade
- Assess airway and ensure patency in case of scorpion bite

Pharmacological treatment

To relieve pain
Paracetamol oral
Adult:
500 mg to 1g every 6-8 hours as required
Child:
6-12 years: 250-500 mg every 6-8 hours or when necessary
3-5 years: 250 mg every 6-8 hours or when necessary
up to 3 years: 125mg every 6-8hours or when necessary

OR
Ibuprofen oral
Adult: 400–800 mg every 8 hours for 3 days
Child: 10 mg/kg every 8 hours; maximum 400 mg per day for three days

If severe local reaction give:
Chlorphenamine oral
4 mg every 6 hours (max: 24 mg daily) until swelling subsides
Child:
1-2 years: 1 mg every 12 hours
2-5 years: 1 mg every 6 hours (max: 6 mg daily)
6-12 years: 2 mg every 6 hours (max: 12 mg daily)

OR
Promethazine tablet orally
Adult:
25 mg at bedtime or 12.5 mg before meals and at bedtime (dosage range, 6.25-12.5 mg every 8 hr)
Child:
<2 years contraindicated
2-5 years, 5 mg every 8 hrs
6-12 years, 12.5 mg every 8 hr

Apply **calamine** lotion when necessary every 6 hours

To prevent anaphylactic shock give:
Adrenaline IV
Adult and child 30 kg (66 lbs) or more
1:10,000, 0.1mg (0.1mg/mL) IV at rate of 1-4 mcg/min over 5 min

Note:
- **Do not administer IV unless the patient fails to respond to several doses of IM**
- Should only be done in cardiopulmonary arrest or if patient is profoundly hypotensive

Adrenaline IM
Child:
<6 years: 150 micrograms (0.15 mL)
6-12 years: 300 micrograms (0.3 mL)
1 in 1000 (1 mg/mL) 0.5 mg (0.5 mL) IM immediately, into anterolateral thigh
Repeat every 5-15 minutes according to BP, pulse rate, and respiratory function until better

If very painful scorpion sting
Apply 2 mL of 2% **lignocaine** around the area of the bite

Tetanus prophylaxis
Tetanus toxoid (0.5 mL) immunization if not previously immunized within the last 10 years

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

Referral
- If there are signs of systemic envenomation immediately refer for specialist care

Human and Animal Bites

- Human and animal bites usually lead to infections if not properly managed.

Signs and symptoms
- Teeth marks or scratches, lacerations
- Puncture wounds (especially following bites from cats, dogs and monkeys)

Complications
- Bleeding, lesions of deep structures, wound infection (by mixed flora, anaerobes), tissue necrosis, transmission of diseases (tetanus, rabies, others)

Treatment objectives
- Prevent and treat infection
- Minimize soft tissue damage

Non-pharmacological treatment
- Immediately clean the wound thoroughly with plenty of clean water and soap to remove any dirt or foreign bodies; allow to dry
- Stop excessive bleeding where necessary by applying pressure
- Application of ice pack may aid in pain relief and decrease swelling
- Soak puncture wounds in antiseptic for 15 minutes
- Thorough cleaning, exploration and debridement (under local anesthesia if possible)

Pharmacological treatment

Wash wounds with:
Chlorhexidine 0.05% topical solution

OR
Povidone iodine 10%

For pain relief give analgesic
Paracetamol, oral,

If wound is infected give
Amoxicillin, oral,
Adult:
500 mg every 8 hours for 5-7 days
Child:

15 mg/kg/day in three divided doses for 5-7 days

PLUS
Metronidazole
Adult:
400 mg every 12 hours for 5 days
Child:
10-12.5 mg/kg per dose for 5 days

Tetanus prophylaxis
- Give 0.5mL of **tetanus toxoid** for active immunization if not previously immunized within the last 10 years
- Follow guidelines on the management of rabies if applicable

Referral
- Refer for specialist care

Anaphylaxis

This is a serious life threatening, generalized or systemic allergic reaction that is rapid in onset and may result in death. The reaction typically occurs without warning and requires emergency treatment.

Causes
It is commonly triggered by:
- Allergy to pollens, some medicines (e.g. penicillins, vaccines, acetylsalicylic acid), or certain foods (e.g. eggs, fish, cow's milk, nuts, some food additives)
- Reaction to insect bites, e.g. wasps and bees
- Transfusion of blood or blood products

Signs and symptoms
- **Mild:** Itching mouth, nausea, urticaria, oedema of the face, conjunctivitis, inflammed throat
- **Moderate:** Cough or wheeze, diarrhoea, sweating, wheeze, tachycardia, pallor
- **Severe:** Difficulty in breathing, collapse, vomiting, severe wheeze with poor air entry, oedema of the larynx, shock, respiratory arrest, cardiac arrest

Differential diagnoses
- Other causes of shock, e.g. haemorrhagic (due to bleeding), hypovolemic (e.g. from severe dehydration), septic, cardiogenic
- Asthma
- Foreign body in airways

Complications
- Brain damage, kidney failure
- Change in level of consciousness, arrhythmias, collapse, respiratory or cardiac arrest.
- Death

Investigations
- Diagnosis is mainly clinical
- Diagnosis of allergic disease is usually made on the basis of history, and may be backed up by skin prick testing
-

Treatment objectives
- Treat life threatening symptoms and signs
- Identify possible triggers
- Maintain adequate airway
- Maintain adequate blood pressure

Non-pharmacological treatment
- Determine and withdraw offending agent if possible.
- Ensure a clear airway: give 100% oxygen if available.
- Restore BP: lay the patient flat with feet raised; monitor BP and pulse
- Gain intravenous access
- Keep patient warm

Pharmacological treatment

For mild cases (e.g. just rash and itching)
Prednisolone oral
1 mg/kg for 5 days

Chlorphenamine oral
Adult:
4 mg every 6 hours for 5 days
Child:
1-2 years: 1 mg every 12 hours
2-5 years: 1 mg every 6 hours
5-12 years: 2 mg every 6 hours

OR
Promethazine by deep IM or very slow IV injection (or oral)
Adult:
25 to 50g
Child:
1-5 years*:* 5 mg
5-10 years*:* 6.25-12.5 mg

OR
Hydrocortisone IM
Adult:
200 mg
Child:
<***1 year:*** 25 mg
1-5 years: 50 mg
6-12 years: 100 mg

For moderate cases with stridor and obstruction or wheeze:
Give adrenaline IM into the thigh (or subcutaneous):
Adrenaline (epinephrine) IM
1 in 1000 (1 mg/mL) 0.5 mg (0.5 mL) IM immediately, into anterolateral thigh
Repeat every 5-15 minutes according to BP, pulse rate, and respiratory function until patient is better

Child
<***6 years:*** 150 micrograms (0.15 mL)
6-12 years: 300 micrograms (0.3 mL)

Note:
Do not administer IV unless the patient fails to respond to several doses of IM

Adrenaline IV infusion
Adults and children 30kg (66lbs) or more
1:10,000, 0.1mg (0.1mg/mL) IV at rate of 1-4 mcg/min over 5 minutes

Note:
- This should only be done in cardiopulmonary arrest or if patient is profoundly hypotensive

AND
Sodium chloride 0.9%or Ringers Lactate, IV infusion
Adult:
500 mL as bolus over few minutes
Child:
20 mL/kg as bolus over few minutes

Special Note: First litre should run in 15-20 minutes, then review

Severe anaphylactic shock:
Adrenaline as stated above

AND
0.9% Sodium chloride or Ringers Lactate by IV infusion
If the obstruction is severe, consider intubation or call an anaesthetist and surgeon to intubate or create a surgical airway.

AND
Hydrocortisone IV injection
Adult:
200 mg by slow IV injection, every 12 hours
Child:
6-12 years 100 mg
1-5 years 50 mg
<1year 25 mg

Treatment of severe hypersensitivity reaction and anaphylactic shock in patients who also present with asthma-like symptoms

ADD
Aminophylline, IV,
Adult:
5 mg/kg (by slow IV injection) over 20 minutes

THEN
Aminophylline in 5% dextrose by slow IV infusion
12mg/kg over 24 ***hours***

OR
Salbutamol, nebulizer,
Adult:
5 mg stat. Then 5 mg every 20-30 minutes
Child:
6-12 years: 2.5-5 mg then 2.5 - 5 mg every 20-30 minutes
1-5 years: 2.5 mg then 2.5 mg every 20-30 minutes
<1 year: 2.5 mg then 2.5 mg every 20-30 minutes

Special note:
- Ventilation and/or tracheostomy should be established after 20 minutes of treatment in case of acidosis. Good quality CPR is very necessary for cardiorespiratory arrest due to anaphylaxis
- Always ask about allergies before giving patients any new medicine
- Keep emergency drugs at hand at health facilities and in situations where risk of anaphylaxis is high, e.g. visiting bee hives or places that usually harbour snakes

Prevention
- Counsel allergic patients to wear alert bracelets or tags

Referral
- Refer to a specialist Allergy service

Hypovolaemic Shock

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

Causes
- Loss of blood due to internal or external haemorrhage (e.g. post-partum haemorrhage, splenic rupture etc.)
- Acute loss of fluids, e.g. in gastroenteritis, or extensive burns

Signs and symptoms
- Tachycardia
- Small volume pulse
- Slow capillary refill
- Cold extremities
- Tachypnoea
- Hypotension
- Mental agitation
- Confusion

Differential diagnoses
- Other types of shock

Complications
- End organ failure- especially the heart ,brain and kidneys
- Death

Investigations
- Full blood count
- Urea, electrolytes, creatinine,,
- Liver function tests
- Blood grouping and cross matching
- Ultrasonography- if abdominal aortic aneurysm is suspected
- Pregnancy test- to exclude ectopic pregnancy

Treatment objectives
- Control/stop blood/fluid loss
- Restore blood/other fluid volumes
- Reduce morbidity
- Prevent complications

Non pharmacological treatment
- Control obvious bleeding with pressure packs
- Keep patient laying down with legs raised
- Monitor blood pressure and other vital signs

Pharmacological treatment

Adult
- If internal or external hemorrhage, consider blood transfusion
- Give IV fluids bolus 0.9% saline or Ringer's lactate 500 mL over 60 minutes, according to response and until blood is available (if due to blood loss)
- Consider Tranexamic acid if within 3 hours of no response: 1g IV over 10 minutes, then 1g over 8 hours)

If rapid improvement and stable (blood loss <20% and not progressing)
- Slow IV fluids to maintenance levels
- Regular reassessment e.g. repeat BP every 15 minutes
- If systolic BP is <90 give further bolus of IV fluids

Caution
- Do not use glucose solutions or plain water as replacement fluids

Child:
Signs of hypovolaemia give:
0.9% saline or **Ringer's lactate**, or **5% dextrose in 0.9% saline** IV infusion
20-30 mL/kg over 60 minutes

If no response:
- Give further IV fluids and blood transfusion (where there is blood loss)
- Initially transfuse 20 mL/kg of whole blood or10 mL/kg of packed cells (only in severe anaemia)

Referral
- All patients with hypovolaemia must be immediately referred for specialist care

Poisoning

This refers to exposure to, or administration of products or toxic substances, in amounts that cause dysfunction of body systems. Acute poisoning can occur by ingestion, inhalation, injection or cutaneous/mucosal absorption. Exposure can be intentional (e.g., suicide or homicide attempt), unintentional (e.g., medication error) or environmental/occupational

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

Signs and symptoms

Wide and varied; dependent on the type of poison—

- Sudden onset of illness, usually diarrhoea and vomiting
- Increased or slowed pulse rate
- Dilatation or constriction of pupils
- Increased or lowered respiratory rate
- Change in muscle tone, skin colour, and body temperature
- Seizures, shock, drowsiness, unconsciousness or coma.

Investigations
- Diagnosis is based on history from patients' relatives, friends or those around if patient is unconscious, unwilling or unable to provide information; or if if patient is a child
- Obtain full details of the suspected agent, the amount ingested and the time of ingestion.
- Check for signs of burns in or around the mouth, or of stridor (upper airway or laryngeal damage), which suggest ingestion of corrosives.

Treatment objectives
- Maintain airway, breathing and circulation
- Reduce absorption and enhance elimination
- Antagonize or neutralize the effects
- Relieve symptoms
- Prevent organ damage or impairment

Non-pharmacological treatment
- Ensure safety of the patient and minimize/stop exposure e.g. wash off/clean skin with water and soap
- Monitor and stabilize all vitals (blood pressure, heart rate, respiratory rate, oxygen saturation and temperature)
- Position patient semiprone to minimize risk of inhalation of vomit, or place the patient in the left lateral head-down position
- Maintain airway
- Give oxygen if Sp02 is <95%
- Gain IV access

Principles of management of poisoning for ingested poisons
- Supportive care
- Psychosocial intervention

Referral
- All patients who present in the hospital with ingestion, inhalation or absorption of poisons should be given immediate attention by a specialist.

Ingested Poisons

Ingested toxins are suspected in any patient with signs and symptoms irrespective of reported dose ingested.

Signs and symptoms
- General clinical features: nausea, vomiting, drowsiness, blurred vision, and dizziness
- Central nervous system toxicity: altered level of consciousness, convulsions, acute confusion and coma
- Renal toxicity: acute kidney injury/ kidney failure and papillary necrosis
- Metabolic derangement: metabolic acidosis, respiratory acidosis, hypoglycaemia.
- Allergic reactions: urticaria, angioedema, anaphylaxis
- Haematological toxicity: aplastic anaemia, agranulocytosis

Non-pharmacological treatment
- Gastric decontamination within one hour of ingestion.
- Gastric lavage: gastric lavage should not be employed routinely in the management of a poisoned patient. Done if the ingestion was within one hour and is life threatening, and there has been no ingestion of corrosives or petroleum derivatives.

Procedures
- Place the patient in the left lateral/head down position
- Insert a large nasogastric tube. Ensure the tube is in the stomach
- Perform lavage with 10 mL/kg body weight of warm 0.9% sodium chloride. The volume of lavage fluid returned should approximate to the amount of fluid given.

Note
- Make sure a suction apparatus is available in case the patient vomits

- Lavage should be continued until the recovered lavage solution is clear of particulate matter.
- Tracheal intubation may be required to reduce risk of aspiration.
-
- **General care:** keep the patient under observation for 4–24 hours depending on the poison swallowed.

Note
- Treatment is most effective if given as quickly as possible after the poisoning event, ideally within 1 hour.
- If the patient has swallowed petroleum derivatives or corrosives, do not induce vomiting in the patient but give water orally
- ***Never use salt as an emetic as this can be fatal.***

Pharmacological treatment

Gastric lavage
- If ingestion was less than 1 h previously and is life-threatening and if the patient did not ingest corrosives (for example with bleach, toilet cleaner or battery acid) or petroleum derivatives. Make sure a suction apparatus is available in case the patient vomits.

Method:
- Insert NG tube (size 32-40 FG)
- Position patient left lateral position, head and chin tilted up.
- Aspirate fluid from stomach
- Instil 200-500 mL of water or saline
- Perform lavage with 10 mL/kg of 0.9% saline
- Aspirate the fluids
- Repeat lavage until aspirate clear

Contraindications to Gastric Lavage:
- An unprotected airway in an unconscious patient
- Ingestion of corrosives or petroleum products e.g. kerosene
- Bowel obstruction
- Bowel perforation
- GI bleeding

Consider administration of activated charcoal

Activated charcoal

Single dose (if available) within one hour of ingestion of poison
Do not induce vomiting.
Give by mouth or nasogastric tube according to the dosages below:

Method:
- Insert NG tube (size 32-40FG)
- Administer 50 mg of activated charcoal as a slurry in 200 mL water

Adult and adolescent:
25–100 g
Child:
≤ 1 year of age: 1 g/kg
1–12 years of age: 25–50 g

Content mixing/administration:
- Mix the charcoal in 8–10 times the amount of water, e.g. 5 g in 40 mL of water.
- If possible, give the whole amount at once; if the patient has difficulty in tolerating it, the charcoal dose can be divided.
- If patient is unable to swallow the charcoal/water mixture (slurry), give by gastric lavage tube
- If charcoal is not available, then induce vomiting (only if the patient is conscious) by rubbing the back of the patient's throat with a spatula or spoon handle

Avoid giving activated charcoal in the following situations: ingestion of strong acids, alkalis, corrosives, heavy metals (e.g. iron salts), cyanide, lithium, organophosphates, petroleum products, methanol and ethylene glycol.

Risks: vomiting, constipation, diarrhoea

Contraindications: decreased level of consciousness (using Glasgow Coma Score) or unprotected airway

Consider administration of multiple doses of activated charcoals in cases of ingestion of life-threatening amounts of **carbamazepine, phenobarbitone, quinine, theophylline, digoxin, phenytoin, phenobarbital and paraquat, acetylsalicylic acid**:

First dose as above; followed by 50 g every 4 hours until clinical condition improves.
Treat any vomiting as this may reduce the effectiveness of the charcoal

In case of intolerance
- Reduce dose and increase frequency, e.g., 25 g every 2 hours, or 12.5 g every hour

Contraindications
Ileus, small bowel obstruction

Ongoing management
- Manage according to specific ingested substance
- If there are seizures, treat as per seizure treatment (**benzodiazepines** are first line)

Referral
- Consider transferring patient to next referral level hospital, where this can be done safely, if the patient is:
    - Unconscious or consciousness level is deteriorating
    - Has burns to mouth and throat
    - In severe respiratory distress
    - Cyanosed
    - In heart failure

Treatment of Poisons in Contact with Skin, Eyes or inhaled

Management of Skin contamination
- Remove all clothing and personal effects and thoroughly flush all exposed areas with copious amounts of water
- Use soap and water for oily substances
- Attending staff should take care to protect themselves from secondary contamination by wearing gloves and aprons
- Removed clothing and personal effects should be stored safely in a see-through plastic bag that can be sealed, for later cleansing or disposal.

Management of Eye contamination
- Rinse the eye for 10–15 minutes with clean running water or saline, taking care that the run-off does not enter the other eye.
- The use of tetracycline hydrochloride eye drops will assist irrigation. Evert the eyelids and ensure that all surfaces are rinsed.
- In the case of an acid or alkali irrigate for 20 minutes.
- Where possible, the eye should be thoroughly examined under fluorescein staining for signs of corneal damage.

Referral
- Refer when further eye evaluation cannot be performed.
- Refer if there is significant conjunctival or corneal damage
    - Refer to an ophthalmologist for further care

Management of Inhaled Poisoning
- Remove patient from the source of exposure.
- Administer supplemental oxygen if required.
- Inhalation of irritant gases may cause swelling and upper airway obstruction, bronchospasm and delayed pneumonitis. Intubation, bronchodilators and ventilator support may be required.

Carbamates and Organophosphates

These are ingredients of some pesticides and insecticides intended for agricultural and household use. Examples if organophosphorus compounds: malathion, parathion
Examples of carbamates: methiocarb, carbaryl
These poisonings occurs by ingestion, inhalation or absorption through the skin.

Causes
- May be accidental e.g. contamination of food
- Intended poisoning i.e. suicidal or homicidal
- Occupational hazard e.g. in agricultural workers

Signs and symptoms
- Salivation
- Lacrimation

- Urination and
- Defecation

Muscarinic effects
- Hyper-secretion (sweating, salivation, bronchial secretions)
- Miosis
- Bradycardia
- Hypotension
- Bronchoconstriction
- Vomiting, diarrhoea and urinary incontinence.

Nicotic effects (4 hours later)
- Muscular weakness
- Fasciculations
- Weakness of respiratory muscles.

CNS effects
- Restlessness
- Anxiety
- Headache
- Convulsions
- Difficulty with breathing
- Coma

Differential diagnoses
- Other causes of poisoning
- Other causes of convulsions

Investigations
- Clinical assessment
- Toxicological analysis

Treatment objectives
- Relieve symptoms and signs of poisoning
- Prevent complications

Non-pharmacological treatment
- Remove poison by irrigating eye or washing skin (if in eye or on skin).
- Give activated charcoal if ingested and within 4 hours of the ingestion.
- In a serious ingestion where activated charcoal cannot be given, consider careful aspiration of stomach contents by NG tube (the airway should be protected).
- Auscultate the chest for signs of respiratory secretions and monitor respiratory rate, heart rate and coma score (if appropriate)
- Give oxygen if oxygen saturation is less than 90%

Do not induce vomiting because most pesticides are in petrol-based solvents.

Pharmacological treatment

If there are signs of excess parasympathetic activation (see above) give:
Atropine IV/IM
Boluses of 5 mg IV/IM (according to the severity of the poisoning)
Repeat every 10 minutes until satisfactory atropinisation
- No chest signs of secretions
- Heart rate is >80 beats/min
- Systolic BP >80 mmHg
- Pupils no longer pinpoint
- Axillae are dry

Child:
Start at 0.05mg/kg, then double the dose every 5-10 minutes.
Stop doubling the dose when clinical parameters have improved.

Where there is dehydration, hypovolaemia, and shock give IV fluids
0.9% saline as necessary (for example)

Bronchospasm
Salbutamol nebulisation
Adult: 5 mg
Child:

<5 years: 2.5 mg

Prevent and treat convulsions
Diazepam IV
Adult:
10 mg
Child:
0.2 mg/kg IV
OR
0.5 mg/kg rectal

Moderate to severe poisoning not responding to adequate doses of atropine
Pralidoxime IV (a cholinesterase reactivator)
5 mg/kg IV if poisoning occurred <24 hours before.
It may be given 5minutes after the first dose of **atropine**, if available.

If muscle weakness occurs give:
Pralidoxime IV
Adult:
25-50 mg/kg diluted with 15 mL water for injection by IV infusion over 20 minutes, repeated once or twice; or followed by IV infusion10–20 mg/kg/hour, as necessary; maximum 12 g per day
Child:
Initially 25-50 mg/kg by IV infusion over 20 minutes, followed by 8 mg/kg/hour; maximum 12 g per day.

Note
- Pralidoxime is only effective if given within 24 hours of poisoning

Prevention
- Label agricultural and domestic pesticides properly – do not use unlabelled bottles for pesticides
- Store products such as these away from children's reach
- Wear protective clothing when using these products

Carbon Monoxide

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

Cause
- Carbon monoxide, a colourless and odourless nonirritating gas

Signs and symptoms
- Headache
- Nausea, vomiting
- Dizziness, confusion
- Weakness, hypotension, collapse
- Seizures, coma, death

Investigations
- Blood gases
- Serum electrolytes
-

Non-pharmacological treatment
- Move person to fresh air
- Clear the airway
- Give 100% oxygen as soon as possible to accelerate removal of carbon monoxide until signs of hypoxia disappear

Note: patient can look pink but still be hypoxemic

Pharmacological treatment

IV fluids for hypotension
Injection **diazepam** for seizures

Referral
- Immediately refer to specialist

Poisoning from Corrosive Compounds

Examples: sodium hydroxide (soaps-drain/oven cleaners), potassium hydroxide, acids, bleaches or disinfectants.

Non-pharmacological treatment
- Give small volume of water as soon as possible-beneficial within 30 minutes
- Give oxygen therapy if respiratory distress.

Surgical review
Arrange for surgical review to check for:
- Oesophageal damage/rupture, if severe.
- Perforation, mediastinitis and peritonitis if suspected

Note
- Do not induce vomiting or use activated charcoal
- Give milk or water as soon as possible to dilute the corrosive agent.

Referral
- Immediately refer patient for specialistcare

Poisoning with Petroleum Compounds

- These include kerosene, turpentine and turpentine substitutes and petrol, paraffin, petrol, paint thinners, organic solvents.

Signs and symptoms
- Patient may smell of paraffin/other petroleum product
- Burning sensation in mouth and throat
- Gastrointestinal system: abdominal pain, bloody stool, vomiting
- Respiratory system: throat swelling, pneumonitis and/or pulmonary oedema; cough, tachypnoea, cyanosis, crepitation and rhonchi
- Central nervous system: headache, dizziness, euphoria, restlessness, ataxia, convulsion, encephalopathy and coma

Differential diagnoses
- Other causes of poisoning
- Acute infections

Non-pharmacological treatment
- Remove the patient from source
- Remove contaminated clothing and thoroughly wash the skin with soap and water
- Give supplemental oxygen as needed

Note
- Do not induce vomiting or give activated charcoal, as inhalation can cause respiratory distress with hypoxaemia due to pulmonary oedema and lipoid pneumonia. Ingestion can cause encephalopathy

Prevention
- Store paraffin and other petroleum products safely e.g. in a locked cupboard, out of reach of children
- Do not store paraffin and other petroleum products in common beverage bottles

Referral
- Immediately refer patient for specialist care

Paracetamol Poisoning

Paracetamol (N-acetyl-p-aminophenol) is a common antipyretic and analgesic, that is used worldwide. It is the commonest drug-induced poisoning.

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

Signs and symptoms
Phase 1: 0.5–24 hours after ingestion:

- Asymptomatic to nonspecific symptoms and signs e.g. anorexia, nausea, vomiting and malaise. pallor, diaphoresis

Phase 2: 18–72 hours after ingestion:
- Right upper quadrant abdominal pain, anorexia, nausea and vomiting
- Tender right upper quadrant, tachycardia, hypotension and oliguria.

Phase 3: 72–96 hours after ingestion:
- All of the above features, and jaundice, coagulopathy, hypoglycemia and hepatic encephalopathy, Acute Renal failure.

Phase 4: 4th day to 3weeks after ingestion:
- Patients who survive critical illness in phase 3, have complete recovery.

Investigations
- Liver Function Tests: ALT, AST, ALP, PT with INR (International Normalization Ratio)
- Blood glucose
- Renal Function Test: Electrolytes, BUN, creatinine
- Arterial Blood Gases (ABG)

In females, rule out pregnancy (paracetamol crosses the placental barrier)

Non-pharmacological treatment
- Resuscitation
- Usually there is no immediate threat to the airway, breathing and circulation with paracetamol poisoning
- Correct hypoglycaemia (give glucose, or sugar, or honey)

Pharmacological treatment

Activated charcoal
- If ingestion of 150 mg/kg within 1 hour of presentation, administer 50 grams of activated charcoal
- If more than 8 hours after ingestion, or the patient cannot take oral treatment, give:

Acetylcysteine
150 mg/kg IV (maximum 16.5 g) in 200 mL of 5% dextrose over 1hour,
THEN
50 mg/kg (maximum 5.5 g) in 500 mL of 5% dextrose over 4 hours,
THEN
100 mg/kg (maximum 11 g) in 1 litre of 5% dextrose over 16 hours.

Note:
- In severe poisoning a further 100 mg/kg may be given over the next 24 hours

Child: <20 kg
150 mg/kg in 3ml/kg of 5% glucose as loading dose over 15 minutes
Followed by 50 mg/kg in 7 ml/kg of 5% glucose over 4 hours,
Then 100 mg/kg IV in 14 ml/kg of 5% glucose over 16 hours

Note:
- 5% dextrose is the preferred solution to use with n-acetylcysteine, however **0.9% saline** can be used as an alternative.
- ***Caution is needed as N-acetyl-cysteine can cause anaphylaxis***

For conscious patients who are not vomiting, or when there is severe reaction to N-acetylcysteine give:
Oral Methionine within 8 hours of poisoning:
<6 years: 1 gram every 4 hours for 4 doses
≥6 years: 2.5 grams every 4 hours for 4 doses

Note:
- If patient presents more than 8 h after ingestion, or the patient cannot take oral treatment, give IV acetylcysteine
- ***Acetylcysteine may cause histamine release, mimicking an allergic reaction. If patient is stable, slow the infusion.***
- ***If bronchospasm occurs, stop the infusion***

Prevention
- All medicines should be safely stored, out of reach of children and other vulnerable persons

- Label all medicines appropriately

Referral
- Immediately refer for specialist care

Acetyl Salicylic Acid (ASA; Aspirin) and other Salicylates Poisoning

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

Signs and symptoms
- ***Mild to moderate toxicity (after 1-2 hours)***:
  Hyperventilation, tinnitus, deafness, nausea, vomiting, dizziness, vasodilation, diarrhoea, lethargy, sweating, warm extremities
- ***Severe toxicity:***
  Hyperpyrexia, convulsions, altered mental status, non-cardiogenic pulmonary oedema.

  Note:
  Confusion, disorientation, coma and convulsions are more common in children

Complications
- Heart failure
- Acute kidney injury
- Worsening metabolic acidosis
- Coma (cerebral oedema),

Investigations
- Arterial blood gases, pH and bicarbonates
- Serum urea, electrolytes and creatinine levels
- Pregnancy test in females

Non-pharmacological treatment
- Maintain airway
- Give oxygen
- Measure vital signs and blood glucose
- Gastric lavage: worthwhile up to 1 hour after poisoning as stomach emptying is delayed
  - Perform gastric lavage if presentation is within 1 hour of ingestion of more than 500 mg/kg and patient is alert
- Induce vomiting, as above.
- Monitor blood glucose every 6 hours and correct as necessary
- Monitor urine pH every hour.

Pharmacological treatment

Sodium bicarbonate IV
1 mMol/kg over 4 hours to correct acidosis and to raise the pH of the urine to above 7.5 so that salicylate excretion is increased.

Note:
- Correct plasma potassium concentration before giving sodium bicarbonate as hypokalaemia may complicate alkalinisation of urine

Replace fluid and electrolyte losses
Sodium chloride 0.9% for maintenance requirements
Potassium
2–5 mMol/kg per day in three or four divided doses

Hemodialysis is required if the ASA concentration exceeds 700 mg/liter, or in presence of severe metabolic acidosis.

Referral
- Immediately refer patient for specialist care

Warfarin Poisoning

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

Signs and symptoms

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

Non-pharmacological treatment

- Empty the stomach
- Give activated charcoal 50 g if presenting early
  Child: 25 g (50 g if severe)

Pharmacological treatment

Phytomenadione (vitamin K1) slow IV
Administer 5 mg slowly intravenously

Supportive treatment

- IV fluids
- Blood transfusion
- Fresh frozen plasma if bleeding actively

Note:

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

Prevention

- Keep all rat poison away from children
- Label all medicines appropriately

Referral

- Urgently refer specialist care.

Iron Poisoning

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

Signs and symptoms

- Nausea, vomiting, abdominal pain and diarrhoea. (The vomitus and stools are often grey or black)
- Gastrointestinal haemorrhage
- Hypotension
- Drowsiness
- Convulsions
- Metabolic acidosis (in severe poisoning)

Non-pharmacological treatment

- Gastric lavage if potentially toxic amounts of iron were taken.
- Monitor for at least 12 hours

Pharmacological treatment

Desferoxamine IM
50 mg/kg every 6 hours. Maximum dose, 6 g/day.

Note:

- Gastrointestinal features usually appear in the first 6 hours and a patient who has remained asymptomatic for this time probably does not require antidote treatment.
- The need to treat for more than 24 hours is uncommon.
- Therapeutic end-points for ceasing infusion: clinically stable patient and serum iron < 60 µmol/litre.

If very severe

Desferoxamine slow IV infusion
Initially 15 mg/kg per hour then reduced after 4–6 hours so that the total dose does not exceed 80 mg/kg in 24 hours. Maximum dose, 6 g/day.

Referral

- Immediately refer patient for specialist care

Opioid Poisoning

Opiate intoxication can occur any time from birth (delivery/maternal opioid usage) to terminal care. Drugs that may be involved include: codeine, diamorphine, hydrocodone, fentanyl, heroin, loperamide, methadone, morphine, opium, tramadol (etc.) - alone, or in combination.

Signs and symptoms

***Acute toxicity**:*

- Drowsiness, nausea and vomiting
- Respiratory depression,
- Tachycardia, hypotension and pin point pupils,
- Slow response time, decreased mental status until coma.

***Chronic toxicity**:*

- Constipation, loss of appetite ± nausea and vomiting

Non-pharmacological treatment

- Maintain patent airway
- Intubate the patients who cannot protect their airway
- Give supplemental oxygen

Pharmacological treatment

Antidote: **Naloxone**

Adult and child >20 kg:

Initial dose 0.5mg titrated upward until respiratory rate is ≥12

Child <20 kg:

0.01 mg/kg IV (maximum 0.2 mg/dose), increase till hypoventilation resolves

Patients with apnoea

New-born with apnoea secondary to maternal opioid:

0.01 mg/kg IV/IM (maximum 0.4 mg/kg/dose)

Child <20 kg:

0.1 mg/kg (maximum 2 mg/dose),repeat doses with continuous infusion as required.

Adult and child >20 kg:

Higher dose of Naloxone (0.2-1 mg and titrate to clinical response)

For life threatening opioid toxicity

Children < 20 kg:

0.1mg/kg/IV (maximum 2 mg/dose)

Repeat dose/continuous infusion as required.

Adult and child >20 kg:

2mg IV

- The dose should be repeated every 3 minutes until improvement of respiratory distress syndrome
- If maximal cumulative dose of 10mg is reached and the respiratory insufficiency has not improvement, consider other pathology

Note

- Withdrawal reaction might be life threatening in the neonatal period, hence low doses should be given

Referral

- Seek specialist attention as soon as possible

Barbiturate Poisoning

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

Signs and symptoms

- Confusion, irritability, combativeness
- Drowsiness, lethargy
- Hypotension, bradycardia or tachycardia
- Shock
- Respiratory depression
- Coma

Non -pharmacological treatment

- Oxygen therapy

Pharmacological treatment
- IV fluids for hypotension
- Alkalinisation of urine to increase renal excretion
- Sodium bicarbonate 1 mEq/kg bolus followed by infusion (specialist only)
- Activated charcoal may be useful, but only if given within 1 hour from ingestion, and if the patient is not drowsy (risk of inhalation)

Referral
- Immediately refer patient for specialist attention

Lead Poisoning

Lead is a heavy metal, ubiquitous in our environment that has no physiologic role in biological systems. Lead toxicity is a particularly insidious hazard with the potential of causing irreversible health effects associated with chronic toxicity.

Signs and symptoms:
- Varies widely, depending upon the age at exposure, the amount of exposure, and the duration of exposure

Obstetric:
- Preterm, low birth weight, IUGR,

Child:
- Developmental delay
- Learning difficulties
- Irritability
- Loss of appetite
- Weight loss
- Sluggishness and fatigue
- Abdominal pain
- Vomiting
- Constipation
- Hearing los
- Seizures
- Pica - eating things that aren't food, such as paint chips,
- Lower IQ
- Anxiety
- Depression
- ADHD-like symptoms

Adult:
- High blood pressure
- Joint and muscle pain
- Difficulties with memory or concentration
- Headache
- Abdominal pain
- Mood disorders
- Reduced sperm count and abnormal sperm morphology
- Abortions (miscarriages), stillbirth or premature birth
- Anaemia
- Fanconi's syndrome
- Wrist drop.

Investigations
- Lead blood levels >10 µg/dl
- Free erythrocyte protoporphyrin (FEP) level
- Full blood count
- Imaging studies appropriate for presenting features: chest, bones, abdomen etc.
- Renal function tests
- Liver function tests

Non-pharmacological treatment
Identify and remove the source of lead exposure
- Closely monitor cardiovascular and mental status
- Maintain adequate urine output.

Pharmacological treatment

D-penicillamine oral
30-40 mg/kg/day for 1-6 months, 2 hours before or three hours after meals

If blood lead levels are 45–70 µg/dL achieve chelation of lead:
2,3-dimercapto-succinic acid (DMSA or succimer) deep IM injection
10 mg/kg by deep IM injection, every 8 hours for 5 days, followed by 10 mg/kg every 12 hours for 14 days.

If blood lead levels are <70 µg/dL and/or there is encephalopathy:
Dimercaprol deep IM injection
3 mg/kg by deep IM injection every 4 hours for 48 hours, followed by 3 mg/kg every 12 hours for 10 days

AND
Ethylene diamine tetra-acetic acid (CaNa2 EDTA) IV
10 mg/kg intravenously every 8 hours for 5 days

Alcohol (Ethanol) Poisoning

Alcohol poisoning may be acute or chronic

Acute Alcohol Poisoning

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

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

Signs and symptoms
- Smell of alcohol in the breath
- Slurred speech, uninhibited behaviour,
- Altered cognition and perception
- Nausea and vomiting
- Excessive sweating
- Dilated pupils
- Hypoglycemia
- Hypothermia

Differential diagnosis
Other causes of coma:
- Cerebral malaria and other intracranial infections
- Diabetes mellitus
- Head injury
- Stroke (cerebrovascular accidents)
- Low blood sugar (hypoglycaemia) due to other causes
- Poisoning by other medicines e.g. narcotics
- Mental illness
-

Complications
- In later stages, stupor and coma develop

As coma deepens the following appear:
  - Thready pulse and falling blood pressure
  - Hypothermia
  - Airway obstruction
  - Death

Investigations
- Blood: alcohol content, glucose level
- Urine: for glucose and protein
- Lumbar puncture to exclude intracranial disease

Treatment objectives
- Correct hypothermia

- Correct hypovolaemia
- Restore normal functioning

Non-pharmacological treatment
- Airway protection - intubation and ventilation support
- Insert urinary catheter to monitor urine output
- Pass nasogstric tube to aspirate gastric contents

Pharmacological treatment
- Give 20-50 mL of 50% dextrose IV
- Maintain infusion of 5-10% dextrose until patient wakes up and can eat
- Give thiamine 100 mg IV in 1 L of 5% dextrose

Chronic Alcohol Poisoning

Cause
- Heavy habitual drinking combined with poor nutrition

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
- Withdrawal features:
    - Mild: 12-48 hours after the last drink: anxiety, agitation, insomnia, tremors, palpitation, sweating. If not progressing, these may resolve over 24-48 hours
    - Severe: seizures, hallucinations (from 12 to 48 hours after the last drink)

Complications
- Delirium tremens characterized by hallucinations, disorientation, tachycardia, hypertension, hyperthermia, agitation, and diaphoresis. In the absence of complications, symptoms of delirium tremens typically persist for up to seven days
- Wernicke's encephalopathy:
    - Due to thiamine deficiency.
    - Common in chronic alcohol abuse
    - Characterized by acute mental confusion, ataxia (unstable gait) and nystagmus/ophthalmoplegia (abnormal eye movements)

Treatment objectives
- Stabilize patient
- Prevent complications

Non-pharmacological treatment
- Supportive care (nutrition)
- Check and correct hypoglycaemia
- Monitor respiration

Pharmacological treatment

Dextrose 50% IV
20-50 mL
Note:
- Maintain infusion of dextrose until patient wakes up and can eat

AND
Diazepam IV
5-10 mg every 10 minutes until appropriate sedation is achieved

OR
Lorazepam IV
2 to 4 mg IV every 15 to 20 minutes.

OR
Phenobarbital slow IV
100-200 mg
Note:
- Has a risk of respiratory depression and hypotension

Thiamine 100 mg in 1 L of 5% **dextrose** IV

If delirium or hallucinations persist in spite of treatment,
CONSIDER
Haloperidol 2.5-5 mg up to 3 times a day

Wernicke's encephalopathy
Thiamine IV or IM
100 mg every 8 hours for 3-5 days

Prevention
Advise patient to:
- Stop alcohol intake
- Eat nutritious food

Food Poisoning

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

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

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

Differential diagnosis
- Cholera
- Dysentery
- Other causes of gastrointestinal infections
-

Complications
- Paralysis of skeletal, ocular, pharyngeal and respiratory muscles(botulism)
- Fluid and electrolyte derangements
- Sepsis
- Shock
- Organ (e.g. kidney) failure

Investigations
- Good history and examination is important for diagnosis
- Stool microscopy, culture & sensitivity
-

Treatment objectives
- Establish the cause and treat accordingly
- Prevent complications
-

Non -pharmacological treatment
- Reassure patient
- Provide education on prevention

Pharmacological treatment

Rehydrate as required
ORS or IV fluids (**0.9% saline**)

For pain
Paracetamol oral
Adult:
1 g every 4-6 hours
Child:

10 mg/kg per dose

If diarrhoea is severe and persisting, or bloody with associated high fever
Give an appropriate antibiotic for 5-7 days, depending on response:

Ciprofloxacin
Adult:
500 mg every 12 hours
Child:
10 mg/kg per dose

OR
Erythromycin oral
Adult:
500 mg every 6 hours
Child: 10 mg/kg per dose

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

Referral
- If no progress after initial treatment, refer for specialist care